COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 21.4.2004
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COMMISSION DECISION

of 24.03.2004

**relating to a proceeding under Article 82 of the EC Treaty
(Case COMP/C-3/37.792 Microsoft)**

(ONLY THE ENGLISH TEXT IS AUTHENTIC)

(Text with EEA relevance)

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THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Council Regulation No 17 of 6 February 1962, First Regulation implementing Articles 85 and 86 of the Treaty[1], and in particular Article 3 and Article 15(2) thereof,

Having regard to the complaint lodged by Sun Microsystems, Inc. on 10 December 1998, alleging infringements of Article 82 of the Treaty by Microsoft and requesting the Commission to put an end to those infringements,

Having regard to the Commission decision of 1 August 2000 to initiate proceedings in Case IV/C-3/37.345,

Having regard to the Commission decision of 29 August 2001 to initiate proceedings in this case, and to join the findings in Case IV/C-3/37.345 to the procedure followed under this case,

Having given the undertaking concerned the opportunity to make known their views on the objections raised by the Commission pursuant to Article 19(1) of Regulation No 17 and Commission Regulation (EC) No 2842/98 of 22 December 1998 on the hearing of parties in certain proceedings under Articles 85 and 86 of the EC Treaty[2],

Having regard to the final report of the hearing officer in this case,

After consulting the Advisory Committee on Restrictive Practices and Dominant Positions,

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[1]   OJ 13, 21.2.1962, p. 204/62. Regulation as last amended by Regulation (EC) No 1216/1999 (OJ L148, 15.6.1999, p.5).
[2]   OJ L 354, 30.12.1998, p. 18.

Whereas:

1 PARTIES TO THE PROCEEDINGS

1.1 Microsoft Corporation

(1)   Microsoft Corporation ("Microsoft"), a company based in Redmond, state of Washington, USA, manufactures, licenses and supports a wide variety of software[3] products for many computing devices.[4] Its turnover for the fiscal year July 2002 to June 2003 was USD 32,187 million[5] (EUR 30,701 million[6]) on which it earned net profits of USD 13,217 million[7] (EUR 12,607 million). Microsoft employs 55,000 people around the world. Microsoft Europe Middle East & Africa controls its activities in the European Economic Area ("EEA") from Paris La Défense. Microsoft is present in all countries within the EEA.

1.2 The complainant: Sun Microsystems, Inc.

(2)   Sun Microsystems Inc. ("Sun"), a company based in Palo Alto, California, USA, provides network computing infrastructure solutions that comprise computer systems (hardware and software), network storage systems (hardware and software), support services and professional and educational services.[8] Its turnover for the fiscal year July 2002 to June 2003 was USD 11,434 million (EUR 10,906 million[9]) on which it suffered a net loss of USD 2,378 million[10] (EUR 2,268 million). Sun employs some 36,100 people around the world. Sun is present in all countries within the EEA.

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[3]   For a definition of computer terms such as software and hardware, PC, etc. see below at recitals (21) *et seq.*

[4]   Microsoft's Annual Report for US fiscal year ending June 2002, on page 1. See http://www.microsoft.com/msft/sec/FY02/10k2002.htm, printed on 24 January 2003.

[5]   Microsoft's Form 10-K Annual Report for the US fiscal year ending June 30, 2003, page 9. See http://www.sec.gov/Archives/edgar/data/789019/000119312503045632/d10k.htm, printed on 18 November 2003.

[6]   The exchange rate used for the year July 1, 2002-June 30, 2003 is EUR 1 = USD 1.0484. This is the average of the average quarterly exchange rates for the third and fourth quarters of 2002, and the first and second quarters of 2003 (0.9838, 0.9994, 1.0731, 1.1372). Source: Eurostat.

[7]   Microsoft's Annual Report for US fiscal year ending June 2002, on page 11. See http://www.microsoft.com/msft/sec/FY02/10k2002.htm, printed on 24 January 2003.

[8]   Sun's Form 10-K Annual Report for the US fiscal year ending June 30, 2003, on page 1. See http://www.sun.com/aboutsun/investor/annual_reports/sun_10k03.pdf, printed on 24 January 2003.

[9]   The exchange rate used for the year July 1, 2002-June 30, 2003 is EUR 1 = USD 1.0484. See footnote 8.

[10]   See Sun press release outlining annual results for US fiscal year ending June 2003, http://www.sun.com/smi/Press/sunflash/2003-07/sunflash.20030722.1.html, issued on 22 July 2003, printed on 18 November 2003.

2 CHRONOLOGY OF THE PROCEDURE AND BACKGROUND

2.1 The procedure

(3)   On 10 December 1998, Sun made an application to the Commission pursuant to Article 3 of Regulation No 17 for the initiation of proceedings against Microsoft ("Sun's Complaint"). Sun alleged that Microsoft enjoyed a dominant position as a supplier of a certain type of software product called operating systems for personal computers ("PC operating systems"). Sun further contended that Microsoft infringed Article 82 of the Treaty by reserving to itself information that certain software products for network computing, called work group server operating systems, need to interoperate fully with Microsoft's PC operating systems. According to Sun, the withheld interoperability information is necessary to viably compete as a work group server operating system supplier.

(4)   The case opened pursuant to Sun's complaint was registered as Case IV/C-3/37.345. After a first investigation of the complaint, the Commission, on 1 August 2000, sent a Statement of Objections ("the first Statement of Objections") to Microsoft to give Microsoft opportunity to comment on its preliminary findings of facts and law. The Statement of Objections focussed on the interoperability issues that formed the basis of Sun's complaint. Microsoft responded to the Statement of Objections on 17 November 2000.[11]

(5)   In the interim (February 2000), the Commission had launched an investigation into Microsoft's conduct on its own initiative, under Regulation No 17, which was registered as Case COMP/C-3/37.792. The investigation carried out under that case concerned more specifically Microsoft's "Windows 2000" generation of PC and work group server operating systems and Microsoft's incorporation of a software product called "Windows Media Player" into its PC operating system products. On 30 August 2001, that investigation resulted in the sending of a second Statement of Objections ("the second Statement of Objections") to Microsoft. The second Statement of Objections concerned issues of interoperability as well as the incorporation of Windows Media Player in Windows. The Commission, by virtue of the second Statement of Objections, joined the relevant findings set out in the first Statement of Objections to the procedure followed under Case COMP/C-3/37.792.[12] On 16 November 2001, Microsoft responded to the second Statement of Objections.

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[11]   This response, as was the case with Microsoft's subsequent responses, included submissions by Microsoft's economic consultant, NERA.

[12]   For the documents initially collected under Case IV/C-3/37.345, the page numbering in the original file and the original case number have been indicated (although the relevant evidence has been joined to Case COMP/C-3/37.792).

(6)   In its responses to both the first and second Statements of Objections, Microsoft
        submitted several statements from customers (enterprises and administrations) and
        system integrators ("Microsoft customer statements"), purportedly supporting its
        responses to the Commission's objections concerning interoperability.[13] Altogether,
        46 such Microsoft customer statements were submitted.[14]

(7)   In February and March 2002, the Commission sent a round of requests for
        information to those 46 customers, with a view to obtaining quantitative data on
        those customers' use of products relevant to the Commission's investigation.

(8)   From April to June 2003, the Commission engaged in a wider market enquiry ("the
        2003 market enquiry"). For interoperability, on the basis of an independent sample
        of organisations that use PC and work group server operating systems, a first set of
        requests for information was sent on 16 April 2003 to 75 companies, all based in the
        EEA.[15] Those companies, which were selected at random, are from a number of
        different activity sectors[16] and of different sizes. Some of the 71 companies which
        responded provided answers for their sub-entities/subsidiaries or for sister-companies
        in the same group, so the total number of responses was in fact over 100, covering
        more than 1.2 million client PCs (desktops and laptops).[17] The replies to the
        questionnaire generated additional queries, and a follow-up questionnaire was
        therefore sent on 28 May 2003 and on 4 June 2003 to the 62 organisations that at
        those points in time had already responded to the requests for information of 16 April
        2003.[18]

(9)   In parallel, 46 requests for information were sent on 16 April 2003 to companies
        active in areas relevant to the issues raised by the incorporation of Windows Media

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[13]   The statements were drafted by Microsoft's lawyers on the basis of notes taken during conversations
        with the customers' IT managers and then sent to these IT managers for review and signature. See
        Microsoft's submission of 16 November 2001 at paragraph 37.
[14]   34 such statements were submitted in Microsoft's response to the Commission's First Statement of
        Objections (submissions dated 17 November 2000 and 15 March 2001) and 13 additional customer
        statements in its response to the Commission's Second Statement of Objections (submission dated 16
        November 2001). One of the organisations in question ([Confidential]) withdrew its statement in
        March 2001 (Case IV/C-3/37.345, on page 17614).
[15]   The sample covers companies based in Austria (1 company), Belgium (4), Denmark (1), France (19),
        Germany (11), Italy (4), The Netherlands (4), Portugal (1), Spain (10), Sweden (4), United Kingdom
        (15). In addition, the very same questionnaires were sent to 8 of the 46 Microsoft customers. Those 8
        customers had provided incomplete answers to the Commission's February-March 2002 pursuant to
        Article 11 of Regulation No 17 ("Article 11 requests").
[16]   Corresponding to 10 NACE codes at 2-digit.
[17]   All the figures for the responses to this set of Article 11 requests are based on the 102 answers by
        entities that provided the number of client PCs that they use, and for which that number was above 100.
        A significant part of the entities requested in their replies that their identity is not disclosed to
        Microsoft. They have been identified through the number of the organisation and (if relevant) an
        additional number for the entity (for instance, Entity I1, Entity I2,... Entity I46-1, etc.).
[18]   57 of the entities in question were from the Commission's sample of 75 organisations, 5 were from the
        8 Microsoft customers to which the Article 11 requests of 16 April 2003 had been sent.

Player into Windows (content owners, content providers, software developers and associations of such companies).[19] 33 responses were received.

(10)   In the light of the findings of the market enquiry and how they related to the Commission's existing objections, a supplementary Statement of Objections ("the supplementary Statement of Objections") was issued on 6 August 2003. Although the supplementary Statement of Objections did not purport to cover abusive practices different from the ones set out in the first two Statements of Objections, where appropriate it refined and consolidated the legal considerations contained therein. Microsoft replied to the supplementary Statement of Objections on 17 October 2003 and submitted supplementary material on 31 October 2003. These materials contained two surveys (and analysis of those surveys) carried out by Mercer Management Consulting[20] ("Mercer") on behalf of Microsoft. Microsoft had already in December 2001 submitted a first survey (with analysis) which Mercer had carried out following the second Statement of Objections. The three Mercer surveys will be referred to throughout this Decision as Mercer's "Survey I", "Survey II" and "Survey III".[21]

(11)   Throughout the procedure, a significant number of companies, comprising major Microsoft competitors, as well as industrial associations, have been admitted as interested third parties. These are *inter alia* the Association for Competitive Technology ("ACT"), Time Warner Inc. ("Time Warner", previously AOL Time Warner), the Computer & Communications Industry Association ("the CCIA"), the Computing Technology Industry Association ("CompTIA"), the Free Software Foundation Europe ("FSF Europe"), Lotus Corporation ("Lotus"), Novell Inc. ("Novell"), RealNetworks, Inc. ("RealNetworks"), and the Software & Information Industry Association ("the SIIA"). Microsoft has been asked to comment on certain submissions by these interested third parties and by the complainant Sun, and in particular on the comments that these third parties and the complainant made on Microsoft's reply to the second Statement of Objections and on certain submissions that they made following the supplementary Statement of Objections.

(12)   At Microsoft's request, an Oral Hearing took place on 12, 13 and 14 November 2003. Microsoft was given an opportunity to submit material following the Hearing, and to comment on the issues raised by the Commission services, the complainant

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[19]   Based both in the EEA and the US.
[20]   Mercer Management Consulting is part of the Mercer Consulting Group, of which NERA, Microsoft's economic counsel, is also a member. See the presentation at the home page of http://www.mercer.com/ (printed on 8 January 2003) and Novell's submission of 8 January 2003, at footnote 4. Both NERA and the Mercer Consulting Group specifically advertise their ability to call on each other's resources (see Novell's submission of 8 January 2003, at footnotes 8 and 9).
[21]   This is in accordance with the way they are referred to by Mercer itself in its latest submissions.

and the interested third parties who attended the Hearing, which it did on 1 December 2003.

(13)   Access to the file was granted five times to Microsoft throughout the procedure (28 August 2000,   14 September 2001,   14 February 2002,   6 December 2002, 7/8 August 2003 and 16 January 2004). On 16 January 2004 the Commission sent Microsoft a letter inviting it to provide comments on conclusions spelt out in this letter which drew on documents not mentioned in the statements of objections. Microsoft replied to this letter on 7 February 2004.

2.2   Background on antitrust proceedings against Microsoft in the United States

(14)   In parallel to the Commission's investigation, Microsoft has been under antitrust scrutiny in the United States of America. As the corresponding proceedings under US antitrust law ("the US proceedings") had an impact on Microsoft's commercial behaviour, it is appropriate to provide some background information on them.

(15)   In 1998, the United States and twenty States filed suit under the Sherman Act against Microsoft. The complaint focussed on various measures taken by Microsoft *vis-à-vis* Netscape's Web browser "Netscape Navigator" and Sun's "Java technologies". The plaintiffs identified four distinct violations of the Sherman Act: (i) unlawful exclusive dealing arrangements in violation of Section 1; (ii) unlawful tying of Microsoft's "Internet Explorer" Web browser to its "Windows 95" and "Windows 98" PC operating systems in violation of Section 1; (iii) unlawful maintenance of a monopoly in the market for PC operating systems in violation of Section 2; and (iv) unlawful attempted monopolisation of the Web browser market in violation of Section 2. The States also brought claims charging Microsoft with violations of various State antitrust laws.

(16)   On 3 April 2000, the US District Court for the District of Columbia found Microsoft liable on the Section 1 tying and Section 2 monopoly maintenance and attempted monopolisation claims,[22] while ruling that there was insufficient evidence to support a Section 1 exclusive dealing violation.[23] On 7 June 2000, the District Court released an order approving the plaintiffs' proposed remedies.[24] The ruling imposed an interim restriction on Microsoft's commercial behaviour until the ordered break-up of the company would occur.

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[22]   Conclusions of Law of 3 April 2000 United States District Court for the District of Columbia, *United States v. Microsoft Corporation*, Civil Action No. 98-1232 and 1232 (TPJ), at paragraphs 35 to 51.

[23]   Conclusions of Law of 3 April 2000 United States District Court for the District of Columbia, *United States v. Microsoft Corporation*, Civil Action No. 98-1232 and 1232 (TPJ), at paragraphs 51to 54.

[24]   *United States v. Microsoft Corporation*, Civil Action No. 98-1232 and 1232 (TPJ).

(17)   The Court of Appeals ruled on Microsoft's appeal on 28 June 2001.[25] The Court of Appeals: (i) upheld that Microsoft had acted illegally in protecting its monopoly; (ii) reversed the finding that Microsoft had illegally monopolised the Web browser market; (iii) sent back to the lower court for reconsideration the question of whether Microsoft had illegally tied its dominant PC operating system with its Web browser; and (iv) sent back to the lower court for reconsideration the question of an appropriate remedy for Microsoft's violation.

(18)   The United States and Microsoft agreed a settlement on 2 November 2001 ("the US Settlement"). On 6 November 2001, this settlement (in slightly amended form) was also signed by the States of New York, Illinois, North Carolina, Kentucky, Michigan, Ohio, Wisconsin, Louisiana, and Maryland.

(19)   On 1 November 2002, the US District Court handed down a judgment ("the US Judgment")[26] which (i) essentially adopted the US Settlement; and (ii) rejected the remedy proposals of the nine "non-settling States".

(20)   One of these non-settling States, Massachusetts, appealed this judgment. This appeal is still pending.

3   THE PRODUCTS CONCERNED BY THE DECISION

3.1   Technical background

3.1.1   General software concepts

(21)   Computer systems are constituted of "hardware" and "software". The word hardware refers to the set of physical components that can constitute computer systems (such as e.g. a display, a keyboard, a hard disk[27] or a processor) whilst the word software refers to the instructions that direct the hardware operations, also designated as computer programs.[28]

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[25]   Judgment of 28 June 2001, United States Court of Appeals for the District of Columbia Circuit, *United States v. Microsoft Corporation*, No. 00-5212.

[26]   See: United States District Court for the District of Columbia, Memorandum Opinion with Findings of Fact and Final Judgment of 1 November 2002 *in re State of New York et al. v. Microsoft Corporation,* Civil Action No. 98-1233 (CKK); Memorandum Opinion with Findings of Fact and Final Judgment of 1 November 2002 *in re United States of America v. Microsoft Corporation*, Civil Action No. 98-1233 (CKK).

[27]   A hard disk is "*a device containing one or more inflexible platters coated with material in which data can be recorded magnetically, together with their read / write heads, the head-positioning mechanism and the spindle motor in a sealed case that protects against outside contaminants*". Microsoft's *Computer Dictionary*, on page 246.

[28]   Microsoft's *Computer Dictionary*, on page 489.

(22)   When run on a computer, software is as a rule in "binary" form, which means that it can be described as a list of "0"s and "1"s.[29] When it is in this binary form, software is described as "binary code" (also called "object code" or "machine code").

(23)   The instructions to be executed by the processor are as a rule not directly written by software developers[30] in binary form. Human-readable "programming languages" have been developed, along with automatic tools that translate the "source code" written in those languages into binary form. A software product that translates source code into binary code is called a "compiler". Once "compiled" for a given computer, a software product can be executed by it: it is often said that the product is "run" on the computer.[31]

3.1.1.1   Specifications and implementations

(24)   In considering the process of development of software products, it is common to distinguish between "specifications" and "implementation". A specification is a description of what the software product must achieve, whereas the implementation relates to the actual code that will run on the computer.

(25)   Commercial implementations are specific to a given software environment and optimised and tuned for performance. Furthermore, the development of a commercial product involves testing it and correcting possible "bugs", that is to say, mistakes in the source code. Most such bugs are only discovered after intensive testing in a variety of possible configurations. In addition to the testing that they carry out internally, most software vendors take advantage of the feedback provided by potential customers or partners, who get access to a pre-release called a "beta test version" and report on potential bugs. In spite of all those efforts, many bugs are often corrected after the official "release to market", either by means of software add-ons, or fixes called "patches" or in future commercial releases.

(26)   Commercial implementations are often marketed in binary code. However, the source code may also be made freely available to the customer and allow him to copy, modify and distribute it under certain conditions. In such a situation, the software product is said to be "open source".

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[29]   Physically, all the supporting storage for such binary information (for example, main memory, hard drives, floppy disks, CD-ROMs) contains a great number of small elements, each of which can be in one of two different states representing the "0"s and the "1"s.

[30]   The terms "software developer", "programmer" and "developer" will be used interchangeably and as a generic term to describe a person that writes software.

[31]   As a rule, binary code depends on the type of processor on which it is used. In contrast, the same source code written in a given language can in theory be compiled for all the machines for which a compiler for this language has been provided. In fact, this "hardware-portability" is limited by the idiosyncrasies of the hardware – which is not limited to the processor – and by the fact software very often relies on pieces of code that belong to the underlying operating system.

(27)   For instance, the "GNU General Public Licence" ("GNU GPL") is a software licensing schema created in the framework of the GNU Project by the Free Software Foundation, a non-profit organisation.[32]   Software released under the GNU GPL cannot be delivered in binary code only. The full source code of the product must be made available to the licensee, who is authorised to make any change to it, and to redistribute the product, possibly with his modifications, but on the condition that he does so under the GNU GPL.

(28)   Red Hat, Inc. ("Red Hat")[33], a leading vendor of open source products, describes its business model in the following way:

> "There are no licensing fees associated with open source software … We derive the value from the sale of our open source solutions by the value we add through the integration and testing of open source technology and by the managed services we provide for our technologies through the Red Hat Network."[34]

(29)   A distinction must thus be drawn between the "proprietary source" business model, where the source code is usually not made available to the public and the "open source" business model.   This being said, these two business models are not incompatible in the sense that the same company may develop certain products in open source and other products in binary code only.   Open source software has become an established feature of the mainstream software market.

3.1.1.2 Interoperability

(30)   "Open source" must be distinguished from "open systems", which is used to describe an approach of ensuring interoperability between products of various vendors, so as to allow flexibility in the customer's choice of a product as a substitute to another.

(31)   The development of open systems is particularly important to ensure the "interoperability" of various products in a computer system.

(32)   The term "interoperability" can be used by technicians in various contexts and with various meanings. The preambles to Council Directive 91/250/EEC of 14 May 1991 on the legal protection of computer programs[35] ("the Software Directive") which

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[32]   See http://www.gnu.org.
[33]   Red Hat, a US company was founded in 1993. Red Hat describes itself as *the premier Linux and open source provider*". See http://www.redhat.com/about/corporate/, printed on 8 December 2003.
[34]   See Red Hat Form 10-K SEC filing, pages 2 and 18, at http://www.sec.gov/Archives/edgar/data/1087423/000095016802001569/d10k.htm, printed on 24 January 2003.
[35]   OJ L 122, 17.5.1991, p. 42.

harmonises copyright protection of computer programs in the Member States, contain the following language:

> "Whereas the function of a computer program is to communicate and work together with other components of a computer system and with users and, for this purpose a logical and, where appropriate, physical interconnection and interaction is required to permit all elements of software and hardware to work with other software and hardware and with users in all the ways in which they are intended to function;

> Whereas the parts of the program which provide for such interconnection and interaction between elements of software and hardware are generally known as 'interfaces';

> Whereas this functional interconnection and interaction is generally known as 'interoperability'; whereas such interoperability can be defined as the ability to exchange information and mutually to use the information which has been exchanged."[36]

(33) Microsoft has criticised the Commission for adopting in the present case a "concept of full interoperability" which, in Microsoft's view, goes beyond what is contemplated by the Software Directive.[37] This issue will be discussed below in the section on the Economic and legal assessment (at recital (743) *et seq.*). However, it appears to be common ground between Microsoft and the Commission that interoperability is a matter of degree and that various software products in a system "*interoperate*" (at least partially) when they are able to exchange information and mutually to use the information which has been exchanged.[38] In any case, the issue at stake in this case is ultimately the question whether, *pursuant to Article 82 of the Treaty*, Microsoft provides to its competitors in the work group server operating system market the interoperability information that it has a special responsibility to provide. As such, it is not necessary at this stage to engage in a detailed discussion on the interpretation of the Software Directive.

(34) Software vendors frequently agree to establish open interoperability standards. In this context, they usually agree on interface specifications (that is to say, specifications needed to implement compatible interfaces). Thereafter, different competing implementations compatible with the specification can be created. Such

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[36] Recitals 10, 11 and 12 of the Software Directive.
[37] See Microsoft's submission of 17 November 2000, at paragraphs 140 to 143.
[38] See, for example, Microsoft's submission of 17 October 2003, at page 16. See also Stuart Madnick and Patrick Valduriez, *Comments on the Commission's Statement of Objections Filed against Microsoft*, submitted by Microsoft as an annex to its submission of 16 November 2001, at paragraph 21. See also Microsoft's submission of 15 March 1999, on page 2.

implementations may vary widely in terms of performance, security, etc. They will in principle always differ as regards their source code.

(35) Specifications can in certain circumstances be accompanied by a "reference implementation", that is to say, a source code implementing the specification. Reference implementations serve to illustrate and clarify particular points of the specification and are not suitable for direct marketing of the corresponding binary code. As such, reference implementations need to be distinguished from commercial implementations.

(36) Software vendors do not systematically publish the specifications of their products' interfaces. If product A and product B, both available in binary code, interoperate using interfaces of which there is no available specification, a developer of product C who wants his product to interoperate with A or B through the same interfaces may need to engage in reverse-engineering. Reverse-engineering may in that context involve the translation of the available binary code – that of product A or of product B – into a human-readable form (to that effect, tools called "decompilers" may be used). The software developer would then be able to derive a specification for the interface from this reconstructed source code, and on the basis of this specification, he would write his own specification-compliant implementation.[39] Depending on the size of the program to be decompiled, reverse-engineering may be very costly and time-consuming, and there may also be technical barriers.

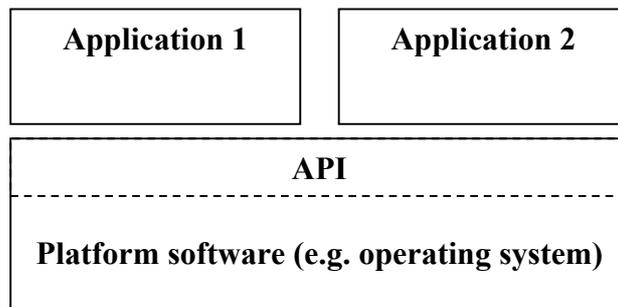*3.1.2 Operating systems, applications and software platforms*

(37) Among the multitude of existing software products, there is a certain degree of specialisation according to given sets of tasks. For instance, a distinction can be drawn between "system software" and "application software". "System software" controls the hardware of the computer, to which it sends instructions on behalf of "applications" fulfilling a specific user need, such as word processing.[40] Operating systems are system software products that control the basic functions of a computer and enable the user to make use of such a computer and run application software on it.

(38) Interfaces used by applications to call upon the services provided by an operating system are called "Application Programming Interfaces" ("APIs").

(39) An application that uses a given API to access a service provided by a given operating system cannot run on an operating system that provides an equivalent service through a *different* API. To illustrate the dependency that links the

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[39]   It is worth noting that there are certain conditions that must be fulfilled for such reverse-engineering to be lawful.
[40]   Microsoft's *Computer Dictionary*, on page 31.

applications to the operating system (through the API), applications are often said to run "on top" of the operating system, and the operating system is often described as "platform software". The term "platform software" (or "platform") not only refers to operating systems, but to any software product that exposes an API for use by applications (see Figure 1).

Figure 1. Software platform, API and applications

Application 1	Application 2
API	
Platform software (e.g. operating system)	

(40)   The verb "to port" can be used to describe the process through which an application running on an operating system A is modified in order to run on an operating system B. This verb can also be used when a sub-element of operating system A is modified in order to run on top of operating system B, or when the necessary development work is done so that B supports an API already present in A ("to port the API from A to B").

(41)   An API can be documented by means of a specification so that it can be implemented (or "ported") on top of various operating systems. Using this specification, several different operating systems can provide their services to applications through the same API. The various UNIX products are a good example of such a situation.

(42)   The term "UNIX" designates various operating system products that share a number of common features. The first UNIX operating system was developed at Bell Laboratories in the 1970s. Various successors to this product were then developed, and the UNIX operating systems progressively gained acceptance in the 1970s and 1980s, both in the academic field and in the industry. There are various implementations of the UNIX operating system. These various implementations share a set of APIs that is being progressively standardised by consensus among the major UNIX vendors. In 1998, the Institute of Electrical and Electronics Engineers ("IEEE")[41] adopted a first standard UNIX API set, called IEEE Standard 1003.1, also

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[41]   The IEEE, a non-profit, technical professional association which claims to have more than 380,000 individual members in 150 countries, develops and publishes standards in the fields of, *inter alia*, electrical engineering, electronics, computer science and radio.
See   http://www.ieee.org/portal/index.jsp?pageID=corp_level1&path=about/whatis/policies&file=p8-1.xml&xsl=generic.xsl printed on 17 November 2003.   See also *About IEEE*, printed from

known as "POSIX 1". The source code of a program that relies only on the APIs specified in POSIX 1 can be recompiled and run on any operating system that implements POSIX 1. Since 1988, the process of standardisation has been going forward in the UNIX community. The Open Group, an industry consortium grouping most UNIX vendors, including Hewlett Packard Corp. ("HP"), International Business Machines Corp. ("IBM") and Sun,[42] maintains the "Single UNIX Specification", a set of open specifications that define the requirements for a conformant UNIX system.[43]

(43)   The "Java technologies" provide a further example of API specifications that are implemented in various products. The Java technologies encompass a number of interrelated elements. The first element is a programming language developed by Sun, called Java. The second element is the "Java Virtual Machine". Instead of being compiled directly to binary code, Java software is compiled to a specific type of instructions called "bytecode". The bytecode instructions are translated one after the other by the Java Virtual Machine into processor instructions, while the program is running. As opposed to a situation where the whole program is compiled first to processor instructions and then run on the computer, the Java Virtual Machine therefore works as a "virtual processor", hence its name. Third, the "Java class libraries" constitute a set of APIs. Java Specifications, which includes specifications for the language, virtual machine and APIs are maintained by the "Java Community Process".[44] Compatible implementations of these specifications have been developed to run on top of various operating systems.[45] As soon as a computer implements the relevant Java specifications, applications written to the Java platform can run on it, irrespective of the underlying hardware or operating system. This situation is often referred to as meaning that the developer can "write once" and then "run everywhere".

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http://www.ieee.org/portal/index.jsp?pageID=corp_level1&path=about&file=index.xml&xsl=generic.xsl on 10 December 2003.

[42]   Microsoft describes the Open Group in its submission of 17 November 2000, Annex A on page 8. See also the Open Group's Web site, http://www.opengroup.org/overview/index.htm and http://www.opengroup.org/overview/members/membership_list.htm, printed on 18 November 2003.

[43]   The "Single UNIX Specification" includes the necessary information to implement a list of 1,742 API calls. See *Single UNIX Specification Frequently Asked Questions*, printed on 18 November 2003 from http://www.opengroup.org/austin/papers/single_unix_faq.html.

[44]   See http://jcp.org/en/introduction/glossary#J, printed on 18 February 2004.

[45]   Microsoft mentions IBM and BEA Systems, Inc. ("BEA") as licensees of the "Java 2 Platform, Enterprise Edition" ("J2EE") and notes that these companies have even had "*substantially greater commercial success with J2EE-based application servers than Sun* [which first developed the Java technologies] *has had*". See Microsoft's submission of 7 February 2004, in response to the Commission's letter of 16 January 2004, on page 32.

3.1.3 Network computing

(44)   In the late 1970s, computer systems were typically built of one expensive computer called a "mainframe"[46] accessed by multiple users from "terminals". These terminals merely consisted of a keyboard and a monitor, without any processing power. It was the mainframe that actually carried out the processing job.

(45)   During the 1980s and 1990s, two main changes radically modified this paradigm. First, powerful processors enabling unparalleled price/performance gains have been developed. This has allowed the development of "Personal Computers" ("PCs"), that is to say, general-purpose computers designed for use by one person at a time,[47] at prices suitable for mass consumption.[48] Most companies and organisations have replaced terminals with such PCs (sometimes referred to in that context as "workstations"),[49] whilst home usage of PCs has grown exponentially.

(46)   In parallel, high-speed "IT[50] networks" have been developed and set up, which make it possible to move data quickly between computers.

(47)   As a consequence, computers nowadays increasingly operate in conjunction with other computers. Depending on the specific tasks that they want to carry out, PC users now use both the computing capability of their "client PC" *and* of various types of more powerful, multi-user computers called "servers", which they access indirectly through their client PC.[51]

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[46]   The term "mainframe" originally derives from the cabinet in which the electronic circuitry of early computers was contained.

[47]   A distinction can be established between *laptop PCs* and *desktop PCs*. Laptop PCs are compact computers with an integrated keyboard, a flat screen, a large storage hard disk and a battery. They are designed for mobile users and, as such, are highly portable. The use of desktop PCs is usually restricted to a fixed place. Due to different component features, the price of laptop PCs is usually higher than the price of desktop PCs.

[48]   The term PC is often used to designate "IBM-compatible" PCs, a class of personal computers introduced in 1981 and conforming to the IBM hardware and software PC specification. The first PCs were based on the 8088 processor designed by the US company Intel, and IBM-compatible PCs are also often called "Intel-compatible" PCs. In this Decision, however, the term client PC will be used to encompass both Intel-compatible PCs and other desktops or laptops.

[49]   It often happens that an organisation needs to keep a multi-user computer that used to be accessed through terminals. This would for instance be the case when the tasks fulfilled by the multi-user computer are crucial to the company's business and a migration process towards a new infrastructure appears risky in terms of possible loss of data or downtime. In such a situation, the organisation may use "terminal emulation software", which makes the PC act, when it connects to the multi-user computer, as if it were a terminal.

[50]   IT stands for "information technology".

[51]   The terms "client PC" and "server" derive from the so-called "client/server paradigm", which describes communication between software elements as requests made by "clients" to "servers" and the corresponding replies. They do not mean, however, that the servers (the powerful multi-user computers) never act as clients (in the sense of the client/server paradigm). On the contrary, servers often have to make requests to other server machines – and on such occasions can be considered as "clients" in terms of the client/server paradigm.

(48)   Although there is a degree of specialisation between the different types of computers of the network, it is preferable to ensure that the ensuing complexity does not impede, from the perspective of the end-user, the efficient and easy access to and use of network resources. Similarly, it is desirable to use to the fullest extent the computing capabilities of the network. This has led to distributing applications across several computers, which host different components that interoperate with one another ("distributed applications"). Here again, it is preferable that the various components of such distributed applications can have efficient and easy access to and efficiently and easily use of network resources. This implies that the various computers of the network need to be integrated into a consistent distributed computing system (a "distributed system"). Such a distributed system would ideally make the complexity of the underlying hardware and software "transparent" (that is to say, invisible) to the user and distributed applications alike, so that users and applications can easily find their way through this complexity in order to access computing resources. Microsoft describes the evolution of network computing in the following terms:

> "*Generally speaking, the aim has been to maintain or achieve mainframe functionality by 'distributing' applications between a client and one or more servers. In distributed computing systems, the processing power is taken out of a central processor (such as a mainframe) and placed in the constituent parts of the network.*"[52]

(49)   For this transparent distribution of software resources across the network to be possible there is a need for interoperability between the various pieces of software running on different physical machines of the network. For instance, this can include the formalisation of rules of interconnection and interaction – often over a wire connection – called "protocols".[53]

(50)   By way of illustration, the "Internet" and the "World Wide Web" (the "Web") stand out among IT networks and distributed systems in terms of popularity. Physically, the Internet uses a portion of the total resources of the currently existing public telecommunication networks. Technically, what is specific to the Internet is its use of a set of protocols called "TCP/IP".[54] The Web is a distributed system that supports a massive collection of digital information resources stored throughout the Internet in documents called "Web pages". Users of client PCs can access Web pages and display them by means of applications called "Web browsers". Since the

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[52]   Microsoft's submission of 8 June 1999, on page 14 (Case IV/C-3/37.345 page 01378).

[53]   It is noteworthy that certain interconnections and interactions between various software elements in a network may be linked to one another through a precise architecture (for example, two software elements need to interoperate in a precise way in order for a third one to benefit from a service that they will jointly deliver).

[54]   TCP and IP stand respectively for "Transmission Control Protocol" and "Internet Protocol".

mid-1990s, "graphical" Web browsers –Web browsers with a graphical user interface, as opposed to text-based ones – have become widely available, and have been marketed by companies such as Netscape (Navigator, Mozilla), Microsoft (Internet Explorer), Apple (Safari) or Opera (Opera). Many protocols used in the context of the Web and the Internet are industry standards maintained by various organisations, such as the Internet Engineering Task Force ("IETF") or the World Wide Web Consortium ("W3C").[55]

(51)   Most companies and public organisations have their own internal physical network. Such an internal network is typically structured in "Local Area Networks" ("LANs") and "Wide Area Networks" ("WANs"). LANs rarely extend over a few kilometres. In contrast, WANs may be continent-wide networks. In a typical organisation's network, various LANs with a number of client PCs and servers would be connected through a WAN and possibly to the wider Internet. Due to security reasons, such organisations use "firewalls" to isolate their networks and thereby protect them against external threats.[56]   A distinction is therefore often drawn between the "intranet" (a LAN or a WAN which links computers that all belong to the organisation), and the public "Internet".

3.1.4   Work group server operating systems

(52)   The tasks that are fulfilled by servers may be of very different types, which will translate in various hardware and software requirements for the server.

(53)   The present case focuses on "work group server services", which are the basic infrastructure services that are used by office workers in their day-to-day work, namely sharing files[57] stored on servers, sharing printers, and the "administration" of how users and groups of users can access these services and other services of the network (for example, applications installed on the client PCs or servers). "Work group server operating systems" are operating systems designed and marketed to deliver these services collectively to relatively small numbers of client PCs linked together in small to medium-sized networks.

(54)   The "group and user administration" services include in particular ensuring that the users have access to and make use of the resources of the network in a secure manner. This involves various security steps, such as "authentication", which is the process of verifying that an entity is what it pretends to be (for example, by asking a

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[55]   See http://ietf.org/overview.html, printed on 8 December 2003 and http://www.w3.org/Consortium, printed on 17 November 2003.

[56]   "*Usually a combination of hardware and software, a firewall prevents computers in the organisation's network from communicating directly with computers external to the network and vice versa.*" Microsoft's *Computer Dictionary*, on pages 214 and 215.

[57]   The term "file" is used to designate the basic unit of storage that enables a computer to distinguish one set of information from another.

user for his password), and "authorisation", which consists in checking whether an authenticated entity has the right to perform a certain action (for example, whether a given user is allowed to access a given confidential file).

(55) To efficiently store and query the group and user administration information, modern work group server operating systems rely extensively on "directory service" technologies. In broad terms, a "directory service" can be described as software that allows the storage of data in a "Yellow Pages"-like manner,[58] that is to say, resources stored in a directory can be looked up according to a description of their properties. It is noteworthy that directory service technologies are used in various contexts, not only in work group server operating systems. It is also important to note that numerous directory-related standards have been developed in the last two decades. An example is the X.500 series of standards maintained by the International Organisation for Standardisation, "ISO".[59] Another example is the "LDAP" directory access protocol,[60] which is based on the X.500 data model, and which is an industry standard maintained by the IETF.[61]

(56) In work group server operating systems, the provision of file and print services on the one hand and of group and user administration services on the other hand are closely interrelated. In fact, they constitute to a large extent one and the same work group service, but viewed from two different perspectives, respectively that of the user (file and print services) and that of the network administrator (group and user administration services) . If there were no proper group and user administration, the user would not have efficient and secure access to file and print sharing services.

(57) Work group servers (servers that run a work group server operating system) must be distinguished from high-end servers that are generally needed to support "mission-critical" tasks, such as inventory control, airline reservations or banking transactions.

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[58] The term "directory" is also used to designate what Windows or Macintosh users generally call a "folder", i.e. "*a catalogue for filenames and other directories* [in that sense] *stored on a disk*" (Microsoft's *Computer Dictionary*, on page 162). In order to avoid any misunderstanding, the term "directory" will not be used in that sense in this Decision. Instead, the term "folder" will be used.

[59] See Sun's submission dated 31 October 2003, Martin Wirsing *et al.*, *Specifications and Implementations of Interoperable Systems*, on pages 19-20. ISO is an organisation whose principal activity is the development of technical standards. It functions as a network of the national standards institutes of 148 countries, on the basis of one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system. It began its operations in 1947. See http://www.iso.ch/iso/en/aboutiso/introduction/index.html, printed on 6 January 2004.

[60] "LDAP" stands for "Lightweight Directory Access Protocol". See Microsoft's submission dated 16 November 2001, at paragraph 76.

[61] The "RFC 3377" lists a number of eight RFCs (RFCs 2251 through 2256, RFC 2829 and RFC 2830) which are commonly viewed as representing the specifications for LDAP version 3. IETF standards are defined in a series of documents referred to as "RFC documents". "RFC" stands for "Request for Comments". This term is historical. IETF standards documented by means of RFC documents can have various status, for instance: "Proposed Standard", for newly-published standard specifications, "Draft Standard" for standards that have demonstrated real applicability and have gone through an extra ratification and "Internet Standard" for technologies that have already achieved many years' wide use.

Such tasks may involve the need to support storage of vast amounts of data and require maximum (often termed "rock-solid") reliability and availability.[62] They are carried out by expensive machines sometimes called "enterprise servers" or by mainframes. By contrast, work group server operating systems are generally installed on less expensive computers.

(58)   However, not all low-end server machines are used as work group servers. For instance, low-end servers can also be installed at the "edge" of networks and be specialised in Web serving[63] or Web caching,[64] or firewall,[65] to the exclusion of the core work group server services.

(59)   It should also be pointed out that whilst only file, print and group and user administration constitute the core work group server services, work group server operating systems can be used to run applications, as is the case with other operating systems. As work group server operating systems are as a rule used with inexpensive hardware, these applications will generally be non-mission critical (meaning that whilst their failure would impact the activity of some users, they would not impact the overall activity of the organisation). An example would be an e-mail/groupware package[66] used in a small site where the quantity of e-mails that needs to be stored is rather limited.[67] A further example would be group and user administration tools that enhance the group and user administration capabilities built into modern work group server operating systems. Consistent with the paradigm of distributed computing, the application serving features and the core work group server services will often be interrelated.

3.1.5   Digital media

(60)   Just as text can be stored in a digital file and then interacted with through a word processing application, audio and video content can be stored in digital files and

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[62]   Reliability is the ability of an operating system to function for a long period of time without malfunctioning or having to be rebooted. Availability is the ability of an operating system to function for a long period of time without having to be taken out of service for routine maintenance or upgrades. Another aspect of availability is how fast an operating system can get back up and running after a failure has occurred. See Microsoft's submission of 17 November 2000, Annex A, on pages 2 and 9.

[63]   A Web server hosts Web pages and makes them accessible through standard Web protocols.

[64]   A cache is a place where temporary copies of Web objects are kept. Web caching is therefore a way of storing Web files for later re-use in a way that speeds up the access for the end user.

[65]   For a definition of firewall, see above in footnote 56.

[66]   Groupware products enable a group of users in a network to collaborate, mostly – but not exclusively – *via* the exchange of e-mails and attachments. On the server side, groupware products would manage a list of users, receive, store and send messages. On the client side, they would enable users to compose messages. Example of groupware products are Microsoft Exchange, Lotus' Domino and Novell's GroupWise. The failure of a groupware product would impact the activity of some users –, for example, those that would urgently need to send an e-mail – but not the overall activity of the organisation.

[67]   Such e-mail packages will often be "distributed" applications (i.e. distributed across the client PC and the work group server).

interacted with using multimedia play back applications. A "media player" is a software product that is essentially able to "play back" such audio and video content, that is to say, to understand that digital content and translate it into instructions for the hardware (for example, loudspeakers or a display). Such instructions are channelled to the hardware through the operating system layer.

(61) As with text files (for example, a ".txt" file), there are specific "formats" that define how data are arranged in such digital media files. As digital media involves voluminous amounts of information[68] compression and decompression algorithms have been developed, in order to make it possible to reduce the storage space required by audio and video content with a minimal loss – or no loss at all – in sound and image quality. These algorithms are implemented in media players, as well as in encoding software that makes it possible to generate compressed files. The piece of code in a media player that implements a compression/decompression algorithm is called a "codec" (coder/decoder). In order to correctly interact with a digital media content compressed in a given format using a given compression/decompression algorithm, a media player needs to understand that format and the related compression/decompression algorithms, that is to say, it needs to implement the corresponding codec.

(62) With the development of network computing, there has been an increasing demand for audio and video content that can be accessed across networks, and in particular across the Internet. A first possibility is that the end user simply "downloads" a file stored on a server – that is to say, copies it and transfers it – onto his client PC. This will generally involve general-purpose protocols that can be used for transfer of any file and are not specific to digital audio and video content. Once downloaded on the client PC, the file can be played back using the media player, provided that the media player is compatible with the file's format.

(63) A different option is for the end user to receive audio and video content "streamed" across the Internet. With streaming, instead of waiting for an entire audio or video file to download, the file is sent to the client PC as a sequence of small pieces, that is to say, as a "stream" of data which the media player plays as it goes along. In one variant, as soon as some of the data have been received by the media player, it begins to play the data. By the time the first units of data have been played, more pieces will have been sent and received, and those can be played (this is also called progressive download). Pure streaming, such as webcasting (live-streaming such as in the case of Internet-based radio stations), does not create any temporary copy of the file or its pieces and, in the interest of moving the broadcast along in timely

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[68] Without compression just one minute of CD-quality audio would require 10 megabytes of storage space. By way of comparison, a floppy disk has as a rule less than 1.5 megabytes of storage space. See, for example, http://grahammitchell.net/writings/vorbis_intro.html, printed on 19 November 2003.

fashion, does usually not process retransmission requests (from possibly many sources) in case of disruptions but smoothes over mis-transmitted data or uses forward error correction. For users, both variants provide a streamed media experience in real time and are therefore, in this Decision, referred to as media streaming. Such usage presupposes the existence of a streaming media player on the client PC.

(64)   The delivery of streamed content to an end user often involves specific streaming protocols that govern the communication between the media player and server-side software that streams the content over the Internet. In order to access content streamed using a given protocol, a media player will need to understand that protocol.

(65)   "Digital rights management" ("DRM") technology is also relevant in this context. As digital files can be copied without degradation of the file content, there is a heightened danger that once digital content is licensed, it is unlawfully reproduced and distributed – in spite of potential contractual licensing limitations foreseen by the owner of the content. To meet these concerns, software-based solutions have been developed that protect content and aim at "hardwiring" contractual licensing conditions into the digital media file, thereby technically preventing unlawful usage. Using such software, it is possible to protect the content at the step of encoding or at least before making the content available to end users. End users who want to access protected content *via* their media player will have to present some form of key which is evidence of their licence rights before being able to interact with the file. A media player needs to support a given DRM technology in order to interact with a media file which has been protected using that DRM technology.

(66)   Encoding software, streaming servers and media players that are compatible in terms of codec, format and streaming protocol support can be used to build a software infrastructure for delivery and consumption of streamed digital audio or video content over IT networks. Such an infrastructure will also constitute a platform for the development of further applications, which will use the services provided by it. In particular, media players may exhibit APIs upon which other applications will call, in order for example, to trigger the playback of a file by the player.

3.2 Client PC and work group server operating systems

3.2.1 The sales channel for computer devices

3.2.1.1 Bundles of hardware and software

(67)   The sales channel for computer devices is fairly complex, and differs according to the type of device and the type of customer.[69]

(68)   Computers are as a rule assembled by companies called "Original Equipment Manufacturers" ("OEMs"), using a variety of components provided by other manufacturers. This includes the installation of an operating system supplied by a software company (or developed by the OEM), as well as the bundling of several applications that are required by the end-user. "Value-Added Resellers" ("VARs") buy already assembled computer devices and re-sell them with additional software and services – including specific configurations of the software or the hardware. The more complex a computer system, the more room there is for such value-added resellers.

3.2.1.2 Operating systems

(69)   Some vendors develop the operating system together with the hardware, both operating system and hardware then being fine-tuned to adapt to each other, and distributed together. This is the case for Sun and most UNIX vendors. By contrast, some operating system vendors are pure software companies, such as Microsoft or Novell. They do not assemble computers but license their operating system products to OEMs and to direct customers. Their operating systems target primarily "Intel-compatible" hardware (client PCs or servers).[70]

(70)   Operating systems can also be distributed separately from the hardware (that is to say, directly from the software vendor to the customer). Indeed, a customer that runs a given operating system on his hardware may, over time, want to "upgrade" to the newer versions of the products sold by the same operating system vendor, without necessarily changing his hardware. The customer may also want to switch to a different operating system vendor whose operating system runs on the same hardware. As a rule, operating system vendors make sure that the price of an "upgrade" is lower than the full price of the product, as a means to encourage customers' loyalty to their products.

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[69]   The term "customer" designates in this Decision an "end customer", i.e. an entity that buys a product for use and not for redistribution. The term "user" will designate the person that effectively uses a client PC operating system. When the customer is an organisation, for example a company, the user (for example, an employee of the company) may be different to the customer.

[70]   As outlined above at footnote 48, an "Intel-compatible" PC (and more generally, an "Intel-compatible" computer) is a PC (respectively a computer) compatible with Intel's processor architecture.

(71)   Even when there are commercial intermediaries between the operating system supplier and the customer, the *contractual* relationship between that supplier and the customer is usually a direct one. Indeed, the operating system product is copyrighted material and, as such, its use can be subjected to licensing conditions that are transferred across the distribution channel.

3.2.2   *Microsoft's operating system products for client PCs and work group servers*

3.2.2.1   Historical background

(72)   Microsoft has been developing operating systems for client PCs since the beginning of the 1980s. Several versions of its MS-DOS client PC operating system were followed by Windows 3.0 and Windows 3.1, which added a graphical user interface to run on top of MS-DOS. The subsequent versions, Windows 95, Windows 98 and Windows 98 Second Edition ("Windows 98 SE"),[71] were still partly dependent on the MS-DOS technology (albeit to a much lesser extent). MS-DOS, Windows 95, Windows 98 and Windows 98 SE were all client PC operating systems. Windows Millennium Edition ("Windows Me") was based on Windows 98's underlying structure and was released in June 2000 as a client PC operating system intended for home usage only.

(73)   In parallel, Microsoft had developed another operating system family, Windows NT, for which it released several versions up to Windows NT 4.0.[72] Windows NT was developed both for client PCs and servers. Microsoft underlines that "*[from] the outset, Windows NT was designed to provide client and server versions built on the same code base and to expose the same basic application programming interfaces ('APIs') to software developers*".[73]

(74)   Windows 2000 (which was called Windows NT 5 at the beginning of the development phase and was launched in 2000) relied on the NT technology. The version of Windows 2000 for client PCs was intended for professional usage and called Windows 2000 Professional. At the server side, Microsoft differentiated between Windows 2000 Server, Windows 2000 Advanced Server and Windows 2000 Datacenter Server.[74]

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[71]   Windows 95 was released to market in August 1995. Windows 98 in June 1998, and Windows 98 Second Edition in May 1999. Windows 98 Second Edition was essentially an update to Windows 98, which bundled certain features and applications, most notably the Windows Media Player 6.
See http://www.microsoft.com/presspass/press/1998/Jun98/98AVALMA.asp, printed on 18 January 2003 and http://www.microsoft.com/presspass/press/1999/Jun99/SEavailabilityPR.asp, printed on 18 January 2003.

[72]   Windows NT Server 4.0 was released in July 1996. See *Microsoft announces the Release of Windows NT Server 4.0*, printed from http://www.microsoft.com/presspass/press/1996/jul96/NT40ANPR.asp on 2 December 2002.

[73]   Microsoft's submission dated 17 November 2000, at paragraph 47.

[74]   For a more detailed description of the three products, see below, in Section 5.1.1.2.

(75)   The latest version of Microsoft's client PC operating system is called Windows XP, and was launched on 25 October 2001.[75] It is based on the Windows 2000 structure and has been released in two different versions, respectively intended for home and professional usage: Windows XP Home Edition and Windows XP Professional. On 24 April 2003, Microsoft released a number of server operating systems that are the successors of the Windows 2000 server range (Windows 2003 Server).[76]

(76)   The "Win32 API" is the set of APIs used by most Windows-based applications in Windows 95, Windows 98, Windows Me, as well as Windows NT 4.0 and Windows 2000 (for these last two versions, this applies to both the client PC version and the various server versions). Each of these operating systems implements a subset of the Win32 API.[77] Windows only offers limited support for other APIs, such as the early standard UNIX API, POSIX 1.[78]

(77)   The following table summarises the above chronology.[79]

Table 1: Chronology

Product	First Beta version	Release to market
Windows 95	June 1994	August 1995
Win NT 4.0	February 1996	August 1996
Windows 98	June 1997	June 1998
Windows 98 SE		May 1999
Win 2000 Professional	September 1997	February 2000
Windows Me		June 2000
Windows XP	October 2000	October 2001

3.2.2.2   Currently marketed Client PC operating systems

(78)   The client PC operating system products currently marketed by Microsoft are Windows Me, Windows 2000 Professional, Windows XP Home Edition and

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[75]   See Microsoft's press release *Windows XP is Here!*, printed on 5 May 2003 from http://www.microsoft.com/presspass/press/2001/oct01/10-25XPOverallPR.asp.   Windows XP was therefore launched after the Commission issued its second Statement of Objections in this case.

[76]   See Microsoft's press release, *Microsoft Windows 2003 Server is Available Worldwide Today*, printed from http://www.microsoft.com/presspass/press/2003/apr03/04-24WindowsServer2003LaunchPR.asp on 5 May 2003.

[77]   See *Inside Windows 2000*, by David A. Solomon and Mark A. Russinovich, Microsoft Press 2000, on page 2.

[78]   See *Inside Windows 2000*, by David A. Solomon and Marc E. Russinovich, Microsoft Press 2000. "*This standard [POSIX] was included primarily to meet U.S. government compliance as specified in the Federal Information Processing Standard [...] [The] POSIX subsystem that comes with Windows 2000 isn't a complete programming environment*" (page 56). Windows also implements the OS/2 API (the API of IBM's OS/2 operating system), but "*[t]he OS/2 environment subsystem, like the built-in POSIX subsystem, is fairly limited in usefulness [...]*" (page 58).

[79]   See http://www.microsoft.com/presspass/press/1998/Jun98/98AVALMA.asp, printed on 18 January 2003, http://www.microsoft.com/presspass/press/1999/Jun99/SEavailabilityPR.asp, printed on 18 January 2003, http://www.microsoft.com/presspass/press/2000/Oct00/Whistler1PR.asp, printed on 8 December 2003.

Windows XP Professional Edition. Those products are available for purchase in versions that have been slightly modified since their release to market, to correct possible bugs and bring a limited set of enhancements. These modifications come in the form of "updates" (for smaller ones) or "Service Packs" (for more comprehensive ones).[80]

(79)   The licence fee paid by OEMs to preinstall a Microsoft operating system on their client PCs is not publicly disclosed.

(80)   For direct purchase of the software, Microsoft distinguishes between "Retail Pricing for Individual Computers" and "Volume Licensing for Purchases of five Licences or more".

(81)   The "Volume Licensing" conditions are only available for Windows 2000 Professional, Windows XP Professional (and not for Windows Me or Windows XP Home Edition). Various programs are designed to fit the particular needs of customers, according to the number of PCs they purchase and the way the customer wishes to purchase – centralised, decentralised, etc.

(82)   The following table gives the price charged by Microsoft for the CD ROM of its currently marketed operating systems in the United States,[81] ordered from the Microsoft's Web site.[82]

Table 2: Prices of currently marketed Windows client PC operating systems

Version	Upgrade	Full Price
Windows Me	USD 109	USD 209
Windows2000 Professional	USD 219	USD 319
Windows XP Professional	USD 199	USD 299
Windows XP Home Edition	USD 99	USD 199

3.2.2.3   Currently marketed work group server operating systems

(83)   Windows 2000 Server and Windows 2003 Server, Standard Edition are Microsoft's work group server operating systems for the Windows 2000 and the Windows 2003 generations of its products respectively.

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[80]   Updates and Service Packs are also provided for Microsoft's work group server operating system products.

[81]   Microsoft does not sell products online outside the United States. The prices of Microsoft's products that are generally referred to throughout the present Decision are therefore those sold on Microsoft's web site in the United States.

[82]   See http://shop.microsoft.com/Referral/Productinfo.asp?siteID=10451, http://www.microsoft.com/windows2000/professional/howtobuy/pricing/default.asp, http://shop.microsoft.com/Referral/Productinfo.asp?siteID=10798, http://shop.microsoft.com/Referral/Productinfo.asp?siteID=11052, http://www.microsoft.com/windows2000/server/howtobuy/pricing/default.asp, printed on 20 November 2003.

(84)   The pricing structure for Microsoft's server operating systems includes a fee per server on which the product is installed and a fee per client PC that is "authenticated"[83] to a Windows server.[84]   The latter is called a "Client Access License" ("CAL"). As well as selling a package comprising both the licence for the server operating system and the CALs, Microsoft also sells CALs alone.

(85)   The retail price for Windows 2000 Server in the United States is USD 999 for a 5-user version and USD 1,199 for a 10-user version.[85] The retail price for Windows 2003 Server, Standard Edition in the United States is USD 999 for a 5-user version and USD 1,199 for a 10-user version.[86]

3.2.3   Other parties' client PC operating systems[87]

3.2.3.1 Mac OS

(86)   Apple markets its Mac operating system that is designed to run exclusively on Apple hardware such as Macintosh (now Power Macintosh), iMac, eMac, iBook, Power Mac and PowerBook computers using a PowerPC G3 or G4 processor.[88]   The most recent Mac operating system, called "Mac OS X", is UNIX-based.   The previous version of the Mac OS (Mac OS 9) was sold at USD 99. The current version (Mac OS X) is sold at USD 129.[89]   Mac OS X is not designed to run on Intel-compatible PCs.

3.2.3.2 Linux products

(87)   Linux is an open source operating system that was developed in the 1990s and released under the GNU GPL.[90] Strictly speaking, it is only a code base, called the

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[83]   For a definition of "authentication", see above at recital (54).

[84]   Throughout this Decision, the term "Windows client PC" and "Windows work group server" will be used to designate computers running a Windows client PC operating system and a Windows work group server operating system respectively.

[85]   See   http://www.microsoft.com/windows2000/server/howtobuy/pricing/default.asp,   printed   on   24 January 2003.

[86]   See supplementary Statement of Objections, at paragraph 54.

[87]   Until recently, IBM marketed its OS/2 Warp Client product, which was designed to run on Intel-compatible PCs and which was first released by IBM in 1994. The last version, OS/2 Warp v4 Client, was sold at USD 284. See:
http://www-132.ibm.com/webapp/wcs/stores/servlet/CategoryDisplay?catalogId=-840&storeId=1&langId=-1&dualCurrId=73&categoryId=215&x=19&y=16, printed on 24 January 2003.

[88]   Apple does not market its Macintosh desktop computer as a "PC". Nevertheless, it is classified within its "desktop" range of products. Moreover, it exhibits the same functional characteristics as other desktop PCs, and on this basis, for the purposes of the present assessment, will be categorised as a "client PC". This is consistent with the approach taken in the HP/Compaq merger decision. See Commission Decision of 31/01/2002 declaring a concentration to be compatible with the common market (Case No IV/M.2609 - HP / COMPAQ), OJ C 039 , 13.02.2002, p. 23.

[89]   See http://www.apple.com/macosx/, printed on 24 January 2003.

[90]   See above, at recital (27).

"kernel",[91] which provides a limited set of "core tasks" of an operating system. Additional layers of software (for example, a graphical user interface[92]) may be added to it, depending on the functions that the user expects from the computer. The products designated in this Decision by the phrase "Linux operating systems" are bundles of the Linux kernel with such additional software layers.

(88)   Linux runs, *inter alia*, on Intel-compatible computers, and was developed with the aim of making it compatible with UNIX. Many Linux features are in fact similar to those of UNIX, and Linux is compliant with the POSIX 1 specification.

(89)   Whilst the Linux kernel is available for free, Linux operating systems – which may under specific conditions bundle application programs not subject to the GNU GPL licence – are as a rule distributed for a fee. This entitles the customer to a certain amount of technical support, or consulting services for use with higher-end computers.

(90)   There are a large number of Linux operating systems for client PCs, none of which have a significant presence on the market. By way of example, for client PCs for professional usage, Red Hat currently distributes its Red Hat Linux 8.0 Professional version for USD 149.95 [93]. SuSE Linux, a subsidiary of Novell, ("SuSE")[94] distributes SuSE Linux Professional 8.2 for USD 79.95.[95] Turbolinux, Inc. markets Turbolinux 8 Workstation for USD 119.

(91)   As regards home usage, MandrakeSoft distributes its Mandrake Linux 9.0 version for USD 39 [96]. SuSE markets SuSE Linux Personal 8.2 for USD 39.95 [97].

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[91]   Microsoft's *Computer Dictionary* defines the kernel as "*the core of an operating system – the portion of the system that manages memory, files, and peripheral devices; maintains the time and date; launches applications; and allocates system resources*". However, the concept of "kernel" is also often used to refer to a particular "space" in which software processes (that is to say, programs being executed) can run on a computer. "Kernel space" is thus differentiated from "user space". Processes running in the "kernel space" have greater privileges than processes in the "user space". Depending on the design choice of the operating system programmers, more or fewer tasks can be carried out in the kernel space. For instance, virtually the entire Windows NT operating system was put in kernel space starting with Windows NT 4.0. See, for example, Andrew Tanenbaum *Modern Operating Systems*, on page 782.

[92]   Two widely-used graphical user interfaces for Linux are Gnome and KDE, both of which are built using the X-Window windowing system.

[93]   See http://www.redhat.com/software/linux/professional/, printed on 24 January 2003.

[94]   Established in 1992, SuSE, a privately-held company based in Nuremberg, Germany, describes itself as "*one of the world's leading providers of Linux software and services*". On 11 April 2003, Novell announced that it had entered into an agreement to acquire SuSE Linux. See *Novell Announces Agreement to Acquire Leading Enterprise Linux Technology Company*, printed on 8 December 2003 from http://www.suse.de/us/company/press/press_releases/archive03/novell_suse.html.

[95]   See http://www.suse.com/us/private/products/suse_linux/i386/index.html printed on 18 January 2003.

[96]   See http://www.mandrakestore.com/mdkinc/index.php?LANG_=en&tab_x=tab_0#menu_2_text_tab_0, printed on 16 May 2003.

[97]   See http://www.suse.com/us/private/products/suse_linux/i386/index.html printed on 18 January 2003.

(92)   Other open source operating systems exist that are based on a non-Linux code base, in particular FreeBSD [98], which is distributed under the BSD Licence, another open source licence which is different to the GNU GPL.

3.2.4 *Other parties' work group server operating systems*

3.2.4.1 NetWare

(93)   The NetWare operating system was developed by Novell in the second half of the 1980s. It has from the outset been developed for a network environment and only as a *server* operating system. It was introduced in 1983, as the first LAN software based on file-server technology. Over time, NetWare integrated a growing number of networking technologies.

(94)   Since NetWare 4 in 1993, Novell's work group server operating system products have been released with a directory service. This directory service was called NDS (Novell Directory Service), and its successor, eDirectory, is available with NetWare,[99] but can also run on other platforms, such as Windows NT or Windows 2000 for servers, as well as various Linux or UNIX versions.[100]

(95)   On 14 April 2003, Novell announced that its NetWare 7 product (due out in approximately 2005) would come in two versions, one based on the traditional NetWare platform and one built around the Linux operating system.[101]

(96)   NetWare 6[102] with a 5-user licence is priced at USD 896.[103] It runs on servers with an Intel architecture.

3.2.4.2 UNIX products

(97)   Sun is a major manufacturer of servers. Sun developed a UNIX-based operating system called Solaris. The Solaris operating system may be configured and customised according to customers' preferences by the addition of Solaris Server extensions. On 23 May 2002, Sun released version 9 of Solaris. Solaris 9 is available in an Intel-compatible version and also runs on Sun's proprietary hardware,

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[98]   Like Linux, FreeBSD borrows a lot from UNIX concepts.

[99]   See *Novell, NetWare, Information at-a-glance*, printed from on 23 January 2003 from http://www.novell.com/products/netware/quicklook.html.

[100]   See *eDirectory vs. Sun One Directory*, printed on 2 December 2002 from http://www.novell.com/inc/pf/pf.jsp?url=http://www.novell.com/collateral/4820810/4820810.html.

[101]   See http://www.nwfusion.com/news/2003/0414novlinux.html, printed on 20 October 2003.

[102]   The latest version of this is NetWare 6.5.

[103]   See http://shop.novell.com/dr/v2/ec_MAIN.Entry16?SP=10024&CID=59633&PN=29&xid=27477&V1=30 010917&V2=30010917&V3=1&V5=11000021&V4=10&S1=&S2=&S3=&S4=&S5=&DSP=0&CUR =840&PGRP=0&CACHE_ID=59633, printed on 24 January 2003.

using the SPARC processor, designed by Sun.[104] The price of an upgrade from an already installed version of Solaris 8 to Solaris 9 is USD 95.[105]

(98)   Contrary to Microsoft and Novell, Sun's business model is to sell a hardware and software bundle. Many servers falling under its "entry-level" server category[106] offer work group server services. For instance, the Sun Fire V60x (Intel processor, from USD 2,450 to USD 3,395) and Sun Fire V65x servers are described, *inter alia*, as "*workgroup servers*".

(99)   As is the case with Novell's work group server operating system product, Sun's Solaris includes a directory service, Sun Java System Directory Service 5.2 (formerly known as the Sun "ONE Directory Server").[107] This directory server is the successor of the "Netscape Directory Server", first marketed by Netscape in 1996 for use with its mail and Web servers.[108] The Sun Java System Directory Server 5.2 can run on Sun's UNIX and Linux operating system products, on most Linux and UNIX versions, as well as on Windows 2000 Server.[109]

(100)   The SCO Group ("SCO")[110] markets another version of UNIX, UnixWare 7.1.3 Business Edition as a server "*for small businesses or workgroups requiring file and print services, reliable access to diverse applications, and the ability to expand system capability as the organisation grows*".[111]

3.2.4.3   Linux products

(101)   Linux is also used as a basis for work group server operating systems.

(102)   Red Hat describes its Red Hat Enterprise Linux ES in the following way:

> "*Red Hat Enterprise Linux ES provides the core operating system and networking infrastructure for a wide range of entry-level and departmental*

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[104]   SPARC is produced by Sun, and based on the RISC (reduced instructions set) technology.

[105]   See http://wwws.sun.com/software/solaris/binaries/package.html printed on 15 April 2003.

[106]   Sun's "entry-level" servers: Fire B1600, Fire B100s, Fire V100, Fire V 120, LX 50, Fire V 120, 210, Fire V 240, Fire 280R, Fire V480, Fire V 880, and Enterprise 250, at http://www.sun.com/servers/entry, printed on 15 April 2003. See also Sun's Web page on Enterprise Servers (Case IV/C-3/37.345 page 4462).

[107]   ONE stands for "Open Net Environment". See Sun's Press Release *Sun Microsystems rolls out Sun ONE*, printed from http://www.sun.com/smi/Press/sunflash.20011023.1.html on 2 December 2002.

[108]   The "directory approach" is useful for messaging software, in order to keep track of all users of a messaging service in a structured way. It is also very useful in the realm of e-business, in order to maintain information about customers, trading partners, suppliers, etc.

[109]   See   http://wwws.sun.com/software/products/directory_srvr/home_directory.html,   printed   on 2 December 2002.

[110]   Caldera International, Inc. acquired SCO late 2000. In August 2002, Caldera International, Inc. announced that it would change its name to The SCO Group upon shareholder approval. See *Caldera to Change Name to the SCO Group*, printed on 15 December 2003 from http://ir.sco.com/ReleaseDetail.cfm?ReleaseID=88781.

[111]   See http://www.caldera.com/products/openunix/, printed on 15 December 2003.

server applications. It is ideally suited for network, file, print, mail, Web, and custom or packaged business applications."[112]

(103)   Linux vendors such as Red Hat (or SuSE) are not hardware manufacturers. Hardware manufacturers such as Sun, IBM, HP and Dell partner with them to offer the Linux operating system with their products, in particular on Intel-compatible servers.

(104)   In addition, with the source code of the Linux operating system being freely available on the Web, customers may download the product and install it on their hardware.

3.2.4.4   Mac OS X

(105)   Apple launched its Mac OS X Server operating system in 2002. Mac OS X Server is a UNIX-based operating system.[113]   It offers traditional work group server functionality, including a directory service called Open Directory.[114] The Mac OS X Server operating system is priced at USD 499 for 10 clients and USD 999 for unlimited client use.

3.2.4.5   OS/2 Warp Server

(106)   IBM's OS/2 Warp Server was developed by IBM as a server operating system for Intel-based architecture and a competitor to NetWare and Windows.[115]   IBM describes OS/2 as "*the choice network OS*" (although its "*OS/2 Strategy for 2003*" focuses more on the use of OS/2 in the Internet than as a typical work group server operating system).[116] OS/2 Warp is priced at USD 1,614.[117]

3.3   Media players

3.3.1   The digital media industry

(107)   Before turning to Microsoft's and its competitors' media players, it is necessary to provide a short overview of the economic factors which characterise supply, competition and consumption patterns in digital media. As the distribution of digital

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[112]   See http://www.redhat.com/software/rhel/es, printed on 30 May 2003.
[113]   See http://www.apple.com/server/macosx, printed on 30 May 2003.
[114]   See http://www.apple.com/server/macosx/opendirectory.html, printed on 30 May 2003.
[115]   See for instance *OS/2 Warp Server, Windows NT, and NetWare, A Network Operating System Study*, printed from http://www.redbooks.ibm.com/pubs/pdfs/redbooks/sg244786.pdf on 30 May 2003.
[116]   See *OS/2 Strategy for 2003*, printed from http://www-3.ibm.com/software/os/warp/strategy on 30 May 2003.
[117]   See   http://www-132.ibm.com/webapp/wcs/stores/servlet/CategoryDisplay?lang=en_US&catalogId=-840&categoryId=2040337&cgmenbr=1&dualCurrId=73&langId=-l&cgrfnbr=2040337&y=9&x=8&cntrfnbr=1&storeId=1&cntry=840&scrfnbr=73, printed on 24 January 2003

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music over the Internet is more developed than the distribution of digital moving images and a distribution pattern has evolved, the examples given will at times in particular refer to music.

3.3.1.1 Content owners are the source of digital content

(108) At the beginning of the digital distribution chain stands content, that is to say, pieces of information or entertainment in the form of sound and images. Content is normally owned by someone and often this content owner will have copyright over the content and can therefore control its reproduction and distribution by for instance licensing others to market a product based on the copyrighted work. By way of illustration, as regards digital music, there are so-called content owners who license musical works from various artists and distribute them or license them for distribution.

3.3.1.2 Content providers aggregate content and make it accessible

(109) When distributing digital music, content owners often license content providers (intermediaries) which aggregate the music and provide a music service directly to end users (for example, Apple, PressPlay, Yahoo).[118] The intermediaries may also provide the IT platform and provide their service to other corporate customers who then sell to end users (for example, OD2).[119]

(110) Content providers are often entities which produce and sell their own content. British Broadcasting Technology ("BBCT"), for instance, is a content provider which operates a Web site where users can access the news not only in the form of text but also in the form of images and sound.[120] It should be noted that besides the much reported impact that digital media had on the music and film industries, digital media also plays an important role in the corporate environment (for example, training videos over a local area network) and for home use (for example, a holiday film shot on a digital camcorder[121]).

(111) To provide a digital master copy of a musical work on a CD to content providers is straightforward. To make copies of this master copy and to enable an undefined number of end users to purchase the work is, however, challenging from a logistical point of view, and presupposes for example having access to a network of retail outlets. The dissemination of client PCs and the availability of access to the Internet has opened up a new way of distributing digital content which is characterised by

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[118]   See for example Microsoft's submission of 17 October 2003, NERA, on page C-5.
[119]   Entity T34's submission of 7 August 2003, at answer 1.
[120]   See Entity T11's submission of 18 July 2003, at answer 1 and 2.
[121]   A digital camcorder is a digital video camera that records images in digital form. The images can be transferred to a PC.

low marginal distribution costs: content providers can store digital content on servers connected to the Internet, which the users will then access from their client PC.

3.3.1.3   Enabling technology including streaming media players is provided by software developers

(112)   To allow for the distribution of content over IT networks, not only a physical IT infrastructure, but also a software infrastructure that enables the creation, transmission and the playback of such content in digital form is needed. This is the field in which software technology providers such as Microsoft, RealNetworks and Apple are active.

(113)   It is specific to Microsoft, RealNetworks and Apple that, besides some support for industry standard formats (see recital (114)), they offer an end-to-end solution (from the encoding software to the player), based on their own digital media technologies and proprietary file formats. Microsoft's "Windows Media formats" include WMA (audio compressed using the Windows Media Audio codec), WMV (audio and video compressed using the Windows Media Audio codec) and ASF.[122]   Apple's "QuickTime formats" have the file extensions ".qt" and ".mov" and ".moov". RealNetworks' formats are called RealAudio (".ra" file extension) and RealVideo (".ram" file extension), and will be referred collectively as "Real formats".

(114)   There are also various industry standards that have been developed in this field.[123]   In particular, the Moving Picture Expert Group ("MPEG") is a working group of the ISO/IEC[124] in charge of the development of standards for coded representation of digital audio and video.[125]   Established in 1988, the group has *inter alia* developed MPEG-1, on which the very popular "MP3" file format is based, MPEG-2, which is used by DVDs,[126] and MPEG-4, which is based on Apple's QuickTime file format. AAC (Advanced Audio Coding) is the audio part of the MPEG-4 standard and is

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[122]   ASF (Advanced Streaming Format) defines the structure of synchronised object data streams (audio, multi-bit-rate video, metadata (such as the file's title and author), and index and script commands (such as Uniform Resource Locators ("URL") and closed captioning).   ASF-formatted content can be streamed or stored as files. Audio and/or Video content compressed with different codecs can be stored in an ASF file while "*Windows Media Player is the client application used to play back ASF streams.*" (Microsoft's submission of 17 October 2003 (NERA), Exhibit 44, S. Kevorkian, *Microsoft and Streaming Media: A Profile*, on page 10)

[123]   These standards are partly supported in Microsoft's, RealNetworks' and Apple's products.

[124]   IEC stands for the International Electrotechnical Commission. See http://www.iec.ch/about/mission-e.htm printed on 9 December 2003.   The IEC is an organization that prepares and publishes international standards for all electrical, electronic and related technologies. The ISO and the IEC work in common on a number of projects. See http://www.iec.ch/about/partners/prtner-e.htm printed on 9 December 2003.

[125]   See http://www.chiariglione.org/mpeg/index.htm, printed on 6 January 2004.

[126]   A DVD (Digital Versatile Disk) is a type of CD that has a storage capacity (4.7 Gbyte) which is much higher than a CD-ROM (600 Mbyte). A DVD can also deliver the data at a higher rate than a CD-ROM.

often considered as a replacement for MP3.[127] There also exist open source patent-free and royalty-free audio formats, for example Ogg Vorbis.[128]

(115)   A further example of an open industry standard, which relates to streaming, is the "Real Time Streaming Protocol" ("RTSP"). RTSP was developed *inter alia* by RealNetworks and Netscape in the framework of the IETF,[129] and builds on the "Real Time Protocol" ("RTP"), another Internet protocol.[130] Other streaming protocols, such as the Microsoft Media Server ("MMS") protocol, are proprietary.

(116)   A further initiative in the field of standardisation for media technology is the "Internet Streaming Media Alliance (ISMA)", which was founded in 2000 *inter alia* by Apple, IBM and Sun, as "*a non-profit corporation formed to create specification(s) that define an interoperable implementation for streaming rich media*".[131]

(117)   Besides Microsoft, RealNetworks and Apple, most software developers in the field of digital media have not developed an end-to-end solution for delivery of media content. They rather license the technology from one of these three companies or use open industry standards. This will as a rule involve the payment of licensing fees to the companies or industry groups that own the technology.[132]

(118)   The ability to "mix and match" products from various vendors to deliver content (for example, a media player from one technology provider and a server-side software from another one) will depend on whether the various technology providers have implemented the codecs and streaming protocols that are necessary for that purpose.

3.3.1.4   Various channels for distribution of media players to end users exist

(119)   Distribution of media players can be secured through technology providers entering into agreements with OEMs who install the media players on PCs. End users then find the media player present on the "out of the box" PC together with the operating system and possibly other add-on software for which there is consumer demand. The

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[127]   See, for example, http://www.apple.com/mpeg4/aac/, printed on 9 December 2003.

[128]   Ogg is the name of the container format for audio, video, and metadata. Vorbis is the name of a specific audio compression scheme that is designed to be contained in Ogg. See http://www.vorbis.com.

[129]   RTSP is defined by RFC 2326. See http://ietf.org/rfc/rfc2326.txt?number=2326, printed on 9 December 2003. For a definition of "RFC", see above at footnote 61.

[130]   RTP is defined by RFC 1889. See http://ietf.org/rfc/rfc1889.txt?number=1889, printed on 9 December 2003.

[131]   See http://www.isma.tv/about/, printed on 9 December 2003.

[132]   For instance, the use of Microsoft's codecs in a product is subject to a license fee. Unit pricing for Windows Media Video 9 on devices and non-Windows platforms is 10 US cents per decoder, 20 cents per encoder and 25 cents for both encoder/decoder (as announced in January 2003). See *Final Release of Windows Media 9 Series Starts Next Wave of Digital Media*, 7 January 2003, printed from http://www.microsoft.com/presspass/press/2003/jan03/01-079SeriesFinalReleasePR.asp.

software vendor's relationship with an OEM involves the grant of a licence to the OEM to install the media player on the OEM's PCs (distribution licence). Normally, the demand of OEMs in relation to software vendors (such as Microsoft or RealNetworks) derives from end-users' demand in relation to the OEMs. Therefore, OEMs in their relation to software vendors can be seen as acting as "purchasing agents" for end-users.

(120) The Internet provides for an alternative distribution channel as end users can download a media player onto their client PCs. Other channels include distribution in retail stores, distribution together with other software products (either because the media player is essential to the working of the relevant software product or because the media player vendor tries to increase its technology's dissemination by taking advantage of the distribution of the other software programme). Media players can also be embedded in Web pages using redistributable code. The respective merits of these forms of distribution will be further discussed below at recital (849) *et seq.*

3.3.2   Microsoft's products

(121) Microsoft's media player is called Windows Media Player ("WMP"). Microsoft's most recent player is Windows Media Player 9 Series ("WMP 9") and has been available since 7 January 2003 as an upgrade to previous versions of Windows Media Player for download for Windows XP, Windows 98 SE, Windows Me, and Windows 2000.[133] WMP 9 is also available for Macintosh and UNIX computers since the beginning of November 2003. WMP 9 delivers *inter alia* digital audio and video playback both via download and streaming, Internet radio tuner, DVD playback support, an integrated media guide from WindowsMedia.com, audio CD creation, one-click transfer of digital music to portable devices, and personalisation for users. Information on Microsoft's past record regarding media players and server side media software will be given at recitals (302) to (315).

(122) WMP 9 supports neither Real nor QuickTime formats. WMP 9 plays MP3 files but does not enable native MP3 recording (users need a plug-in product). WMP 9 does not play standard MPEG-4 video files.[134]

(123) WMP 9 is a product which is part of what Microsoft calls Windows Media Technologies. Another product is Windows Media Services 9 Series, Microsoft's streaming server software. Windows Media Services 9 Series Servers can stream

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[133]   See Microsoft's press release of 7 January 2003, printed on 28 January 2003. According to Microsoft's Web site, downloading Windows Media Player 9 Series Beta (13.3 MB) for Windows 98 SE, Me and 2000 takes 62 minutes @ 28.8 kb, and 45 minutes for Windows XP). Downloading Windows Media Player 7.1 (10.187 MB) for Windows 98, Me and 2000 takes 49 minutes @ 28.8 kb). See http://www.microsoft.com/windows/windowsmedia/download/default.asp, printed 28 January 2003.

[134]   See *Microsoft's media player beat goes on*, 6 August 2002, CNET News.com, printed on 27 January 2003.

WMA, WMV, ASF, MP3 files. However, Windows Media Services cannot use the intelligent streaming feature to stream files in MP3 format. Windows Media Services 9 Series runs only on Windows servers and is freely available as an optional component on any version of the Windows 2003 Server family.[135] At the same time, users can download Windows Media Services for free from Microsoft's Web site.

(124) Microsoft also distributes its Windows Media Encoder ("Windows Media Encoder 9 Series") for free download. Windows Media Encoder allows content providers to create digital media files in the Microsoft media formats, and to package them using Microsoft's DRM technology.

3.3.3   Other parties' products

3.3.3.1   RealNetworks

(125) RealNetworks is a software company specialised in network-delivered digital media services and the technology that enables digital media creation, distribution and consumption.[136] RealNetworks reports revenues in three categories: software licence fees (client and server side) accounting for 39.8% of net revenue in 2002, service revenues (mainly digital media subscription services) accounting for 56.6% and advertising revenues accounting for 3.7%.[137] RealNetworks' revenue over the last years shows a clear tendency towards service based revenue.[138]

(126) In 1995, RealNetworks (then called Progressive Networks[139]) was the first major company to commercially implement streaming media (audio) over the Internet in its media player and media server. The RealAudio player compressed sound files and streamed them over the Internet in real time. At the time RealNetworks introduced three products: RealAudio player for consumers, RealAudio Studio for content creators, and RealAudio Server for on-line publishers. RealAudio player was available for free for the Macintosh, Windows, and some UNIX PCs. Microsoft

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[135] See http://www.microsoft.com/windowsserver2003/technologies/winmedia/default.mspx, printed on 9 December 2003.
[136] See RealNetworks' *Annual Report to the United States Securities And Exchange Commission for the year ended December 31, 2002*, item 7, printed on 12 May 2003 from http://www.sec.gov/Archives/edgar/data/1046327/000089102003000987/v88043e10vk.htm.
[137] See RealNetworks' *Annual Report to the United States Securities And Exchange Commission for the year ended December 31, 2002*, item 7, printed on 12 May 2003 from http://www.sec.gov/Archives/edgar/data/1046327/000089102003000987/v88043e10vk.htm,on page 17.
[138] By way of illustration, in 1998, the repartition of net revenues was as follows : 73.0% for software license fees, 22.2% for service revenues and 0.05% for advertising revenues. See RealNetworks' *Annual Report to the United States Securities And Exchange Commission for the year ended December 31, 2002*, item 7, on page 16 (printed on 12 May 2003 from http://www.sec.gov/Archives/edgar/data/1046327/000089102003000987/v88043e10vk.htm).
[139] The name changed to RealNetworks in 1997.

included RealNetworks' RealAudio player as part of Microsoft's Internet Explorer in Windows 95.[140]

(127)   In January 1996, RealNetworks introduced RealAudio 2.0 which included a live streaming broadcast feature which allowed users to listen to live broadcasts. In August 1996, RealNetworks began selling RealPlayer Plus, a premium version of its RealPlayer product. RealPlayer 4.0, which played live and on-demand audio and video, was launched in February 1997.[141]

(128)   In July 1998, RealNetworks released its RealSystem G2 technology including RealPlayer G2.[142] The technology was built on open industry standards, in particular Real Time Streaming Protocol (RTSP).[143] Support for SMIL[144] allowed Web site creators to define and synchronise multimedia elements (video, sound, still images) for Web presentation and interaction.

(129)   In May 1999, RealNetworks introduced RealJukebox, which allowed users to organise and record audio and video files onto CD-ROMs. In December 2001, RealNetworks introduced RealOne Player which merged RealPlayer and RealJukebox. RealOne Player supports MPEG-4 besides Real, WMA and MP3 formats. In December 2001, RealNetworks also launched its RealOne subscription service which offers third-party premium content such as National Basketball Association ("NBA") and Major League Baseball ("MLB") games.[145]

(130)   In July 2002, RealNetworks announced the launch of its new architecture called Helix and in particular the Helix Universal Server which would support streaming in various file formats, including Windows Media formats.[146] In the absence of a licensing agreement covering Microsoft's server transmission technology, RealNetworks developed Helix by observing and analysing communications "on the wire" between Microsoft clients and servers.[147] Helix does not allow encoding of content in Windows Media formats.

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[140]   *Progressive Networks' RealAudio Player has Exclusive [sic] with Microsoft's Internet Explorer*, RealNetworks' press release of 17 August 1995, printed on 22 May 2003.

[141]   Support for streaming video was added to Microsoft's WMP shortly afterwards. See Microsoft's submission of 7 February 2004, on page 49.

[142]   See Microsoft's *Computer Dictionary*, Fifth Edition, 2002, on page 441.

[143]   See above, at recital (115).

[144]   SMIL stands for Synchronized Multimedia Integration Language.

[145]   As regards MLB, not only has RealNetworks' exclusive deal expired in 2003, but also is it reported that WMP is now default for premium service on MLB Advanced Media which led RealNetworks to sue MLB Advanced Media for breach of contract (http://www.eweek.com/article2/0,4149,1547722,00.asp?kc=EWRSS03119TX1K0000594, see also http://online.wsj.com/article/0,,SB107998754119162020,00.html?mod=COMPANY).

[146]   See http://www.realnetworks.com/company/press/releases/2002/helix_products.html, printed on 9 December 2003.

[147]   *RealNetworks Poses Challenge to Microsoft*, The New York Times, online, 23 July 2002.

(131)   In August 2002, RealNetworks launched RealOne Player Plus which is also included as part of its subscription service.[148] The present version of RealNetworks' media player is RealOne Player Version 2.0. The new RealPlayer 10, which includes support for the Advanced Audio Coding (AAC is the standard MPEG-4 audio format) audio file format, includes an online music store and is available as a beta release.[149] RealNetworks distributes a basic version of that player for free and sells a premium version that contains various value-added features and services, for a one time fee of USD 19.95.[150] Users who subscribe to RealOne SuperPass get the premium version of the RealOne Player and access to programming from for example, BBC, CNN and MTV Europe for a monthly membership fee of EUR 14.99.[151] The RealOne Player[152] is available for both the Windows operating systems and the Macintosh operating system. It is also available on Linux.[153] Also in January 2004, RealNetworks introduced the RealPlayer Music Store where music tracks can be downloaded for USD 0.99.[154]

(132)   As regards formats, RealOne Player Plus supports QuickTime MPEG-4, but the basic version (RealOne Player) does not support QuickTime formats. When run on Windows, RealOne Player Plus supports playback of Windows Media files (the basic version does not), albeit not from within Microsoft Internet Explorer. RealOne Player Plus cannot create WMA files.

(133)   As regards server-side software, RealNetworks offers a free one-year licence to its basic Helix Universal Server version (RealNetworks' streaming server software).[155] Helix Universal Server runs on Windows NT 4.0, Windows 2000, Linux, FreeBSD, Solaris, AIX,[156] HP-UX[157] and Tru64[158].[159] More sophisticated products supporting a higher number of simultaneous users start at USD 4,199 (Helix Universal Server - Enterprise).[160]

(134)   As regards encoding software, RealNetworks sells its full-featured version of Helix Producer Plus for USD 199.95[161] and offers a basic version for free.[162]

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[148]   See http://www.realnetworks.com/company/press/releases/2002/universal_realone.html
[149]   RealPlayer 10 was introduced in January 2004
    See http://www.realnetworks.com/company/press/releases/2004/real10platform.html.
[150]   See http://europe.real.com/freeplayer_r1p.html.
[151]   See http://europe.real.com/index.html?lang=en-gb&loc=lu, printed on 4 September 2002.
[152]   See http://www.real.com/realone/mac/index.html
[153]   See http://forms.real.com/real/player/unix/unix.html
[154]   See http://www.realnetworks.com/company/press/releases/2004/10centpromo.html.
[155]   See http://licensekey.realnetworks.com/rnforms/products/servers/eval/index.html?ulf=b, printed on 4 September 2002.
[156]   AIX is a UNIX server operating system marketed by IBM.
[157]   HP-UX is a UNIX server operating system marketed by HP.
[158]   Tru64 is a UNIX server operating system marketed by HP.
[159]   See http://www.realnetworks.com/products/server/specifications.html printed on 9 December 2003.
[160]   See http://www.realnetworks.com/products/server/index.html, visited 4 September 2002.
[161]   See http://www.realnetworks.com/products/producer/index.html, visited on 4 September 2002.

3.3.3.2   Apple

(135)   Apple developed its media player, called QuickTime Player, in the early 1990s. QuickTime first ran exclusively on Apple's Macintosh computers. In November 1994, Apple released QuickTime 2.0 for Windows, thereby offering developers a cross-platform standard for creating, using and sharing multimedia content between Macintosh and Windows computers. Users could download the Windows version for USD 7.95. The Apple Movie Player application cost an additional USD 14.95.

(136)   QuickTime 3.0 (introduced in 1998) included an advanced codec and supported a variety of formats. Apple offered an upgrade to QuickTime 3.0 (called QuickTimePro) for USD 29.95 which permitted editing of files.

(137)   In April 1999, QuickTime 4.0 was released. QuickTime 4.0 introduced support for media streaming.[163] Besides the Macintosh and Windows formats, it supported MP3. In April 2001, Apple introduced QuickTime 5.0 which supported MPEG. QuickTime 5 is available for free while QuickTimePro costs USD 29.99.[164] Apple offers QuickTime 5 as a suite of software applications including the QuickTime 5 Player which Apple commends as *the premier standalone application for multimedia playback on your computer*". QuickTime 5 runs on Windows 98 (and later versions).

(138)   At the beginning of 2001, Apple launched iTunes, a digital music player.[165] iTunes provides jukebox functionality for the Mac (supporting MP3), and allows the compression and transfer of songs from CD-ROMs to the computer's hard drive and to portable devices such as the popular iPod, to organise tracks into play lists, to listen to Internet radio stations and to burn CDs. iTunes can be downloaded for free and is shipped with the Macintosh. In February 2002, Apple improved iTunes to version 2.0, in July 2002 to version 3.0, and in April 2003 to version 4.0. iTunes 4.0 supports Advanced Audio Coding (AAC). In May 2003, Apple launched the iTunes Music Store, an online music store based on the iTunes player, where music tracks (in AAC and MP3 formats) can be downloaded for USD 0.99.[166]

(139)   The most recent version of QuickTime is QuickTime 6 which was released in July 2002 and which includes support for MPEG-4 (MPEG-4 video, AAC audio, .mp4 file format). As outlined above, Apple contributed to the development of MPEG-

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[162]   See http://www.realnetworks.com/products/producer/basic.html, visited on 4 September 2002.
[163]   *Apple Releases QuickTime 4 Public Beta with Internet Streaming*, Apple press release of 19 April 1999, at http://www.apple.com/pr/library/1999/apr/19qt4beta.html, printed on 22 May 2003.
[164]   See http://www.apple.com/quicktime/download/, printed on 10 May 2001.
[165]   See http://www.apple.com/pr/library/2001/jan/16itunes.html.
[166]   See   http://www.apple.com/pr/library/2003/may/05musicstore.html   and http://www.apple.com/itunes/overview.html.

4.[167] QuickTime does not support Real formats or Windows Media formats. It comes in a basic version (Quick Time 6 Player supports playback of MPEG-4 in addition to playback of Macintosh file formats) and an upgrade version called QuickTime 6 Pro which supports, *inter alia*, encoding in MPEG-4. The Pro version of the QuickTime player costs USD 29.99 while the basic version is free. The QuickTime player[168] and iTunes are also available for Windows.

(140)   QuickTime Streaming Server is Apple's server software which enables the streaming of live and stored video and audio over the Internet.[169] QuickTime Streaming Server runs only on Mac OS server and is preinstalled on Apple's servers.[170] Darwin Streaming Server is the open source version of Apple's QuickTime Streaming Server technology.[171] The Darwin Streaming Server runs on Mac OS X Server, Linux, Solaris 9, and Windows 2000/2003 Server.

3.3.3.3   Other media players

(141)   MusicMatch[172] offers an audio player called MusicMatch Jukebox (currently version 8). MusicMatch Jukebox allows users to play digital music, to rip and burn CDs and to organise and arrange music. It licenses and supports different third party file formats and codecs including MP3 and WMA.[173] It also streams audio (it offers access to Internet radio stations) and users can view the videos that go with the music.[174] MusicMatch Jukebox comes in two versions. The basic version is free. A premium version, called MusicMatch Jukebox Plus is sold at USD 19.99 and extends format support to MP3Pro[175] and provides other superior functionality compared to the basic version, for instance higher CD burning speeds.[176] In September 2003, MusicMatch started to offer an online music service based on MusicMatch Jukebox called MusicMatch downloads (comparable to iTunes from Apple).[177] MusicMatch Jukebox is available for the Windows and Mac operating systems.

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[167]   See above, at recital (114).
[168]   QuickTime 6.0 is available for Windows 98, Windows Me, Windows 2000, Windows NT 4.0 and Windows XP. iTunes supports the Macintosh (Mac OS X v10.1.5 or later and Windows 2000 and XP).
[169]   See http://www.apple.com/quicktime/products/qtss/, printed on 9 December 2003.
[170]   See http://www.apple.com/server/media_streaming.html, printed on 9 December 2003.
[171]   See http://developer.apple.com/darwin/projects/streaming/, printed on 9 December 2003. The Darwin Streaming Server is licensed under the "Apple Public Source License". See http://www.opensource.apple.com/apsl/, printed on 9 December 2003.
[172]   Founded in 1997, MusicMatch is a US company primarily active in digital music. See http://www.musicmatch.com/info/company/who/, printed on 9 December 2003.
[173]   MusicMatch's submission of 14 November 2002, at page 8. See also MusicMatch's submission of 8 July 2003, on page 4. MusicMatch points out that the MPEG licenses are for the life of the patents while the WMA license term is for one-year.
[174]   See http://www.musicmatch.com/download/plus/jukebox_intro.htm?os=pc&mode=input&BTD=1&DID=
[175]   MP3Pro is a format based on MP3 (see for example http://www.codingtechnologies.com/products/mp3pro.htm).
[176]   MusicMatch's submission of 8 July 2003, on page 3.
[177]   http://www.musicmatch.com/info/company/press/releases/?year=2003&release=13

(142)   The Winamp Media Player[178] is a freeware player by Nullsoft, registered in Dulles, United States, which supports *inter alia* MP3, WAV[179] and WMA files.[180] It also provides audio streaming, in particular Internet radio. It is available for the Windows and Mac operating systems.

(143)   As can be seen from the above, a common characteristic of the media players outlined at recitals (141) to (142) is that they do not rely on their own codecs or file formats but support either third parties' proprietary technologies or open formats such as Ogg Vorbis.[181] A second differentiating trait is that contrary to Microsoft, RealNetworks and Apple, these vendors are business-to-consumer and not business-to-business oriented. They do not sell software which would allow content providers to create, manage and deliver digital content.

4   MICROSOFT'S BEHAVIOUR

4.1   Interoperability[182]

4.1.1   Interoperability in Windows work group networks

(144)   Microsoft's client PC and work group server operating systems have been described above.[183] Before turning to the conduct of Microsoft relating to interoperability, it is first necessary to provide further background information on certain technologies used in these products.

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178   http://www.winamp.com
179   A sound file format.
180   http://www.winamp.com/download/;$sessionid$AA0D2P2PNJM1FTN241HRCZA
181   Annex J to Microsoft's submission of 17 October 2003 (NERA) in response to the Commission's supplementary Statement of Objections.
182   Microsoft's conduct is described in this section with respect to Windows 2000. The essential characteristics of the technologies that are at stake in the present case are similar in Microsoft's Windows 2000 and Windows XP / Windows 2003 generations of client PC and work group server operating system products. As such, this description applies also to the latest generation of Microsoft's computers. As Microsoft's Web site puts it: "*The Windows Server 2003 family builds on the proven reliability, scalability, and manageability of Windows 2000 Server while improving essential services.*". See http://www.microsoft.com/windowsserver2003/evaluation/overview/default.mspx, printed on 12 May 2003. In a Microsoft press release announcing the final testing of Windows Server 2003 (then called Windows .NET Server 2003, Michael Cherry, lead analyst for operating systems at independent analyst firm, Directions on Microsoft, was quoted as stating "*with Windows .NET Server 2003 Microsoft has improved key technologies such as [...] Active Directory, and Group Policy Manager [...]*". See http://www.microsoft.com/presspass/press/2002/Nov02/11-18RC2PR.asp, printed on 31 January 2003.
183   See above, in Section 3.2.2.

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4.1.1.1   Windows domains

(145)   As outlined above at recital (56), one of the core work group server operating system tasks is the provision of group and user administration services. In Windows work group networks,[184] the concept of "Windows domain" is fundamental to that task.

(146)   All generations of Microsoft's work group server operating system products, from the early Windows NT 3.x versions to Windows 2003 Server through Windows NT 4.0 and Windows 2000, administer client PCs and work group servers in administrative units called "Windows domains". Each "resource" (computer, printer, user, application, etc.) in a Windows domain has one "domain account", which defines its identity for the whole domain. When a user wants to have access to the domain, he "logs on". He does it typically by typing his user name and password, which are then matched against the information stored in his account. Within the same Windows domain, there is "single user logon": as soon as a user has logged on to one resource – typically his client PC – he will be "recognised" by all the resources in the Windows domain and will not need to type his name and password again.

(147)   In a Windows domain, certain servers are set up as "domain controllers", which means that they have the responsibility to store the domain accounts and the related information. Domain controllers act as switchboard operators of the Windows domain, from which the group and user administration task is carried out. Servers that are not domain controllers but are part of the domain are called "member servers".

(148)   In a Windows NT domain,[185] domain controllers managed the domain accounts using a feature of the Windows operating system called the "Security Accounts Manager registry" (or "SAM registry"). The SAM registry was not as modern a directory service as for example, Novell's NDS, which was bundled with Novell's work group server operating system NetWare.[186] In particular, the SAM registry did not support directory-related standards such as the X.500 standards or the LDAP directory access protocol. Administering several domains from the SAM registry was cumbersome.[187]

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[184]   Throughout the present Decision, the term "(Windows) work group network" will be used to designate a set of (Windows) client PCs and (Windows) work group servers that serve these client PCs.

[185]   In the present Decision, the term "Windows NT domain" will designate a domain running in "Windows NT" mode (i.e. up to Windows NT 4.0 technology), as opposed to a Windows 2000 domain.

[186]   In its submission dated 16 November 2001, Microsoft indicates that *the Windows NT 4.0 directory services were fairly rudimentary*" (annex D, on page 6).

[187]   Daniel Blum, *Understanding Active Directory Services* (Microsoft Press 1999), on page 89-90.

(149)   Contrary to Windows NT Server, Windows 2000 Server includes a full-fledged directory service, called the "Active Directory" service.[188] The introduction of the Active Directory service has been accompanied by a number of changes in the way domain controllers relate to each other in Windows 2000 domains, compared to Windows NT domains.

(150)   For instance, in Windows NT 4.0, changes to the domain accounts could be made only at *one* server of the domain, the "primary domain controller". One or more servers acting as "backup domain controllers" maintained copies of the SAM registry. That copy was periodically and automatically updated, through a synchronisation process with the primary domain controller. In a Windows 2000 domain, however, all domain controllers are peers. As such, changes can be made at any of the domain controllers and are then propagated automatically to the other domain controllers, using new synchronisation protocols which are different to the ones used in Windows NT 4.0.[189]

(151)   Another new feature is that Windows 2000 domains can be organised in a hierarchical way, with "trees" of Windows 2000 domains linked to one another by automatic trust relationships. Several trees can then be linked by trust relationships in a "forest".[190] Windows 2000 domain controllers can be set up as "global catalogue servers", which means that in addition to the information on the resources available in the domain that it controls, the domain controller will store a "summary" of all the resources available in the forest ("the Global Catalogue data"). Such Global Catalogue data are kept updated through various protocols.

(152)   With the move from Windows NT to Windows 2000, there have also been changes with respect to the security architecture of Windows work group networks. For instance, in Windows NT domains, authentication[191] was based on a protocol called NTLM.[192] In Windows 2000 domains however, authentication is based on the

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[188]   When upgrading a Windows NT domain controller to a Windows 2000 domain controller, the data is transferred from the SAM registry to Active Directory.

[189]   Strictly speaking, this is only true in "native mode". However, as outlined in Section 4.1.1.4.1., native mode is the natural end stage of a Windows 2000 domain.
        See *Windows and .NET Magazine, What's new in Windows 2000 Directory Replication?*, printed from http://www.winnetmag.com/Articles/Index.cfm?ArticleID=8296 on 23 January 2003.

[190]   It is also possible to allocate resources to "sites", which represent the physical structure of the organisation.

[191]   See above, at recital (54).

[192]   See,   for   example, http://www.microsoft.com/windows2000/en/server/help/sag_SEconceptsUnAuthNTLM.htm, printed on 3 December 2002. NTLM stands for "NT LAN Manager". The "LAN Manager" was an early networking   product   released   by   Microsoft   in   1989.   See http://msdn.microsoft.com/library/default.asp?url=/library/en-us/security/security/microsoft_ntlm.asp, printed on 11 January 2004. See also Daniel Blum, *Understanding Active Directory Services*, on page 60.

"Kerberos" protocol. Microsoft's documentation describes the advantages of Kerberos authentication over NTLM authentication in the following terms:

"The Kerberos protocol is more flexible and efficient than NTLM, and more secure. The benefits gained by using Kerberos authentication are:

- **Faster connections** […]

- **Mutual authentication**: NTLM […] does not allow clients to verify a server's identity, or one server to verify the identity of another. […]

- **Simplified trust managemen**t. […] Network domains no longer require a complex web of explicit, point-to-point trust relationships."[193]

(153)   Kerberos is a security protocol that was originally developed by the Massachusetts Institute of Technology (MIT), as part of its research on the "Athena Project",[194] starting in 1983.[195] Kerberos version 5 ("MIT Kerberos") is an IETF standard, documented by "Request for Comment" No 1510 ("RFC 1510"), dated September 1998.[196] This specification foresees that entities in the network are grouped in "realms" and information on the resources of realms is stored in so-called Key Distribution Centres ("KDC").[197] In Windows 2000, Windows domains play a role analogous to the one played by Kerberos realms, and the Key Distribution Centre "*is integrated with other Windows 2000 security services running on the domain controller and uses the domain's Active Directory as its security account database*".[198]

(154)   Microsoft implements in Windows 2000 Professional and Windows 2000 Server an extended version of MIT Kerberos. This distinction between Microsoft's extended Kerberos and the standard MIT Kerberos will be further discussed below.[199]

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[193]   Microsoft, *Windows 2000 Kerberos Authentication*, White paper, printed from http://www.microsoft.com/TechNet/prodtechno1/windows2000server/deploy/confeat/kerberos.asp?frame=true on 22 July 2002.

[194]   The Athena Project was originally funded by Digital and IBM.

[195]   See Stuart Madnick and Patrick Valduriez, *Comments on the Commission's Statement of Objections Filed against Microsoft*, submitted by Microsoft as an annex to its submission of 16 November 2001.

[196]   See Microsoft's submission of 16 November 2001, Annex E, on page 1. For a definition of "RFC", see above at footnote 61.

[197]   See Sun's submission of 22 September 2000, on page 19.

[198]   See Sun's submission of 22 September 2000, on page 21, quoting Microsoft's *Windows 2000 Kerberos Authentication*,
printed from http://www.microsoft.com./windows2000/library/howitworks/security/kerberos.asp on 15 December 1999.

[199]   See recitals (251) *et seq*.

(155)   A last example of the changes brought to the Windows domains by the move from Windows NT to Windows 2000 and Active Directory relates to the management of the client PCs, a key element of the group and user administration task. In *Understanding Active Directory Services*, a book by Daniel Blum published in Microsoft Press shortly before the launch of Windows 2000, it is explained that: "*[a] manageable general-purpose directory infrastructure offers enterprises the opportunity to reduce workstation or PC maintenance costs, currently estimated at thousands of dollars per year per PC. [...] When information is in the workstation, making changes requires hands-on touch management of each workstation, but when information is moved to the network directory, changes need be made only once. Early directory-enabled tools, such as Novell's Z.E.N.works and Netscape Mission Control Desktop, have proven this concept, which Microsoft has adopted in its Zero Administration Initiative for Windows (ZAW)*".[200] In Windows 2000, "*all the ZAW initiatives benefit indirectly from the role of Active Directory services as the repository for configuration and location data for [various] items*".[201]

(156)   In other words, a number of features have been integrated in both Windows 2000 Professional and Windows 2000 Server to simplify administration of the Windows client PCs in Windows domains. Those features are significantly enhanced (or are only available) in a Windows 2000 domain, managed from a Windows 2000 domain controller running Active Directory. This is in particular the case for the features of the Windows 2000 domain called "Group Policy" and "Intellimirror".[202]

(157)   Microsoft explains that Group Policy is "*a feature of Windows 2000 [...] that allows administrators centrally to manage collections of users, computers, applications and other network resources instead of managing these objects on a one-by-one basis*".[203] Groups can be defined locally for a given computer or for the whole Windows domain. In a Windows 2000 domain, a network administrator can organise groups in a more flexible manner than in an NT domain. For instance, he can set up "universal security groups", which are valid in all the domains of the forest, and "nesting security groups", that is to say groups that contain other groups. This is useful, for example, to delegate administration at a more granular level to

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[200]   Daniel Blum, *Understanding Active Directory Services* (Microsoft Press 1999), on page 9. The "Zero Administration Initiative for Windows" was announced by Microsoft in 1996. See Microsoft Press Pass, October 28 1998, *Microsoft announces Zero Administration Initiative for Windows*, printed from http://www.microsoft.com/presspass/press/1996/jul96/11actxsitpr.asp on 25 April 2003. Microsoft first introduced the "Zero Administration Kit" for Windows, a set of predefined system policies and profiles for the Windows NT 4.0 family of operating systems.
[201]   Daniel Blum, *Understanding Active Directory Services* (Microsoft Press 1999), on page 77.
[202]   Microsoft, *Benefits of Active Directory in a Windows 2000 Environment* (published September 2001) downloaded from http://www.microsoft.com/windows2000/server/evaluation/business/adwin2k.asp on 15 November 2002.
[203]   Microsoft's submission of 16 November 2001, Annex G on page 1.

sub-entities of a company.[204] "Intellimirror" builds on top of Group Policy. It enables users to have their "working environment" (data, software, etc.) available with their personal settings, whether they are connected to the network or not (with automatic update when they have made some modifications offline and come back online), and wherever they are on the network. Intellimirror is available only in a Windows 2000 domain.

4.1.1.2 File and print sharing

(158)   Besides group and user administration, the provision of file and print services constitutes the second category of core work group server tasks.

(159)   Network file systems such as Sun's "NFS" have been developed in the second half of the 1980s. NFS is a protocol designed by Sun that provides transparent remote access to shared files across a network. Using NFS, users can manipulate files stored on remote servers as if they were stored locally on the user's own hard disk.[205] The first IETF "Request for Comment" that defines a standard NFS specification dates back to 1989.[206] NFS is implemented in products sold by various vendors, including most UNIX servers and OS/2.[207]

(160)   Windows' preferred network file system is not NFS, but the so-called "Common Internet File System / Server Message Block" protocol ("CIFS/SMB"). Microsoft describes the "Common Internet File System" ("CIFS") alternatively as *the successor to Microsoft's Server Message Block ('SMB') protocol*[208] or as "*a subset*" of SMB.[209] Microsoft defines CIFS as an "*alternative*" to NFS.[210]

(161)   Modern work group server operating systems provide support for "distributed file systems", which are designed to offer the user a logical view of physical storage:

> "Instead of seeing a physical network of dozens of file servers, each with a
> separate [folder] structure, users see a few logical [folders] that include all

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[204]   Microsoft, *Groups in Active Directory*, printed on 11 December 2002, from http://msdn.microsoft.com/library/en-us/netdir/ad/groups_in_active_directory.asp?frame=true.

[205]   Microsoft's submission dated 17 November 2000, Annex A and Microsoft's submission dated 16 November 2001, Annex A.

[206]   See: RFC 1094 *Network File System Protocol Specification*, submitted to the IETF in March 1989, printed from http://www.ietf.org/rfc/rfc1094.txt?number=1094 on 15 December 2002. The latest version of NFS is NFS version 4. See RFC 3010bis, *NFS version 4 Protocol*, submitted to the IETF in November 2002, printed from http://www.ietf.org/internet-drafts/draft-ietf-nfsv4-rfc3010bis-05.txt on 15 December 2002. For a definition of "RFC", see above at footnote 61.

[207]   See, for example, Microsoft's submission dated 17 November 2000, Annex D, on page 1: "*IBM mainframes running MVS, Digital minicomputers running VMS and servers running OS/2 and UNIX variants support [NFS]*".

[208]   See Microsoft's submission dated 16 November 2001, Annex A on page 2.

[209]   See Microsoft's submission dated 16 November 2001, Annex H on page 2.

[210]   Microsoft's submission of 16 November 2001, Annex A. Similarly, Microsoft's *Computer Dictionary* (on page 112) states that CIFS "*would directly compete*" with Sun's NFS.

of the important file server shares. Each file server share appears in the most logical place in the [folder], regardless of its actual physical location."[211]

(162) An example of distributed file system is Transarc's DFS, which was adopted by the Open Group[212] for its "Distributed Computing Environment" in the first half of the 1990s.[213] Microsoft mentions DFS as providing "*interoperability among different operating systems, including Windows, OS/2, AIX, Solaris, HP-UX, IRIX,*[214] *Digital VMS*[215]*, as well as IBM mainframe operating systems*".[216]

(163) Microsoft's distributed file system is called "Dfs". Dfs was introduced at the end of the 1990s for Windows NT 4.0, as an add-on for Windows NT 4.0 servers and client PCs.[217] Windows 2000 is the first version of Microsoft's Windows line of products to include native support for Dfs both at the client PC and at the work group server side.

(164) Under Windows 2000, Dfs can be set in two different modes: "stand-alone" or "domain-based". The domain-based mode, which provides a number of advantages in terms of "intelligent" retrieval of the Dfs information from the client PC, is available only in Windows domains, and enhanced by the presence of domain controllers running Active Directory.

4.1.1.3 COM/DCOM

(165) Since the mid-1990s, "best practices" for software development increasingly require building modular software programs based on a combination of reusable "components". Distributed object-based systems enable such components to be distributed on different computers and to publish interfaces in a standardised manner, so that the components are able to interoperate with one another across the network.

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[211] Microsoft's submission of 16 November 2001, Annex H on page 1.

[212] For a description of the Open Group, see above, at recital (42).

[213] The Open Group's "Distributed Computing Environment" ("DCE") is a set of technologies developed as an open industry standard for distributed computing. DCE 1.0 was originally released in 1992 and the complete specifications were available in 1996. Microsoft describes DCE as "*middleware that allows distributed applications to run on multiple kinds of operating systems. DCE provides its own security and other services.*" (Microsoft's submissions of 17 November 2000 and 16 November 2001, at Annex A).

[214] IRIX is a UNIX server operating system developed by Silicon Graphics, Inc.

[215] VMS is a server operating system developed by Digital Equipment Corporation ("Digital"). Digital was acquired by Compaq (now HP) in 1995.

[216] See Microsoft's submission dated 17 November 2000, Annex J on page 1.

[217] See Microsoft, *Knowledge Base, Article 232613, Dfs Scalability in Windows NT 4.0 and Windows 2000,* printed from http://support.microsoft.com/default.aspx?scid=kb;en-us;232613 on 13 January 2003.

An example of such a distributed object-based system is CORBA,[218] which is an evolving specification drawn up by the "Object Management Group" ("OMG"), an industry-wide organisation including, *inter alia*, Sun and HP.[219] The first CORBA specification became available at the beginning of the 1990s.[220] CORBA objects can be distributed on various machines that run an implementation of the CORBA specifications, and the CORBA objects are then able to interoperate with one another.

(166) Microsoft has developed a different set of distributed object-based system technologies, which encompasses "COM" (COM stands for "Component Object Model") and "DCOM" ("Distributed COM"). COM and DCOM are supported in all the currently marketed Windows operating systems.[221] DCOM extends COM by letting COM components reside on different computers. COM and DCOM are in fact very closely interrelated.[222] COM is implemented in both Microsoft's client PC and work group server operating systems, and thus links these two operating systems into a consistent platform for distributed applications.

(167) The distributed application environment provided by COM/DCOM is used by third-party products running on the Windows platform, but it is also used by Microsoft itself in its Windows products. Indeed, many elements of the Windows operating system itself are packaged as COM components.[223] Microsoft states that "*COM is fundamental to the architecture of Windows operating systems, with the result that many interfaces in Windows are COM-based*".[224] In particular, many interactions between client PCs and the Active Directory service in Windows work group servers involve COM/DCOM. The "*DCOM protocol*" is involved in client/server communications that are used by Windows servers to deliver authentication services or file services to Windows client PCs.[225]

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[218] CORBA stands for "*Common Object Request Broker Architecture*". Microsoft itself draws the analogy between COM/DCOM and CORBA. See, for example, Microsoft's submission dated 17 November 2000, Annex V.

[219] See http://cgi.omg.org/cgi-bin/membersearch.pl, printed on 23 January 2003.

[220] See: http://www.omg.org/gettingstarted/gettingstartedindex.htm, printed on 1 December 2002. It is noteworthy, however, that CORBA is not very much used in the work group server context. The OMG publicises "*hundreds of mission-critical applications in use today*" that make use of CORBA.

[221] Microsoft's submission of 16 November 2001, Annex A on page 3.

[222] Microsoft's submissions to the Commission confirm this. Microsoft addresses, in the same Annex V of its response to the first Statement of Objections both "*Microsoft's Component Object Model*" and "*Distributed COM*". In this document, Microsoft states that "*the COM Specification [...] includes DCOM*" and refers to DCOM as "*a network version of COM*". Microsoft's submission of 17 November 2000, Annex V, on page 1.

[223] See, for example, Sun's submission of 22 September 2000, on page 12 (Case COMP/C-3/37.792, on page 8804). An example is Active Directory Service Interface ("ADSI"), which will be described in more detail below, at recitals (246) *et seq.*

[224] See Microsoft's submission dated 17 October 2003, on page 60.

[225] See http://members.microsoft.com/consent/Info/TaskDetails.aspx?pkid=907.

4.1.1.4   Migration from Windows NT 4.0 to Windows 2000

(168)   Microsoft takes great care in mapping natural migration paths between successive generations of its Windows work group technologies both for customers and for software developers. This is particularly conspicuous in the move from the Windows NT 4.0 to the Windows 2000 generation of Microsoft's client PC and work group server operating systems.

4.1.1.4.1   The customers' perspective

(169)   It is possible to upgrade computers in a Windows domain from previous versions of Windows to Windows 2000 without using Active Directory. However, Microsoft clearly states that the full advantage of the upgrade can be gained only by setting up a Windows 2000 domain running Active Directory in "native mode". This can be achieved only after the migration of all domain controllers of the domain to Windows 2000 and Active Directory. Conversely, the full advantage of the upgrade is felt only when the work group servers of the domain that are not domain controllers are Windows 2000-compatible (for example, they support Microsoft Kerberos).

(170)   When the primary domain controller has been upgraded to Windows 2000 but some of the backup domain controllers are still running Windows NT, the domain is in "mixed mode". This enables the user to get some – but not all – of the advanced features of the Windows 2000 domain. In particular, in mixed mode, the customer will forego most of the additional flexibility that Active Directory brings to the management of groups of users.[226] In its *Deployment Planning Guide for Windows 2000*, Microsoft indicates to network administrators that, in order to "*receive maximum benefit from Windows 2000 technologies and fully realise [their] migration-related goals, it is recommended that [they] switch [their] Windows 2000 domains to native mode as soon as possible*".[227] Mixed mode can therefore be viewed as an intermediate stage for a network in the process of migrating to native mode. If a customer switches his primary domain controller to "native mode", however, it will no longer be possible to use as a domain controller a server that is interoperable only with the Windows NT 4.0 – as opposed to the Windows 2000 – generation of Microsoft's products.[228]

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[226]   This is the case for instance for "universal group", as well as for most of the "nesting options" of the "nesting groups" (for a definition of these terms, see above, at recital (159)) Microsoft, *Deployment Planning Guide*, Chapter 10 Determining Domain Migration Strategy, on page 322, printed on 5 December 2002 from http://www.microsoft.com/windows2000/techinfo/reskit/dpg/default.asp.

[227]   Microsoft, *Deployment Planning Guide*, Chapter 10 Determining Domain Migration Strategy, on page 322, printed from http://www.microsoft.com/windows2000/techinfo/reskit/dpg/default.asp on 5 December 2002.

[228]   This includes non-Microsoft work group servers that have achieved Windows NT 4–level (and not Windows 2000-level) domain controller compatibility.

4.1.1.4.2 The software developers' perspective

(171)   One of the core elements of the group and user administration services is the management of client PC applications and distributed applications. Daniel Blum, in his book *Understanding Active Directory Services*, notes that "*Windows developers must learn Active Directory technology, and learn it well in order to make their products successful in the Windows 2000 environment*".[229]

(172)   Microsoft has developed certification programs to label applications designed for Windows that fulfil a certain number of requirements in terms of programming best practices. In order to win official certification for Windows, application developers who believe their applications comply with the requirements laid down by Microsoft must apply for certification.[230]

(173)   In the documents that describe the requirements to obtain the Microsoft certification for Windows 2000,[231] Microsoft strongly encourages developers to use the *new* features of Windows 2000, and in particular the Active Directory service.

(174)   For instance, the *Application Specification for Microsoft Windows 2000 for Desktop* contains the requirement for application developers to use the "Windows Installer Service" in order to install and configure the applications on the Windows client PC operating system.   Microsoft indicates that this obligation benefits system administrators in corporate environments, who in particular will have the "*ability to perform installation on secure systems (for non-administrators and non-power users) without having to visit the PC*". Microsoft also indicates that "*the Windows Installer service management APIs can be used with management tools that allow files and application integrity to be remotely checked*" and that "*application installation more readily supports roaming users [and] mass deployment in organisations using*

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[229]   Daniel Blum, *Understanding Active Directory Services* (Microsoft Press 1999), on page 110.
[230]   It should be noted that certification is not limited to Windows 2000 but rather that applications may be certified on different Windows operating systems, see at http://www.msdn.microsoft.com/certification under the caption "*To Qualify for Application Certification*".
[231]   The commercial importance of such certification should not be overlooked. According to a study prepared by the Patricia Seybold Group for Microsoft in July 2000, in a survey of 2000 customers, 63% of respondents stated that certification is a very important criterion in selecting Windows 2000 applications, and 71% of respondents would choose a Windows 2000 certified application over a similar non-certified application. The identified reasons for these findings are that customers believe that Windows 2000 certified applications offer higher reliability and lower ownership cost (installation, maintenance and administration). The study's outlook for the future is that Windows 2000 application certification will increasingly become "*a requirement for application purchases […] The market for uncertified applications is already shrinking*" See Sun's submission of 22 September 2000, at Tab. 16 (Case COMP/C-3/37.792 on page 8765), quoting Patricia Seybold Group, *Customers Want Windows 2000 Certified Applications*, on page 2, posted in July 2000 http://www.microsoft.com/windows2000/server/evaluation/news/external/certreport.asp.

Win2000 software management".[232] Those benefits are available only in conjunction with a Windows 2000 server and are enhanced by the use of Active Directory.

(175)   In the same vein, among the "best practices" put forward by the *Application Specification for Microsoft Windows 2000 for Desktop*, Microsoft mentions the fact that client PCs should query Active Directory when looking for binding information for the network services that are of interest.[233]

4.1.1.5   Conclusion

(176)   It has been underlined that file and print services on the one hand and group and user administration on the other hand are closely linked to one another.[234] The way in which Windows work group servers operate with Windows client PCs is a case in point, which can be illustrated by the pervasive nature of security considerations. For instance, in a Windows 2000 domain, "*the server message block (SMB) client and server underlying the distributed file system (Dfs), Distributed COM (DCOM), LDAP authentication, [...] all use [Microsoft] Kerberos automatically for authentication*".[235] Beside authentication, the authorisation process depends on the ability to create, modify and interpret "Access Control Lists" ("ACL"), which involves communication with the domain controllers of the domain. This is the case for instance when a file is created.[236] In summary, consistent with the description in Section 3.1.4. of work group server operating systems, the Windows technologies relating to file and print and group and user administration are delivered to the user of the Windows client PCs as a *set of interrelated services*.

(177)   In order to transparently deliver their services to the client PC user, Windows work group servers use the presence of specific pieces of software code in the Windows client PC operating system. Microsoft itself states that "*Dfs has a local component that will run even if a Windows 2000 Professional client is operating in standalone mode*".[237] Similarly, Microsoft acknowledges that "*Windows 2000 Professional*

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[232]   See Microsoft, *Application Specifications for Microsoft Windows 2000 for Desktop Applications*, *Chapter 2: Windows Installer Service*, printed on 12 January 2003 from http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnw2kcli/html/w2kcli.asp.

[233]   See Microsoft, *Application Specification for Microsoft Windows 2000 for Desktop Applications*, *Appendix A: Best Practices*, printed on 12 January 2003 from http://msdn.microsoft.com/library/en-us/dnw2kcli/html/W2Kcli_appendixa.asp?frame=true.   The *Application Specification for Windows 2000 Server* includes a number of "Active Directory Requirements". In particular, the application must use Active Directory to locate remote objects. See Microsoft, *Application Specification for Microsoft Windows 2000 Server*, *Chapter 4: Active Directory*, printed on 12 January 2003 from http://msdn/microsoft/library/en-us/dnw2ksrv/html/w2kserve_chapter4.asp?frame=true.

[234]   See above, at recital (56).

[235]   Daniel Blum, *Understanding Active Directory*, (Microsoft Press, 1999), on page 238.

[236]   See Sun's submission of 11 August 1999, on page 44. See also Microsoft's submission of 17 November 2000, Annex A.

[237]   See Microsoft's submission of 16 November 2001, Annex H, on pages 3-4.

contains a client code that can be used to access Active Directory".[238] As Daniel Blum, in his above-cited book, states: "*Active Directory is completely – often invisibly – integrated into the client*".[239]

(178)   These connections that are implemented in the Windows 2000 Professional code make it possible for Windows 2000 Professional-based client PCs to communicate seamlessly with Windows work group servers. It is important to note, however, that the interconnection and interaction involving the Windows 2000 Professional source code should not be viewed as intended to enable *one* Windows work group server to communicate with *one* Windows client PC. It should rather be described in terms of interoperability within a computer *system* encompassing several Windows client PCs and several Windows work group servers linked together in a network. Interoperability within this computer system implies both client-to-server and server-to-server interoperability.

(179)   Indeed, there is in many cases symmetry between server-to-server and client-to-server interconnection and interaction. For instance, the same API, "ADSI", is implemented both on Windows 2000 Professional and Windows 2000 Server to handle access to Active Directory domain controllers.[240] Servers in a network can sometimes use the same protocols as client PCs in order to communicate with other servers. For instance, in a Windows domain, Microsoft Kerberos is used for authentication both between a Windows client PC and a Windows work group server and *among* Windows work group servers.[241]

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[238]   See Microsoft's response dated 4 September 2000 to the Commission's request for information dated 19 May 2000, on page 18 (Case COMP/C-3/37.792 on page 3862). Microsoft states in the very same sentence that "*that software code [used for access to the Active Directory service] is not part of Active Directory*" but this is no more than a terminology issue. This sentence apparently assumes that the term Active Directory only designates the server-side repository where domain accounts of a Windows 2000 domain are stored. Under this definition, saying that this repository is server-side is a mere tautology. In the same vein, in Annex B to its submission of 16 November 2001, Microsoft explains that Active Directory is a server side feature and that the Commission is mistaken in alleging that Active Directory "*is included in Windows 2000 at server and client side*". Again, Microsoft recognises that "*certain Active Directory dynamic-link libraries ('DLLs') are present on the CD-ROM that contains Windows Professional*" and that "*Windows 2000 Professional clients have some software code that they use to access Active Directory*", but considers that "*that software code is not part of Active Directory*".

[239]   Daniel Blum, *Understanding Active Directory Services* (Microsoft Press 1999), on page 118.
         In its submission of 7 January 2002, Sun points out that, in order to "Active Directory-enable" Microsoft's previous versions of its Windows client PC operating system product (Windows 95, Windows 98 and Windows NT), it is necessary to install additional software on them. See Sun's submission of 7 January 2002, at paragraph 168, referring to. *Active Directory Client Extensions for Windows 95, Windows 98 and Windows NT 4.0* (see also printout dated 2 December 2002 from http://www.microsoft.com/windows2000/server/evaluation/news/bulletins/adextension.asp).

[240]   For a description of ADSI, see below at recitals (246) *et seq.*

[241]   Another example is provided by the disclosures of "client Components" made to Compaq for implementation on top of its Tru64 server operating system pursuant to an agreement signed with Microsoft in 1999. See below, at recitals (231)-(235).

(180)   Furthermore, in some circumstances, servers will query other servers *on behalf* of a client PC. An example of such a situation would be "Kerberos delegation", that is used in an MIT (or Microsoft) Kerberos-based network when a server requests a service from another server *on the behalf* of a client PC.[242] In further illustration, with NTLM, following the client-to-server authentication request, the server would query the domain controller to get the credentials of the client.[243]

(181)   It must also be noted that some client-to-server communications build on the expectation that certain server-to-server communications have taken place beforehand. For instance, when a client PC running Windows 2000 Professional queries a domain controller in a Windows 2000 domain,[244] the client PC will expect some preparatory co-ordination to have taken place between domain controllers running Windows 2000 Server. This includes, for example, both the fact that domain controllers will hold a full copy of the Active Directory data, which are kept updated through synchronisation protocols[245] and the fact that Global Catalogue servers are able to store information about computers of the forest that are outside their domain, which is possible through various Global Catalogue-related protocols.[246] In such situations, the server-to-server communication, although it takes place chronologically before the client-to-server communication, is logically linked to it, since it is done *in preparation* for the client-to-server communication.

(182)   In other words, the proper functioning of a Windows work group network relies on an *architecture* of client-to-server and server-to-server interconnections and interactions, which ensures a transparent access to the core work group server services (for Windows 2000 / Windows 2003, this "Windows domain architecture" can be termed an "Active Directory domain architecture"). The common ability to be part of that architecture is *an element of compatibility* between Windows client PCs and Windows work group servers. This compatibility can be described in terms of "interoperability with the Windows domain architecture".

(183)   When a non-Microsoft work group server is added to a Windows work group network, the degree of interoperability with the Windows domain architecture that such a work group server is able to achieve will have an impact on the efficiency with which that work group server delivers its services to the users of the network. For instance, if the work group server does not sufficiently interoperate with the

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[242]   Kerberos version 5 allows principles to delegate to services the authority to request tickets on their behalf. Daniel Blum, *Understanding Active Directory Services* (Microsoft Press 1999), on page 236.

[243]   Excerpt from testimony by Windows Source Licensing Program Manager Dan Neault in AT&T v. Microsoft, presented by Sun at the Oral Hearing, at slide 6.

[244]   In this instance, the Windows 2000 domain is supposed to run in native mode. See above, at recital (169).

[245]   See above, at recital (150).

[246]   See above, at recital (151).

security architecture of the Windows work group network, the user may have to log on twice if he wants to access both Windows-based resources and resources offered by the non-Microsoft work group servers.

(184)   This means that other work group server operating system vendors that want to compete for customers having an existing investment in Windows need access to information relating to interoperability with the Windows domain architecture.

4.1.2   Sun's request for interoperability information and Microsoft's response

4.1.2.1   The request by Sun dated 15 September 1998

(185)   By means of a letter dated 15 September 1998 from Sun Vice-President Richard Green to Microsoft Executive Vice President Paul Maritz, Sun requested from Microsoft "*the complete information required to allow Sun [...] to provide native support for the complete set of Active Directory technologies on Solaris*".[247]

(186)   Against the description of the Windows work group server technologies provided above in Section 4.1.1, to "*provide native support for the complete set of Active Directory technologies on Solaris*" involves the ability for Solaris to act as fully compatible domain controller in Windows 2000 work group networks or as a member server (in particular as a file and print server) fully compatible with the Active Directory domain infrastructure (security, directory service). The fact that the request pertains both to client-to-server and to server-to-server interoperability is consistent with the fact that the Active Directory domain architecture intimately links client-to-server and server-to-server interoperability.

(187)   In other words, Sun's request encompassed the specifications for the protocols used by Windows work group servers in order to provide file, print and group and user administration services to Windows work group networks. This includes both direct interconnection and interaction between a Windows work group server and a Windows client PC, as well as interconnection and interaction between a Windows work group server and a Windows client PC that is indirect and passes through another Windows work group server.

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[247]   See 15 September 1998 letter from Richard Green, Sunsoft, Inc. to Paul Maritz, Microsoft, (Case IV/C-3/37.345 on page 4787). In the same letter, Mr. Green provides a number of clarifications as to the way in which Sun believed that information should be provided: "*We believe that Microsoft should include a reference implementation and such other information as is necessary to ensure, without reverse engineering, [...] that the complete set of Active Directory technologies will run in fully compatible fashion on Solaris. We think it necessary that such information be provided for [...] the full set of Active Directory technologies currently on the market. We also think it necessary that such information be provided in a timely manner and on a continuing basis for [...] Active Directory technologies which are to be released to the market in the future.*"

(188)   It should be noted that in the same letter, Sun requested the information "*necessary to provide native support for COM objects on Solaris*". As outlined above in Section 4.1.1.3, COM/DCOM is relevant to the delivery of file, print and group and user administration in Windows and there is therefore an overlap between this request and the request concerning Active Directory.

(189)   However, Sun's request concerning COM/DCOM also showed Sun's interest in adapting Solaris so that COM objects written to execute on Windows can run on it. In other words, Sun would like to engineer an abstraction layer between applications programmed to the Windows platform and the underlying Solaris operating system, so that Solaris servers used in conjunction with Windows PCs would offer to Windows-based distributed applications the same consistent set of APIs as Windows servers used in conjunctions with Solaris servers. As regards this latter request, Microsoft has expressed a clear-cut refusal to supply that information and to allow the development of such an abstraction layer.[248] This notwithstanding, the only part of Sun's request for information concerning the COM technology that is relevant to the refusal to supply considered in this Decision is what is encompassed in Sun's request for compatibility with Active Directory.

(190)   It is implicit in Sun's request that Sun intends to be provided with specifications that it will then be able to implement in its products. It is possible that such a use could be prevented by Microsoft relying on intellectual property rights. Furthermore, the specifications at issue may constitute innovations that are currently not disclosed and are protected by trade secrecy. More generally, it is possible that ordering Microsoft to disclose such specifications and allow their use for the purposes of implementation by third parties in their products would constitute an interference with Microsoft's intellectual property rights. Microsoft in fact invokes such intellectual property rights over the relevant information to resist disclosure and the subsequent use that could be made of it.[249]

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[248]   See, for example, Microsoft's submission of 17 November 2000, at paragraph 133.

[249]   For instance, Microsoft (NERA) states: "*The interoperability information requested by Sun constitutes valuable intellectual property protected by copyright, trade secret laws and patents*". See NERA Report in Microsoft's submission of 17 October 2003, in footnote 101. As regards patents, Microsoft has informed the Commission (20 January 2004) that it has been granted at least one patent by the European Patent Office (patent No 0669020), for which Sun would need to obtain a license from Microsoft if it wanted to implement certain Microsoft file server protocols. In that submission, Microsoft notes that "*[the] patented inventions are of course publicly disclosed as part of the patent process, but the protocols themselves remain highly proprietary and confidential*". In any case, since the relevant specifications are not available for scrutiny, it is not possible for the Commission to determine to what extent Microsoft's claims relating to various intellectual property rights are justified.

4.1.2.2   Response by Microsoft Mr. Maritz

(191)   On 6 October 1998, Microsoft Vice President Paul Maritz answered Sun Vice-President Richard Green.[250]

(192)   Mr. Maritz stated that the information requested by Mr. Green's letter "*is already available to [Sun] and every other software developer in the world via the Microsoft Developer Network (MSDN)*".[251]   Mr. Maritz also referred Sun to the Professional Developers Conferences held annually by Microsoft.

(193)   As regards COM/DCOM, Mr. Maritz mentioned a product called "COM on Solaris", "*a fully supported binary available from Microsoft*" and said that "*source code for COM could be licensed from other sources, including Software AG*".[252]   As regards Active Directory, Mr. Maritz stated that Microsoft had "*no plans to 'port' the Active Directory to Solaris*", but that Sun could rely on LDAP to interoperate with Active Directory.   Mr. Maritz concluded his letter by mentioning that he had "*asked Marshall Goldberg, the Lead Program Manager, to make himself available*" to answer Sun's requests if need be.   From the documents that Microsoft has provided concerning the subsequent communications between Mr Goldberg and Sun's representatives,[253] it cannot be concluded that any proposal of disclosures of information specifically addressing Sun's request was made through Mr. Goldberg.

4.1.2.3   The information withheld by Microsoft

(194)   Microsoft has acknowledged a number of specific instances of interoperability information that fall within what was requested in Mr. Green's letter and that Microsoft refuses to provide to any work group server operating system vendor.

(195)   For instance, Microsoft recognises that "*replicated copies of Active Directory share secrets with each other that they do not expose via LDAP—such as user and machine account passwords*".[254]   Microsoft also states: "*The [second Statement of Objections] alleges that replication [...] among different copies of Active Directory is proprietary, so non-Microsoft servers cannot participate.   This is true.*"[255] In the same vein, Microsoft further acknowledges: "*The [second Statement of Objections]*

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[250]   See 6 October 1998 letter from Paul Maritz, Microsoft, to Richard Green, Sunsoft, Inc. (case IV/C-3/37.345 on pages 4788, 4789).

[251]   MSDN is one of the channels through which Microsoft provides technical documentation to software developers that want to write applications to its platform. See below, at recital (209).

[252]   In later submissions to the Commission, Microsoft mentioned the Open Group as a further source of information for COM. For a description of the agreements with Software AG and the Open Group, see below, at recitals (225) to (230).

[253]   See Microsoft's exhibits dated 15 March 1999 at Tab 14, "*E-mail messages exchanged between M Goldberg and Sun's employees*" (case No IV/C-3/37.345 on pages 2933 to 2948).

[254]   Microsoft's submission of 16 November 2001, Annex D, on page 4.

[255]   Microsoft's submission of 16 November 2001, Annex D, on page 4.

alleges that only Windows 2000 servers can exchange Global Catalogue data. This is true".[256]

(196) Microsoft also acknowledges that *"more policy-based management is possible if a Windows 2000 Professional client is attached to a Windows 2000 server running Active Directory than if it is running in standalone mode or is part of a non-Windows 2000 domain or realm".*[257]

(197) Finally, with respect to Dfs, Microsoft states:

"The [second Statement of Objections] alleges that 'Microsoft has not documented the protocol or mechanism for replication of Domain-based Dfs file directories and files to another Dfs server.' With regard to what the [second Statement of Objections] refers to as 'Dfs file directories,' which Microsoft assumes to be the Dfs metadata for resolving logical names to actual physical locations, this is true (in domain-based mode)."[258]

(198) To the Commission's knowledge, these various instances of information are still not fully disclosed as of the date of this Decision.[259]

4.1.2.4 Relation to interoperability

(199) Microsoft argues that *"the information requested [does] not concern interfaces".*[260] In other words, since an interface is software code in a computer program that provides for interoperability with other programs,[261] Microsoft disputes that Sun's request was related to interoperability. This is based on two lines of reasoning.

(200) First, Microsoft interprets the letter by Mr. Green as *"a demand by Sun that Microsoft create a version of [...] Active Directory [...] that Sun could use on Solaris".*[262] This interpretation is incorrect. Sun's request does not refer to whether Microsoft should market cross-platform versions of Active Directory.[263] Its focus is

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[256] Microsoft's submission of 16 November 2001, Annex H, on page 4. See also Microsoft's submission of 16 November 2001, at paragraph 93: *"it is true that Dfs will only run in domain-based mode on a Windows 2000 server"*.

[257] Microsoft's submission of 16 November 2001, Annex G, on pages 2-3.

[258] Microsoft's submission of 16 November 2001, Annex H, on page 4.

[259] In particular, they involve both client-to-server and server-to-server interoperability and are therefore not addressed by the provisions of the Communications Protocols licensing program. See below, at recitals (273) *et seq.*

[260] Microsoft's submission of 17 October 2003, on page 49.

[261] See above, at recital (32). In the course of the present Decision, the terms "interoperability information" and "interface information" will thus be used interchangeably.

[262] Microsoft's submission of 17 October 2003, on page 50.

[263] Whilst other work group server operating system vendors such as Novell or Sun market a stand-alone version of their directory service product that runs on other major competing work group server operating systems, Microsoft developed Active Directory for Windows only.

on disclosure of *information*, not on Microsoft's commercial decisions to market specific products.[264]

(201)   Second, Microsoft argues that Sun's request "*concerned the internal make-up of Windows server operating systems*", and thus went beyond interoperability information.[265]

(202)   In this respect, and as a matter of preliminary observation, it should be noted that Microsoft's definition of what is and what is not "interface information" appears to have evolved in the course of the proceeding. For illustration, in its response to the Commission's first Statement of Objections in November 2000, Microsoft already stated that there was "*no refusal to supply interface information in this case*".[266] In the same submission, Microsoft stated: "*The [first Statement of Objections] adopts Sun's accusation [...] that 'privileged linkages' exist between Windows 2000 clients and Windows 2000 servers. There are no such privileged linkages.*"[267]

(203)   This is difficult to reconcile with submissions made later to the Commission. For instance, as will be described below in Section 4.1.3.6, Microsoft has, following the US Settlement, made a number of disclosures concerning protocols that are used for interoperability between Windows client PCs and Windows work group servers. Microsoft does not – and could not – argue that these protocols are not "interface information", or "information that relates to interoperability".[268] Since Microsoft itself describes them as *new* disclosures, which had not been made previously, and in particular had not been made when Microsoft responded to the first Statement of Objections, this means *a contrario* that "*privileged linkages*" to the Windows client PC operating system had previously been reserved by Microsoft for its own usage, by not disclosing the corresponding interoperability information to other work group server operating system vendors.[269]

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[264]   To the extent that Microsoft's argument is based on the presence of the term "*reference implementation*" in Sun's letter, it must be borne in mind that, as outlined above at recital (35), a reference implementation is only a complement and an illustration of a specification.

[265]   Microsoft's submission of 17 October 2003, at page 49.

[266]   Microsoft's submission of 17 November 2000, at paragraph 181.

[267]   Microsoft's submission of 17 November 2000, at paragraph 137. In the same paragraph, Microsoft qualifies this statement by conceding that "*there is software code in Windows 2000 Professional designed to access unique functionality in Windows 2000 Server*". However, in Microsoft's view, "*that does not represent a privileged linkage incapable of being replicated by Microsoft's competitors*", because Microsoft competitors can install client-side software on Windows to provide for their own connections. This argument will be dealt with below at recitals **(671)** *et seq*.

[268]   Microsoft seems at places to consider that "protocol specifications" are not "interface information". For instance in its submission of 17 October 2003, Microsoft says: "*If [the remedy envisaged by the Commission] is disclosure of the <u>interfaces</u> exposed by Windows client operating systems, <u>or</u> licensing the <u>protocols </u>used in communications between Windows client and server operating systems, there is no need for the remedy: Microsoft already <u>discloses interfaces and licenses protocols</u>*" (on page 10, emphasis added). However, at the Oral Hearing, Microsoft (Mr. Holley) confirmed that it considered protocol specifications as "*a species*" of interface specifications.

[269]   See, for example, Microsoft's submission of 16 November 2001, at paragraph 101.

(204)   Insofar as Microsoft's statement suggests that Sun's request did not encompass any interface information that had not been disclosed by Microsoft and was relevant in the given context, this statement must thus be rejected, on Microsoft's own definition of the term.

(205)   In trying to support its claim that the information that it refuses is not interoperability information, Microsoft makes a number of specific statements that must be rejected as factually incorrect.

(206)   For instance, as regards the Active Directory technologies, Microsoft has submitted to the Commission that *"the replication and Global Catalog features of Active Directory do not bear on interoperability"*.[270] But a domain controller in an Active Directory domain (native mode) replicates the data stored in Active Directory with the data stored in the Active Directory of other domain controllers through certain synchronisation protocols.[271] The specifications for these synchronisation protocols, which are not disclosed, are interoperability information. Similarly, Global Catalogue data are exchanged between domain controllers in the forest; this involves other protocols, the specifications of which are interoperability information – and are not disclosed.[272]

(207)   As regards the question whether Mr. Green's letter was asking Microsoft to provide more than interface information, it is noteworthy that the request for *"the full set of Active Directory technologies"* is qualified by the following clarification in Mr. Green's letter: *"We believe that it is in the industry's best interest that applications written to execute on Solaris be able to <u>seamlessly communicate</u> via COM and/or Active Directory with the Windows operating systems and/or with Windows-based software"*.[273] The objective of the requested disclosure of information is thus *"seamless communication"* between the Solaris environment and the Windows environment. Mr. Maritz's reply to Mr. Green's letter shows that Microsoft had perfectly understood that Sun was requesting information and that this information related to interoperability with certain features of Windows. Indeed, Mr. Maritz states in that document: *"[...] I think it is great you are interested in opening up your system to interoperate with Windows. Microsoft has always believed in helping software developers, including our competitors, build the best possible products and interoperability for our platform"*. Mr. Maritz further talks about *"the information [that Sun] requested on how to operate with COM and the*

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[270]   Microsoft's submission of 16 November 2001, at paragraph 78.
[271]   See above, at recital (150).
[272]   See above, at recital (151).
[273]   See 15 September 1998 letter from Richard Green, Sunsoft, Inc. to Paul Maritz, Microsoft, (Case IV/C-3/37.345 page 4787).

Active Directory technologies". In its submissions to the Commission, Microsoft has at places mentioned the "*interoperability information requested by Sun*".[274]

4.1.3 Disclosure of interoperability information by Microsoft

(208) In his reply to Mr. Green, Mr. Maritz mentioned a number of sources of information that Sun could rely on in its effort to achieve interoperability between Solaris and the Windows environment. In the course of these proceedings, Microsoft has also outlined a number of disclosures that it has made and that would facilitate interoperability between competing work group server operating systems and the Windows environment. This section describes these various alleged disclosures, along with other disclosures that are otherwise relevant to the assessment of Microsoft's behaviour in response to Sun's request.
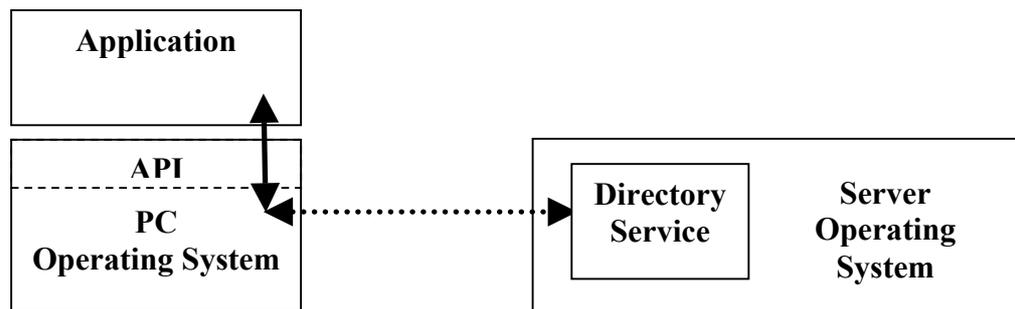
4.1.3.1 Documentation of Windows APIs

(209) First, Microsoft points out that it publishes a significant amount of information on how third-party developers can write applications that call on the APIs that are implemented in Windows. It also insists on the fact that it created MSDN and TechNet, among other mechanisms, "*to convey vast amounts of information*" to third-party developers and offers them "*an array of tools designed to help them create Windows applications*".[275]

(210) However, documenting interfaces through which Microsoft's work group server operating systems deliver their services to the network so that other work group server operating system vendors can write compatible interfaces is different to documenting interfaces that are typically used by application developers wanting to write products that will run on Microsoft's platform. For instance, application developers often rely on the underlying "plumbing" provided by the operating system to connect to services (for example, a directory service) provided by other machines (for example, a work group server) in the network. In doing so, they will only need to know how to ask the operating system to connect to these services (symbolised by continuous arrows in Figure 2). By contrast, operating system vendors would need to know how the "plumbing" between the two operating systems works (the dotted line arrows in Figure 2), if they want to make their own "plumbing" compatible with Microsoft's and thus make their own services available to the client PC applications through the Windows client PC operating system.

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[274] See, for example, Microsoft's submission of 17 October 2003, NERA Report at footnote 101.
[275] See Microsoft's submission dated 17 November 2000, at paragraph 118.

*Figure 2. An example of the difference between APIs necessary for application developers
and the underlying operating-system level "plumbing"*

4.1.3.2   Advanced Server for UNIX (AS/U), Sun's PC NetLink

(211)   In the course of the 1990s, Microsoft entered into a licence with AT&T relating to
the disclosure of portions of the Windows source code. Using these disclosures,
AT&T developed a product called "Advanced Server for UNIX" ("AS/U"). A UNIX
server running AS/U was able to act as a primary domain controller in a Windows
NT domain.

(212)   In 1998, Sun announced its "Project Cascade" plan as "*its most significant plan to
date to provide interoperability and compatibility between Sun and Microsoft
systems without sacrificing the industrial-strength reliability and scalability that are
key attributes of the Solaris operating environment*".[276] This project included "*a
technology agreement with AT&T that allows [...] Solaris systems to provide native
Windows NT services*".[277] That technology agreement concerned in particular a
licence to the AS/U source code.[278]

(213)   On the basis of this licence, Sun developed a product similar to AT&T's AS/U, PC
NetLink, which was optimised to run on Solaris. When installed on top of a Solaris
server, PC NetLink allowed it to "*provide transparent Windows NT file, print,
directory, and security services to Windows 3.X/95/98/NT clients*".[279] In its
marketing material, Sun pointed out that "*the change [was] transparent to the client*"

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[276]   See Sun's Press Release of 9 September 1998, *Sun integrates with, enhances Microsoft customer
environments*, submitted by Microsoft in its submission of 15 March 1999 (Case IV/C-3/37.345 on page
2735).

[277]   See Sun's Press Release of 9 September 1998, *Sun integrates with, enhances Microsoft customer
environments*, submitted by Microsoft in its submission of 15 March 1999 (Case IV/C-3/37.345 on page
2735).

[278]   [Confidential]

[279]   See Microsoft's submission of 15 March 1999, Exhibit 5, *Sun Project Cascade*, printed from
http://www.sun.com/servers/enterprise/sw/cascade/datasheet.html on 25 February 1999, (Case IV/C-
3/37.345 on page 2731).

and required "*no added client software*".[280] AS/U enabled *inter alia* Sun's work group server operating systems to implement a version of Microsoft's file sharing protocols CIFS/SMB and of the NTLM security protocol.[281] A Solaris server running PC NetLink was able to act as a primary domain controller (or backup domain controller) in a Windows NT domain.

(214) Microsoft points out in its submissions to the Commission that "*at the time Sun announced it had licensed technology from AT&T, it was apparently the eleventh company to license technology from AT&T. Other companies included Auspex, Bull, Data General, Digital Equipment Corporation, Hewlett-Packard, ICL, NDR, Olivetti, Siemens-Nixdorf, and the Santa Cruz Operation*".[282]

(215) Microsoft refused to provide to AT&T updates relating to newer generations of Microsoft's products. Following a dispute between Microsoft and AT&T, a settlement, dated 25 September 1998, was entered into between the companies, establishing a date for the termination of Microsoft's obligations to deliver the information to AT&T and otherwise to support AT&T's AS/U development program.[283] The settlement agreement also provided that Microsoft would not be required to license Windows 2000 technologies to AT&T.

(216) The context of this settlement is illustrated by the following e-mail exchanges between Microsoft executives:

> "[AT&T] want a plug replacement for NTS on UNIX so that a stock win9x/NTW [Windows NT workstation] client cannot tell the difference which server it is talking to."[284]

[280] See Microsoft's submission of 15 March 1999, Exhibit 5, *Sun Project Cascade*, printed from http://www.sun.com/servers/enterprise/sw/cascade/datasheet.html on 25 February 1999, (Case IV/C-3/37.345 on page 2731).

[281] In a submission to the Commission on 8 June 1999, Microsoft stated that "*Sun had indirectly licensed COM technology in at least one instance: its [...] license of AS/U technology*". However, in its submission dated 17 November 2000 in response to the Commission's second Statement of Objections, Microsoft only mentions the following features of AS/U: authentication, authorisation, file and print services. See Microsoft's *Submission in opposition to the Complaint* of 8 June 1999 (Case IV/C-3/37.345 on page 1399) and Microsoft's submission of 17 November 2000, Annex G. These statements are not necessary in contradiction, in view of the tight interrelation between COM/DCOM and the core Microsoft work group technologies. See above, at recital (167).

[282] See Microsoft's submission of 15 March 1999, on page 19 (Case IV/C-3/37.345 on page 2288).

[283] See Microsoft's exhibits of 15 March 1999 at Tab. 16, *Settlement Agreement and Mutual Release between Microsoft and AT&T* (Case IV/C-3/37.345 pages 3043 to 3054).

[284] Microsoft's internal e-mail from Senior Vice President Jim Allchin to Microsoft's chairman Bill Gates dated 24 October 1997. See Sun's submission of 14 October 1999 on pages 14-15 and at Tab 16 (Case No IV/37.345 pages 5785-5786 and 5879-5880). See also Sun's submission of 7 January 2002, Annex D on page 3 and at Tab. 3.

"[if] we can't think of a bone to throw to AT&T, we are going to need to get to our checkbook in a big way… We can buy this out if we need to but the # might be very big. Very."[285]

(217)   Sun points out that AS/U has only been updated up to Service Pack 3 of Windows NT Server 4.0. [Confidential].[286] In particular, Sun states that it *"does not have the information to implement version 2 or higher"* of NTLM.[287] Microsoft does not contest this statement. Indeed, in a submission to the Commission, Microsoft states that *"AT&T used the periodic deliveries of source code it received from Microsoft pursuant to the agreement to create improved versions of AS/U that incorporated technologies up through Service Pack 3 of Windows NT 4.0 Server"*.[288]

4.1.3.3   Licences of COM/DCOM

4.1.3.3.1   Licences to UNIX vendors

(218)   In the mid-1990s, Microsoft licensed certain COM/DCOM technology to Digital Equipment Corporation ("Digital") and Silicon Graphics, Inc. ("SGI").[289] In both the agreement with Digital (dated 1995) and the agreement with SGI (dated 1997) the licence is fully paid-up and royalty free.

(219)   Both agreements are explicitly related to interoperability with Windows. One of the stated reasons for the agreement with Digital is that *"the parties wish to use a common object model [...] in an interoperable manner"*.[290] [Confidential][291]

(220)   The use of the licensed technology is limited to enhancing specific server operating system products by SGI and Digital. Sublicensing to other work group server operating system vendors is strictly controlled. For instance, SGI can distribute its derivative work in binary code and not in source code.[292]

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[285]   See Microsoft internal e-mail from Windows Licensing Manager Dan Neault to DCOM Product Manager Nat Brown and Charlie de Jong dated 4 June 1997, in Sun's submission of 14 October 1999 on pages 14-15 at Tab 7 and in Sun's submission of 7 January 2002, Annex D at Tab 2. See also Sun's submission of 7 January 2002, Annex D on page 3 and at Tab. 2.

[286]   [Confidential]

[287]   Sun's submission of 10 July 2000, on page 27.

[288]   Microsoft's submission of 17 November 2000, Annex F, on page 1.

[289]   See Microsoft's exhibits of 15 March 1999 at Tab. 18 (agreement with Digital) and Tab. 19, (agreement with SGI). (Case IV/C-3/37.345 pages 2399 to 2429)

[290]   Microsoft's exhibits of 15 March 1999 at Tab. 18 (agreement with Digital). (Case IV/C-3/37.345, page 2399)

[291]   [Confidential]

[292]   The two exceptions to this rule envisaged by the contract relate to a sublicensing of source code to independent contractors of SGI for the purpose of developing, on behalf of SGI, further derivative work that remains SGI's property, or to SGI's customers, and then solely for the purposes of supporting such customers' use of the covered SGI operating system products. See section 3 (c) and (d) of the 1997 agreement with SGI, in Microsoft's submission of 15 March 1999 at Tab. 19. (Case IV/C-3/37.345 on page 2422)

(221) Similar provisions exist in the agreement with Digital.[293] In addition, the agreement specifically provides that Digital must obtain the express written consent of Microsoft before sublicensing the source code of its derivative work to a number of third parties, including Apple, IBM, Novell and Sun.[294]

(222) Microsoft argues that in the spring of 1996, Robert Muglia, who at the time was responsible at Microsoft for the Java relationship with Sun, verbally offered to Alan Baratz, the President of JavaSoft, one of Sun's software subsidiaries, to license COM/DCOM to Sun.[295]

(223) Sun contends that "*the brief discussions between Mr. Muglia at Microsoft and Mr. Baratz at Sun concerning COM never addressed the incorporation of COM into Sun's Solaris workgroup server operating system*". Sun points out that at the time, "*Mr. Baratz worked for Javasoft, a completely separate division tasked with promoting the Java technologies*", whilst "*Sun's core Solaris operating system business was governed separately from within Sun Microsystems, Inc. and its subsidiary, SunSoft*".[296]

(224) In any case, the offer to Mr. Baratz relates to negotiations that involved Microsoft and Sun in 1996 and Microsoft did not renew its offer following Mr. Green's letter. Furthermore, the alleged 1996 offer was related to a licence of Sun's Java technologies to Microsoft. From the evidence provided by Microsoft, it can be seen that Microsoft was in fact proposing that Sun would adopt COM/DCOM as the object model for the Java technologies.[297] Sun eventually chose to develop a different object model for that technology: "JavaBeans". Sun points out that binding the Java technologies with COM/DCOM would have linked it to the platforms where COM/DCOM was implemented, while the very aim of these technologies was to be cross-platform.[298]

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[293] See, for example, section 5 (a) of the 1995 agreement with Digital in Microsoft's submission of 15 March 1999, at Tab. 18. (Case IV/C-3/37.345, on page 2405)

[294] See, for example, section 4 (d) and Exhibit B of the 1995 agreement with Digital in Microsoft's submission of 15 March 1999, at Tab. 18. (Case IV/C-3/37.345 on page 2404)

[295] See Microsoft's exhibits of 15 March 1999 at Tab. 9, paragraph 20, *Declaration of Robert Muglia,* of August 6, 1998 (Case IV/C-3/37.345 page 2782).

[296] Sun's submission of 11 August 1999, on page 24 (Case IV/39.345 on page 5289).

[297] See Microsoft's exhibits of 15 March 1999 at Tab. 9, paragraph 19, *Declaration of Robert Muglia* (Case IV/C-3/37.345 on page 2782).

[298] See Sun's submission of 11 August 1999 (Case IV/C-3/37.345 on page 3082).

4.1.3.3.2   Licence of COM/DCOM to Software AG

(225)   In his reply to Sun, Mr. Maritz mentioned the fact that Microsoft licensed to Software AG information to implement support for COM on non-Microsoft operating systems.[299]

(226)   In 1995 and 1998, Microsoft entered into two agreements with Software AG, a vendor of software principally for mainframe computers, to develop an implementation of COM/DCOM on non-Windows platforms. Both agreements with Software AG prevent Software AG from sublicensing the ported code that it developed without prior consent by Microsoft.[300] Microsoft eventually took the development work back from Software AG and on this basis created "COM for Solaris", which will be described in further detail below.[301]

4.1.3.3.3   COMsource

(227)   Microsoft outlines that "*the Open Group created a reference implementation of COM on UNIX, called COMsource, that is available to Sun and other members of The Open Group*".[302]

(228)   As evidenced in the material[303] from the Open Group provided by Microsoft, the Open Group released a "Snapshot Release", or "early version" of the said reference implementation only in January 1999, which is more than two years after support for COM/DCOM was integrated in Microsoft's products (1996). COMsource is based on the Windows NT technology, not Windows 2000 technology.

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[299]   See the letter of 6 October 1998 from Paul Maritz of Microsoft (see above, at recitals (191) *et seq*). See also Microsoft's submission of 17 November 2000, Annex U on page 2.

[300]   See section 6 (a) of the 1995 agreement with Software AG and section 2 (e) of the 1998 agreement with Software AG in Microsoft's submission of 15 March 1999, at Tab. 21. (Case IV/C-3/37.345 on pages 2441 and 2474).

[301]   See below, Section 4.1.4.3.

[302]   Microsoft's submission of 17 November 2000, at paragraph 133.

[303]   See Microsoft's exhibits of 15 March 1999 at Tab. 23, *Material regarding COMsource from The Open Group's Web Site* (Case IV/C-3/37.345 pages 2644 to 2655). See also Microsoft's submission of 17 November 2000 at Tab. 77.

(229)   The internal correspondence between Microsoft's executives shows that Microsoft's commitment in its co-operation with the Open Group was somewhat limited:

> "Our attempt to work with the Open Group is going to fail [...] we also need to assume much of the blame because we are just now staffing to support the delivery of this technology."[304]

> "[Concerning the licence given to Mainsoft] You are giving them a better source code base for DCOM than what I gave The Open Group. This [Windows 2000] code base will have asynchronous support.[305] [...] Right now they [The Open Group] only get NT4 SP3 and subsequent bug fixes."[306]

(230)   In an e-mail dated 4 June 1997, Mr. Dan Neault, who was at the time in charge of the licensing of Windows technologies for implementation on non-Microsoft operating systems, describes Microsoft's work with the Open Group in the following way:

> "Yes, we're pressing on with [the Open Group]. [We] have outstanding commitments to them […]. [However,] we are not depending on the Open Group as the source of [cross-platform DCOM], at this point they are mostly open-systems good-vibes. The direct deals with the UNIX [operating system] vendors are looking stronger now. Both HP and [Digital] seem to have become more malleable based on the Open Group work, so it's been useful in that respect, too."[307]

4.1.3.4   1999 licence to Compaq (now HP)

(231)   On 29 March 1999, Microsoft signed an agreement with Compaq[308] "*to improve interoperability between Compaq's Tru64 UNIX operating system and Windows 2000*".[309]

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[304]   See Sun's exhibit of 11 August 1999 at Tab. 25 page 2, Internal Microsoft e-mail from Senior Vice President Bob Muglia to Microsoft executives, of 12 July 1997 (Case IV/C-3/37.345 page 5418, emphasis added).

[305]   When two objects have a "synchronous communication", each time object A sends a request to object B, it has to wait for the answer before doing something else. With asynchronous support, object A can execute a different action and will be interrupted as soon as the reply arrives. Asynchronous support is very important in a production environment.

[306]   Internal Microsoft e-mail from Don Chouinard, Object Services Manager to Takeshi Numoto, Business Development Manager, of 14 October 1997. See Sun's exhibit of 14 October 1999 at Tab. 14 (Case IV/C-3/37.345 page 5871).

[307]   See Sun's submission of evidentiary material of 11 August 1999, at tab. 6 (Case IV/C-3/37.345 on page 5339).

[308]   See agreement signed the 29 March 1999 between Compaq and Microsoft (Case IV/C-3/37.345 pages 2026 to 2060).

[309]   Microsoft's submission of 17 April 2000, on page 16 (Case COMP/C-3/37.792, page 89).

(232)   The agreement covers the software code of a number of Windows *client components* that Compaq may adapt to run on top of its Tru64 product. This includes *inter alia* "*NTLM [Security Service Provider] supporting NTLM v. 2*", "*Kerberos [Security Service Provider]*", "*Code to publish Services to the Active Directory*", "*Netlogon service: Code to create a secure channel from the application server to the Windows domain Controller*", as well as a number of "*COM components*".[310]

(233)   With the exception of limited sublicensing to "*Approved OEMs*", the list of which is controlled by Microsoft, licensing to third parties of the code ported by Compaq is prohibited.[311] The use of the licensed information is limited to implementation in Tru64. Compaq is restricted from using the disclosure "*to develop or implement any domain controller functionality on any version of Tru64 UNIX*".[312]

(234)   The objective of the agreement is described in the following terms:

> "*Microsoft and Compaq are entering into this Agreement in order to better serve enterprises that are running a mixed operating system environment that includes both Windows 2000 Server and Compaq's Tru64 UNIX operating system [...], by enabling Compaq to develop such operating system so that it is 'Interoperable with Windows 2000 Server' [...], and thereby to establish a clear migration path to Windows NT Server for customers using such Compaq operating system.*"[313]

(235)   It is worth noting that Tru64 is not advertised primarily as a work group server operating system that provides file, print and group and user administration services. In fact, it is clear from the Tru64 product description that this operating system is rather sold as a high-end operating system providing "rock-solid reliability" and advanced functions such as clustering.[314]

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[310]   Compaq's submission of 7 May 1999 in response to a request for information, *Software License and Development Agreement*, Exhibit B (Case IV/C-3/37.345, page 2053).

[311]   See section 3.a (ii) of the 1999 agreement with Compaq in Compaq's submission of 7 May 1999 (Case IV/C-3/37.345, page 2032).

[312]   See section 3.e (xv) of the 1999 agreement with Compaq in Compaq's submission of 7 May 1999 (Case IV/C-3/37.345 on page 2038).

[313]   Compaq's submission of 7 May 1999 in response to a request for information, *Software License and Development Agreement* (Case IV/C-3/37.345, page 2026).

[314]   See HP, *Tru64 Alphaserver systems*, printed from http://h30097.www3.hp.com/unix/7Tru64.pdf, on 5 May 2003. Microsoft gives the following definition of clustering: "*[a] server cluster is a group of independent servers running Cluster service and working collectively as a single system. Server clusters provide high-availability, scalability, and manageability for resources and applications by grouping multiple servers running Windows 2000 Advanced Server or Windows 2000 DataCenter Server. The purpose of server clusters is to preserve client access to applications and resources during failures and planned outages. If one of the servers in the cluster is unavailable due to failure or maintenance, resources and applications move to another available cluster node*". See http://www.microsoft.com/windows2000/techinfo/planning/server/clustersteps.asp, 28 January 2000, printed on 26 November 2002. It is also noteworthy that HP's Web page on Tru64 includes information on the possibility to migrate away from Tru64 to the new generation of HP/UX. HP, *From*

4.1.3.5   Support for open industry standards

(236)   Microsoft points out that the Windows operating system products implement a
number of industry standards and Microsoft contributes to the standardisation
process.[315]   In this section, the Commission will focus on Microsoft's behaviour *vis-
à-vis* open industry standards with respect to three protocols that are particularly
relevant to this case, namely the CIFS file sharing protocol, LDAP directory access
protocol (which is mentioned explicitly by Mr. Green's letter) and the Kerberos
security protocol.

4.1.3.5.1   CIFS

4.1.3.5.1.1   Microsoft's 1997 disclosure to the IETF

(237)   With respect to file services, Microsoft argued in the course of the Commission's
investigation that it had disclosed the CIFS Specification in the framework of the
IETF.[316]

(238)   It is true that the *Specification for CIFS 1.0* is an Internet Draft that was filed with
the IETF by Microsoft's Paul J. Leach and Dilip C. Naik on 19 December 1997.
However, it must be highlighted that an "Internet Draft" is a proposal from an
individual or organisation that has not been adopted by any IETF working group, and
has no status in the standards process.[317]   The Internet-Draft *Specification for CIFS
1.0* expired on 19 June 1998.   To the Commission's knowledge, Microsoft did not
submit to the IETF the extensions that it made to the CIFS protocol.

(239)   In its second Statement of Objections, the Commission mentioned the fact that
versions 1 and 2, but not version 3, of the Dfs referral foreseen by the CIFS
specification, had been documented by Microsoft.   Microsoft did not contest this
assertion, and stated that:

> "*The third version [...] is enhanced to work with Active Directory. Since
> other server operating systems do not have Active Directory, they do not*

        Tru64 to HP-UX, A safe journey to evolution, printed on 6 May 2003 from
        http://h30097.www3.hp.com/transition.

[315]   See, for instance, Microsoft's submission of 17 November 2000, at paragraph 58 and Annex B.

[316]   See Microsoft's submission dated 8 June 1999, on page 31, and Microsoft's submission of 16
November 2001, at paragraph 92.

[317]   The IETF describes in the following way the Internet Standards Process: "*During the development of a
specification, draft versions of the document are made available for informal review and comment by
placing them in the IETF's 'Internet-Drafts' directory. [...]An Internet-Draft is NOT a means of
'publishing' a specification; specifications are published through the RFC [Request for Comments[317]]
mechanism [...]. Internet-Drafts have no formal status, and are subject to change or removal at any
time.*"   See RFC 2026, *The Internet Standards Process, Revision 3*, printed on 13 January 2003 from
http://www.ietf.org/rfc/rfc2026.txt.   "Internet Drafts", which are not IETF standards at all, must not be
confused with "Draft Standards", which are IETF standards, albeit not in their definitive form. For a
definition of "RFC", see above at footnote 61.

need the third version of the Dfs referral; they can use the first or second version."[318]

(240)   This means that more than a year after the launch of Windows 2000, an updated CIFS/SMB specification was still not fully disclosed by Microsoft to its competitors.[319]

4.1.3.5.1.2 Microsoft March 2002 disclosure

(241)   In March 2002, Microsoft announced that it was willing to grant royalty-free licences of its CIFS protocol as implemented in Windows NT 4.0 (*not* Windows 2000).[320] Microsoft announced this disclosure to the Commission on 18 March 2002.[321]

(242)   Contrary to what Microsoft had done in 1997 or to what it did for Kerberos, Microsoft did not submit these specifications to the IETF. Sun points out that this disclosure comes after the "*Samba group announced a reverse engineered method for NT 4.0 Dfs interoperation*".[322]

4.1.3.5.2 Support for LDAP in Active Directory

(243)   Microsoft explains that "*Active Directory supports versions 2 and 3 of the Lightweight Directory Access Protocol ('LDAP'), which is the industry standard directory access protocol*".[323]

(244)   However, Microsoft has extended LDAP in a proprietary fashion and failed to disclose the extensions that it has made. In the second Statement of Objections, referring to a submission by Sun which Microsoft had the opportunity to access,[324] the Commission pointed out such an extension in the field of "LDAP binding".

(245)   When a piece of software needs to access a directory service, it has first to set up a communication. This process is referred to as "binding" to the directory service. For

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[318]   Microsoft's submission of 16 November 2001, Annex H, on page 3.
[319]   It should be mentioned that, even if Microsoft had kept its CIFS disclosure to the IETF updated, more protocols are needed for file server interoperability than CIFS. In particular, the disclosed CIFS specification does not extend to the security architecture, and more generally the user and group administration protocols, which are essential to ensuring proper administration of the file service. As outlined above at recital (56), file and print services on the one hand and group and user administration services on the other hand are closely interrelated.
[320]   *Licensing Microsoft's Common Internet File System (CIFS) and Server Message Block (SMB) File System Protocols*, March 2002, http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnkerb/html/Licensing_CIFSandSMB.asp.
[321]   See letter from Mr. Ballmer (Microsoft CEO) to Commissioner Monti on 18 March 2002 (Case COMP/C-3/37.792 on page 25449).
[322]   See Sun's submission of 22 May 2002. For a description of Samba, see below at recital (293) *et seq*.
[323]   Microsoft's submission of 16 November 2001, Annex D on page 1.
[324]   This document is Sun's non-confidential submission of 1 June 2001. (Case COMP/C-3/37.792 pages 8785 to 9822). Sun's argument with respect to LDAP binding is on page 11 of that submission.

security reasons, the binding process often implies *inter alia* the negotiation of an authentication protocol. In LDAP version 3, this negotiation may use the "SASL authentication method", which is an IETF standard. The submission by Sun to which the Commission referred in its second Statement of Objections claimed that Microsoft's products use undisclosed extensions to the SASL standard in binding to Active Directory. Microsoft has not rebutted this argument.[325] Sun also pointed out several functions of the Microsoft LDAP library that are not documented.[326] Microsoft has not rebutted this argument either.

(246) There is an IETF standard that specifies an API that application developers can use to access LDAP-compliant directory services. However, "*[t]he primary and recommended API for accessing Active Directory is ADSI, which exposes objects stored in Active Directory as COM objects*".[327]

(247) Microsoft defines ADSI as an API that "*abstracts the capabilities of different directory services supplied by different vendors to present a single set of directory service interfaces for managing network resources*".[328] Windows-based applications accessing a directory service will typically access that directory service by making an "ADSI call" to the operating system. The operating system will then redirect the call to an "ADSI provider", which in turn will handle the relationship with the directory service.

(248) Microsoft does not fully disclose how the Microsoft ADSI provider included with Windows 2000 Professional and Windows XP Professional communicates with Active Directory.[329] Sun states: "*Sun is aware of at least one ADSI function (DsWriteAccountSpn) that cannot be performed by an equivalent set of LDAP calls*".[330] Microsoft has not contested this statement by Sun.

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[325] In its response to the Commission's second Statement of Objections, Microsoft pretends not to have understood the Commission's statement on LDAP binding and attempts to obfuscate the issue by mentioning all the meanings that the word "binding" may carry. This is surprising, since the Commission had been clear in the meaning ascribed to "bind" in the given context, namely the setting up of communication between two pieces of software. See footnote 48 of the Commission's second Statement of Objections. Microsoft does however mention the technical instance to which the Commission's statement relates, namely the implementation of *"LDAP BIND"* and of *"Simple Authentication and Security Layer ('SASL') authentication as defined by the LDAP specification"*. Microsoft explicitly refers to the *"SASL specification, which is published by the IETF as RFC 2222"*. See Microsoft's submission of 16 November 2001, Annex D.
[326] Sun points out the allegedly undocumented functions in the WLDAP32.DLL: ldap_sasl_bindW, ldap_sasl_bind_sW, ldap_sasl_bindA, and ldap_sasl_bind_sA, see Sun's non-confidential Submission of 1 June 2001, Case COMP/C-3/37.792 at page 8803.
[327] Microsoft's submission of 16 November 2001, Annex D, on page 2.
[328] Microsoft's submission of 16 November 2001, Annex D, on page 2
[329] See, for example, Daniel Blum, *Understanding Active Directory Services*, on page 53: "*Some ADSI extensions to LDAP are proprietary and do not work with other products*".
[330] See Sun's submission of 17 January 2002, non confidential version of Sun's comments on Microsoft's submission of 16 November 2001, at paragraph 35, Case COMP/C-3/37.792 at page 22308.

(249)   Microsoft points out that it makes available "*a software development kit ('SDK')
         with ADSI providers for Novell's NDS and NetWare 3.11, Windows NT 4.0 directory
         services, generic LDAP directories, Exchange 5.5 and the Internet Information
         Services metabase*" as showing its efforts in favour of interoperability.[331]   This
         presentation, however, does not cover all the relevant factors. In fact, Microsoft's
         implementation is not fully compatible with Novell's NDS: for instance, it does not
         support Novell's schema extension.[332]   Moreover, the ADSI provider for Novell is
         not automatically pre-installed with the Microsoft client PC operating system. This
         solution therefore requires an additional client-side software to be installed: "*in order
         to use the Microsoft ADSI NDS provider, either the Microsoft Client Services for
         NetWare […] or Microsoft Gateway Services for NetWare […] must be installed on
         the computer*".[333]

(250)   Observers have stated that an ADSI provider developed by Novell was likely to be
         better integrated with Novell's directory service product than an ADSI provider
         developed by Microsoft[334] and, indeed, Novell did develop an ADSI provider.
         However, the Novell ADSI provider is not distributed with Windows, but is rather a
         client-side add-on that the customer must install on client PCs. In addition, writing
         an ADSI provider is not sufficient for Novell to ensure that ADSI-based applications
         will be able to use Novell's directory service. In fact, it requires significant efforts
         for a developer using ADSI to make his application directory-service agnostic, even
         vis-à-vis directory services for which an ADSI provider is available.[335] This is to be
         contrasted with the situation with LDAP, where any application using LDAP can
         work against any LDAP-compliant directory.

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[331]   Microsoft's submission of 16 November 2001, Annex D, on page 2.

[332]   Microsoft's Knowledge Base Article 1885010, *ADSI NDS Provider Does Not Support Extension of
        NDS Schema*, printed from http://support.microsoft.com/default.aspx?scid=kb;en-us;188510 on 13
        December 2002.

[333]   Microsoft's Knowledge Base Article 267988, *Call to ADSI NDS Provider Returns Error 0x80070003*,
        printed from http://support.microsoft.com/default.aspx?scid=kb;en-us;267998 on 13 December 2002.

[334]   In a preview of ADSI published in November 1997, Windows and .NET magazine envisages that
        *"Novell will release an ADSI provider for NDS that will likely support the NetWare environment better
        than Microsoft's ADSI provider"*. See *Manage Directory Resources with Active Directory Services
        Interfaces*, printed from http://www.winnetmag.com/Articles/Print.cfm?ArticleID=258 on 13 December
        2002.

[335]   When using ADSI to access objects in a directory, a software developer must indicate in the name of
        the object to be accessed on what type of directory this object resides, because this will determine the
        directory provider that is used for that access. Enabling the application to choose at run time the
        directory that it will use is possible but cumbersome: each time there is an access to the directory that
        requires the full name, it is necessary to write as many instructions as directory services that have to be
        supported. Adding support for an additional directory to an already written program using ADSI
        imposes a requirement to spot in the source code all the places where the name of the directory must be
        given and to insert an additional instruction. See http://support.microsoft.com/default.aspx?scid=kb;en-
        us;232241, for an example of a program that supports several directory services.

4.1.3.5.3   Kerberos

4.1.3.5.3.1   Microsoft's proprietary extension to the MIT Kerberos

(251)   As outlined at recitals (153)-(154), MIT Kerberos is an IETF standard of which
          Microsoft implements an extended version in Windows 2000 (both the client PC and
          the work group server version).

(252)   Microsoft's own information material conveys the message that mutual
          authentication between a non-Microsoft operating system and a Windows operating
          system could be achieved using Kerberos in a simpler way than under NTLM. For
          instance, in a white paper dated 1999 Microsoft mentions "*interoperability*" as one of
          the "*benefits of Kerberos authentication*":

          > "*Microsoft's implementation of the Kerberos protocol is based on
          > standards-track specifications recommended to the Internet Engineering
          > Task Force (IETF). As a result, the implementation of the protocol in
          > Windows 2000 lays a foundation for interoperability with other networks
          > where Kerberos version 5 is used for authentication.*"[336]

(253)   Similarly, in a white paper on *The MS Windows NT Platform: Enterprise
          Interoperability with UNIX*, published in 1998, Microsoft states that "*Windows NT
          version 5.0 [now Windows 2000] will natively incorporate security technologies such
          as Kerberos authentication*".[337]   In the same document, Microsoft furthermore states
          that "*the need to interoperate with non-Microsoft operating systems, such as UNIX
          [...] could be a reason for rapid migration to enable widespread use of the Kerberos
          authentication*".

(254)   However, it is necessary to consider how Microsoft's *extension* to MIT Kerberos
          impacts interoperability between standard MIT Kerberos implementations and the
          Windows 2000 security architecture for work group networks. Before doing that, a
          few preliminary observations on the technical background are useful.

(255)   The aim of the MIT Kerberos protocol is to provide "*a means of verifying the
          identities of principals[338] (e.g., a [client PC] user or a network server) on an open*

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[336]   See Microsoft, *Windows 2000 Kerberos Authentication*, a white paper printed from
        http://www.microsoft.com/technet/treeview/default.asp?url=/technet/prodtechnol/windows2000serv/dep
        loy/confeat/kerberos.asp on 20 December 2002.
[337]   See Microsoft, *The MS Windows NT Platform: Enterprise Interoperability with UNIX*, printed from
        http://www.microsoft.com/technet/prodtechno1/winntas/plan/ntspiunx.asp?frame=true on 3 December
        2002.
[338]   A *security principal* is "*an entity that can both prove its identity and verify the identity of other
        principals who wish to communicate with it*". It can be a *user*, i.e. "*a human being who wishes to use a
        computer system*" or a *service*, i.e. "*an abstract specification of some actions to be performed [...] by a
        program or a set of programs running on a computer which is accessible over the network*". See Paul
        B. Hill, *Kerberos_Interoperability issues*, submitted by Microsoft in its Response to the Commission's

(unprotected) network".[339]   This verification occurs through the presentation of "tickets" that client PCs, servers or other entities send to one another.[340]

(256)   As such, the MIT Kerberos protocol focuses on the issue of "authentication" – "verifying the identity" – rather than "authorisation" – "granting or refusing permission".[341]   However, among the "fields"[342] of the Kerberos ticket that are described by RFC 1510 as "reserved for future use", one is called "authorization_data".   RFC 1510 gives the following definition of the "authorization_data field":

> *"The authorization_data field is used to pass authorisation data from the principal on whose behalf a ticket was issued to the application service. [...]*
>
> *The authorization_data field is optional and does not have to be included in a ticket."*[343]

(257)   Microsoft has extended the MIT Kerberos authentication protocol to include – in the "authorization_data" field of the ticket – authorisation information. In particular, the ticket issued by a Windows 2000 domain controller includes, in that field, a "Privilege Access Certificate" ("the PAC"), which contains some authorisation information specific to Windows 2000 / Active Directory. A Windows 2000 computer in a Windows 2000 domain will not accept Kerberos tickets without a Microsoft Kerberos-compliant PAC.

(258)   Work group servers that implement only the standard MIT Kerberos without Microsoft's extension cannot generate Kerberos tickets with such a compliant PAC or interpret the information contained in the PAC. This has a number of consequences in terms of the interoperability that such a work group server can achieve with computers in a Windows domain.

second Statement of Objections, enclosed to Stuart Madnick and Patrick Valduriez, *Comments on the Commission's Statement of Objections Filed against Microsoft*, Binder 4, exhibit 14.

[339]   See IETF, Request For Comments 1510, *The Kerberos Network Authentication Service v. 5*, on page 5, printed from http://www.ietf.org/rfc/rfc1510.txt on 5 December 2002. For a definition of "RFC", see above at footnote 61.

[340]   See, for example, Microsoft's submission dated 5 June 2000, on page 30-31. Sun likens Kerberos tickets to "passports" or "visas". See Sun's submission dated 10 July 2000, on page 20 (Case COMP/C-3/37.792 on page 8812).

[341]   See above, at recital (54).

[342]   A field is a set of one or more characters comprising a unit of information.

[343]   See IETF, Request For Comments 1510, *The Kerberos Network Authentication Service v. 5*, on page 47, printed from http://www.ietf.org/rfc/rfc1510.txt on 5 December 2002. For a definition of "RFC", see above at footnote 61.

4.1.3.5.3.2 Kerberos interoperability scenarios

(259) Microsoft directs the Commission's attention to an article entitled *Kerberos interoperability issues* by Paul B. Hill, from MIT.[344] That article describes various scenarios concerning interoperability between servers implementing the standard MIT Kerberos ("MIT Kerberos servers") and Windows 2000 computers, both client PCs and servers.[345]

(260) Mr. Hill's article clarifies that a "*Windows 2000 domain without a Microsoft [Key Distribution Centre]*" is a scenario that is "*not supported by Microsoft*".[346] In other words, MIT Kerberos servers cannot manage the security in Windows 2000 domains. It is noteworthy that, by using AS/U, UNIX servers *were* able to do that in a Windows domain relying on NTLM.[347]

(261) MIT Kerberos servers can be integrated in a Windows 2000 domain and receive tickets from the Windows Key Distribution Centre in the Windows domain. However, they cannot interpret the PAC data and must use different mechanisms to handle authorisation.

(262) Conversely, Windows client PCs and work group servers running Windows 2000 can be integrated in an MIT Kerberos realm. This requires changing the configuration of each of the client PCs and work group servers. The Windows 2000 computers will thus not be members of a Windows domain. Mr. Hill points out that this solution "*does assume that you plan to offer no Microsoft application services or network resources that support Kerberos authentication*" and that "*the local account mapping [has to] be done on an individual basis where each account in the realm is mapped to a corresponding local account on the machine*". Mr. Hill states that this "*does not scale well*".[348]

(263) Mr. Hill therefore turns to scenarios where an MIT Kerberos realm (for example, a UNIX Kerberos realm) *and* a Windows 2000 domain are run alongside each other. This implies a "bifurcation", in the sense that there is a duplication of network administration. Mr. Hill describes two different options in this scenario.

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[344] See Stuart Madnick and Patrick Valduriez, *Comments on the Commission's Statement of Objections Filed against Microsoft*, at paragraphs 62-64 and Tab. 14, in Microsoft's submission of 16 November 2001. Mr. Hill's article is discussed in the *Interoperability Brief* in Sun's submission of 7 January 2002, at paragraphs 144 to 151.

[345] Mr. Hill's article is dated 2001. To the Commission's knowledge, the description by Mr. Hill remains accurate, in particular the fact that a Windows 2000 domain without a Microsoft KDC is a scenario not supported by Microsoft.

[346] See page 3 of Mr. Hill's article. Mr. Hill's article discusses interoperability between standard MIT Kerberos and Microsoft's implementation. It does not consider UNIX servers taking advantage of the disclosures made by Microsoft in the framework of the US Settlement. These disclosures will be specifically addressed below at recitals (273) *et seq.*

[347] See above at recital (211) *et seq.*

[348] See page 4 of Mr. Hill's article.

(264)   First, it is possible to set up *"a one way trust relationship between the Windows 2000 Domain and the Kerberos realm such that the Kerberos realm trusts the Windows 2000 Domain"*.[349]   In order to simplify administration, *"over time the UNIX user accounts could all be migrated to the Windows 2000 Domain and the UNIX realm would only contain the service principal names for the UNIX based application services"*.[350]

(265)   A second possibility is described in more detail, since it is the solution that has been set up at the MIT.   Mr. Hill indicates that *"the deployment scenario [...] has occupied a great deal of time, and the time of John Brezak, Program Manager of Kerberos at Microsoft"*.[351]   In this configuration, "shadow accounts" have to be managed and synchronised separately in both domains. Depending on the situation, synchronisation between passwords in both realms may also be necessary.

(266)   In conclusion, Mr. Hill's article, although it shows that a certain degree of interoperability can be achieved between MIT Kerberos and Microsoft Kerberos, is also evidence that there are significant limitations and administrative burdens linked to achieving such interoperability.

4.1.3.5.3.3 Microsoft's Authorization Data Specification for Windows 2000

(267)   Already in its reply to the Commission's first Statement of Objections, Microsoft stated that it in fact published *"on 26 April 2000 [...] details concerning its use of the Authorization Data field [...]"*.[352] Microsoft thereby referred to a specification called *Microsoft Authorization Data Specification v. 1.0 for Microsoft Windows 2000 Operating Systems*.

(268)   However, this specification only described the structure of the authorization_data field and does not describe in detail the meaning of the various fields. Furthermore, the text of the document provided that *"the Specification is provided to you solely for informational purposes [...] and pursuant to this Agreement, Microsoft does not grant you any right to implement this Specification"*.[353] Thus, the specification could not be used by competitors to adapt their work group server operating systems so that they could participate in Microsoft's Kerberos-based security architecture.

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[349]   See page 5 of Mr. Hill's article.
[350]   See page 5 of Mr. Hill's article.
[351]   See page 5 of Mr. Hill's article.
[352]   See Microsoft's submission of 17 November 2000, Annex X on page 3.
[353]   Microsoft, *Agreement for Microsoft Authorization Data Specification v. 1.0 for Microsoft Windows 2000* (26 April 2000).

(269)   It is noteworthy that Microsoft made, in the framework of its agreement with Compaq, specific disclosures on Kerberos.[354]   In particular, Microsoft granted Compaq a licence to [Confidential].[355]

4.1.3.5.3.4 Microsoft's February 2002 disclosure to the IETF

(270)   On 20 February 2002, Microsoft informed the Commission that it had "*submitted as an informational RFC to the Internet Engineering Task Force [its] implementation in Windows 2000 of the Authorisation Data [...] field of the Kerberos standard*". Microsoft further alleged that it "*had taken steps to ensure that other operating system vendors can interpret and generate group membership information in the format used in Microsoft's PACs*".[356]

(271)   The document referred to by Microsoft is *Utilizing the Windows 2000 Authorization Data in Kerberos Tickets for Access Control to Resources*, an "Internet Draft" submitted in October 2002 by Microsoft's John Brezak.[357]   As outlined above, Internet-Drafts should not be confused with IETF standards, which are described by means of RFCs.[358]

(272)   In fact, that document seems to provide even less information than the April 2000 *Authorisation Data specifications*. In particular, several fields that are documented, although not fully, in the latter document, are indicated as "Reserved", without further information, in the 2002 IETF filing.

4.1.3.6 Microsoft's Communications Protocols Licensing Program

(273)   In the aftermath of the US Settlement, Microsoft has made a number of disclosures relating to protocols used by its client PC and work group server operating systems to communicate with each other.

(274)   Microsoft made these disclosures pursuant to what has become Section III.E of the US Judgment, and which provides that "*Microsoft shall make available for use by third parties, for the sole purpose of interoperating or communicating with a Windows Operating System Product, on reasonable and non-discriminatory terms*

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[354]   See above, at recitals (231) *et seq.*
[355]   [Confidential]
[356]   See Microsoft's letter to DG COMP, of 20 February 2002. (Case COMP/C-3/37.792 on pages 25068-25069)
[357]   John Brezak, *Utilizing the Windows 2000 Authorization Data in Kerberos Tickets for Access Control to Resources*, printed from ftp://ftp.rfc-editor.org/in-notes/internet-drafts/draft-brezak-win2k-krb-authz-01.txt on 16 December 2002. The October 2002 submission by John Brezak had previously been available on Microsoft's Web site for several months, at http://msdn.microsoft.com/library/en-us/dnkerb/html/MSDN_PAC.asp (printed on 9 September 2002). See Microsoft's submission of 17 October 2003, on page 65, referring to Mr. Brezak's document as published in the Microsoft Web page and that is identical to that submission.
[358]   See above, at recital (238).

[…], any Communications Protocol that is […] (i) implemented in a Windows Operating System Product installed on a client computer, and (ii) used to interoperate, or communicate, natively (i.e., without the addition of software code to the client operating system product) with a Microsoft server operating system product".[359]

(275) Microsoft launched the Communications Protocols Licensing Program, by which it implemented Section III.E, at the beginning of September 2002.[360]

(276) As a preliminary observation, it must be pointed out that the Communications Protocols Licensing Program is not specifically targeted at work group server operating system vendors and even addresses issues beyond the scope of this case. In particular, Microsoft's disclosures relate to the whole range of Microsoft's server operating system products.

(277) These disclosures, however, have been strictly limited by Microsoft to client-to-server communication. They do not cover server-to-server protocols that are functionally related to the client PC, such as Global Catalogue protocols or synchronisation protocols between Active Directory domain controllers.

(278) Furthermore, all licensing agreements under the Communications Protocols Licensing Program[361] include the following provision:

> "*The licences granted […] in this Agreement do not include any use of the Communications Protocols or the Microsoft licensed Intellectual Property for server to server or client to client communications.*"[362]

(279) If a non-Microsoft work group server operating system vendor signs any of the corresponding licensing agreement, it must thus ensure that the products that it sells with the implementation of the protocols do not use those protocols to communicate with another server. This is in contradiction with the fact that the Windows domain architecture involves client-server and server-server interconnections and interactions that are closely interrelated.

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[359] Section III.E, in Final Judgment of 1 November 2002, United States District Court for the District of Columbia, *State of New York v. Microsoft Corporation,* Civil Action No. 98-1233 (CKK) and Final Judgment of 1 November 2002, United States District Court for the District of Columbia, *United States of America v. Microsoft Corporation*, Civil Action No.98-1232 (CKK).

[360] Microsoft began implementing the terms of its settlement with the US Department of Justice and nine States before the settlement had been approved by the Court.

[361] Microsoft offers various licences under the Communications Protocols Licensing Program, each of which corresponds to a given "task" performed by a server.

[362] See Microsoft's Communications Protocol Licence Agreements, Section 2.2. (e) License Scope, Reservation of Rights.

4.1.4   "Interoperability solutions" provided by Microsoft

(280)   The Commission will now turn to products distributed by Microsoft in binary form
and that Microsoft puts forward as relevant to the Commission's concerns related to
interoperability of competing work group server operating systems with Microsoft's
products.   These are "Services for UNIX" and "Services for NetWare"
(Section 4.1.4.1), various directory synchronisation products provided by
Microsoft[363] (Section 4.1.4.2) and Microsoft's COM for Solaris (Section 4.1.4.3).

4.1.4.1   Microsoft's Services for UNIX and Services for NetWare

(281)   As regards Services for UNIX and Services for NetWare, Microsoft's documentation
makes clear that those tools are largely aimed at facilitating the *migration* to a
Windows solution for organisations that have a significant investment in either
UNIX or NetWare, or in ensuring the use of UNIX mission critical application
servers with Windows client PCs:

> *"Windows Services for UNIX version 3.0 provides a full range of cross-platform services for integrating Windows into existing UNIX-based environments."[364]*

> *"Windows Services for NetWare version 5.0 provides a set of interoperability utilities that simplifies the introduction of Windows 2000 Server and its Active Directory service into a NetWare/NDS network environment. Services for NetWare includes [...] tools to simplify the adoption of Windows 2000 Server, reduce overall network administration, and facilitate the migration to Windows 2000 Server from NetWare."[365]*

(282)   Similarly, some products mentioned by Microsoft are rather focused on
interoperability with *previous* generations of competing products than on
interoperability with forthcoming generations of such products. An example of this
is NWLink, which Microsoft itself describes in the following way: *"NWLink
implements the Internetwork Packet Exchange/Sequenced Packet Exchange
("IPX/SPX") protocols that, in the past, have been the primary means of
communication with NetWare servers".[366]*   They are thus also migration tools

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[363]   In this Section, directory synchronisation products provided by third parties will be addressed as well.
[364]   Microsoft, *Services for UNIX*, printed from http://www.microsoft.com/windows/sfu/default.asp on
13 January 2003.
[365]   Microsoft,   *Services   for   NetWare*,   printed   on   13   January   2003   from
http://www.microsoft.com/windows2000/sfn/default.asp.   See also *Microsoft Announces Windows
Services for NetWare 5.0*: *"To bring [the benefits of Windows 2000 Server] to customers who have
chosen the Novell NetWare operating system and to help them migrate to Windows 2000 Server,
Microsoft   developed   Microsoft   Services   for   NetWare   5"*,   printed   from
http://www.microsoft.com/windows2000/sfn/netware.asp on 13 January 2003.
[366]   Microsoft's submission of 17 November 2000, Annex C, on page 2.

towards Windows, rather than real interoperability solutions that would enable non-Microsoft servers to be integrated in a Windows domain on an equal basis with Windows servers.

4.1.4.2 Directory synchronisation tools

(283)   Microsoft points out several "synchronisation tools" that enable a competitor directory service to achieve limited synchronisation with Active Directory: the Microsoft Metadirectory Service (along with competing metadirectory products), the DirSync control, and Microsoft Directory Synchronization Service (MSDSS).

(284)   As a matter of preliminary observation, these various tools are not intended to allow interoperability with the Active Directory domain architecture, in the sense that an alternative directory service could provide the group and user administration of the Windows work group network. They simply enable a directory service to sit alongside Active Directory and exchange certain data with it. They do not provide connectivity to include member servers in the network-wide domain architecture, or to offer file, print or group and user administration services to Windows client PCs.

(285)   In addition, the degree of interoperability that is achieved by synchronising an Active Directory domain controller with a non-Microsoft work group server operating system product by using the Microsoft Metadirectory Service[367] or other metadirectory products[368] cannot be compared to the degree of interoperability between two Active Directory domain controllers. Metadirectory products only synchronise a limited part of the information contained in a directory. As such, metadirectory products do not suppress the need to manage the users, permissions, group memberships and security policies *separately* for the Windows work group servers and the non-Microsoft work group servers.[369]

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[367]   Microsoft Metadirectory Service 2.2 is not a product primarily developed by Microsoft. In 1999, Microsoft acquired Zoomit, a company specialised in metadirectory products. See Microsoft's press release, *Microsoft Acquires Leading Developer of Meta-Directory Products*, printed on 18 January 2003 from http://www.microsoft.com/presspass/press/1999/Jul99/metadirPR.asp. Since its purchase of Zoomit, Microsoft has been marketing Zoomit's Via as the Microsoft Metadirectory Service.

[368]   Microsoft mentions, for example, the following metadirectory products from third parties: Novell's DirXML, Novell's eDirectory, or IBM's Critical Path.

[369]   As an example of limitations for the metadirectory approach, it is worth noting that, among a list of other issues, Microsoft Metadirectory Service 2.2 still suffers limitation in its ability to synchronise passwords. See http://support.microsoft.com/default.aspx?scid=kb;en-us;272023, printed on 24 January 2003.

(286)   As regards more specifically the DirSync control, Sun points out the following excerpt from Microsoft's Web site:

"The DirSync control […] has two significant limitations:

- Only for highly-privileged programs: To use the DirSync control, a program must run under an account that has the SE_SYNC_AGENT_NAME privilege on the domain controller. Very few accounts are so highly privileged, so an application that uses the DirSync control can't be run by ordinary users.

− No subtree scoping: The DirSync control returns all changes that occur within a naming context. An application interested only in changes that occur in a small subtree of a naming context must wade through many irrelevant changes, which is inefficient both for the application and for the domain controller."[370]

(287)   Finally, as regards MSDSS, it should first be noted that it is available only for interoperability with Novell's directory service NDS (now eDirectory). In addition, as is clearly mentioned in the technical documentation attached to Microsoft's submission of 16 November 2001, MSDSS is in fact designed to help customers to progressively migrate from NDS to Active Directory.[371]

4.1.4.3   COM for Solaris

(288)   COM for Solaris, which is mentioned in Mr. Maritz's letter, is a tool marketed in binary form by Microsoft that developers can use to adapt Solaris applications to the COM Technology.[372] Microsoft explains that "*COM for Solaris permits existing Solaris applications to be 'wrapped' in COM interfaces so they can communicate with COM objects running on other platforms*" and "*new Solaris applications to be written as COM objects*".[373] Microsoft further states that "*the principal purpose of*

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[370]   Sun's Submission of 7 January 2002, at paragraph 174, (Case COMP/C-3/37.792 on page 21056). See also the printout of the corresponding Web site, http://msdn.microsoft.com/library/default.asp?url=/library/en-us/netdir/ad/polling_for_changes_using_the_dirsync_control.asp, printed on 19 May 2003.

[371]   Microsoft, *MSDSS Technical Overview* and *Synchronising Windows 2000 Active Directory with Novell Directory Service*, attached to Annex D of Microsoft's submission dated 16 November 2001, at Tab. 2 and Tab.3. Although the *MSDSS Technical Overview* states that MSDSS provides for two types of synchronisation: one-way and two-way, the "one–way synchronisation" is possible only in the direction "Active Directory-to-NDS" - which means that changes made in Active Directory are pushed to NDS and that the management is thus performed using Active Directory, while NDS only reflects the changes made to Active Directory. "One way synchronisation" from NDS to Active Directory is not mentioned. Whilst "two-way synchronisation" seems possible, Microsoft clearly states that one-way synchronisation is a "*desirable configuration in customer scenarios that prefer to centralise directory administration in Active Directory and/or are sensible to network traffic costs*".

[372]   Sun can neither improve the tool, nor link it with any development of its own, since COM for Solaris is available only in binary form.

[373]   Microsoft's submission of 17 November 2000, on page 5.

COM for Solaris was to permit components of distributed applications running in Windows domains to be hosted on Solaris rather than on a Windows server operating system".[374]

(289) This means that COM for Solaris is primarily intended to allow the use of Solaris as an application server. It does not allow Solaris to function as a work group server operating system in fully compatible mode with the Windows domain architecture. In this respect, in a submission to the Commission filed in January 2002, Sun points out that "*COM for Solaris required the use of a Microsoft workgroup server running as a Windows NT 4.0 domain controller as well as the installation and maintenance of special software on the Microsoft workgroup server*".[375]

(290) Finally, COM for Solaris relates to Windows NT 4.0 technology, not to Windows 2000 technology.

(291) COM for Solaris is priced at USD 3,500 per copy.[376]

4.1.5 "Interoperability solutions" developed by Microsoft's competitors on the basis of reverse-engineering

(292) Microsoft points out that its competitors can have recourse to reverse-engineering techniques in order to access some of the interoperability information that it does not disclose.[377]

4.1.5.1 Samba

(293) Microsoft mentions the open source product developed by the Samba group in numerous submissions.[378] Microsoft considers that "*the apparent success of the open source developers of SAMBA in creating their own version of CIFS demonstrates the efficacy of reverse engineering*".[379]

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[374] See Microsoft's submission of 7 February 2004, in response of the Commission's letter of 16 January 2004, on page 4.

[375] See Sun's submission of 7 January 2002, footnote 155 (Case COMP/C-3/37.792 on page 21062). Indeed the COM for Solaris CD includes a file called install.txt, which "*gives information on installing Microsoft's DCOM for UNIX*". This document clearly refers to software (paulas.exe) that has to be installed on the "*Primary Domain Controller*". In a work group network where client PCs are running Microsoft's client PC operating system and work group servers are exclusively running Sun's product, this would require the customer to add to one of its Sun servers a software designed for the integration of a Microsoft work group server operating system into the network.

[376] See http://www.microsoft.com/com/resources/solaris.asp, printed on 24 May 2002.

[377] See, for example, Microsoft's submission of 17 November 2000, at paragraph 164: "*Sun is entitled to access through reverse engineering the interface information necessary for Solaris to exchange information with Windows client operating systems so that Solaris can deliver all of the functionality that Solaris is capable of supplying*". See also Microsoft's submission of 9 June 1999, on page 35.

[378] See, for example, Microsoft's submission of 15 March 1999 on page 29 (case No IV/37.345 page 2298), Microsoft's submission of 17 November 2000 at paragraphs 60, 76, 79, 80, and in Annex H, Microsoft's submission of 16 November 2001 at paragraphs 92-93, Microsoft's submission of 17 October 2003, on page 47 and footnote 75 (mentioning Samba 3).

[379] See Microsoft's submission of 17 October 2003, on page 68.

(294)   The Samba group describes its product as "*an independent implementation of a file, print and authentication server for Windows clients*", which is developed using reverse engineering techniques in order to access the undisclosed interoperability information that it needs for that purpose.[380]   The objective of Samba is to provide 'native' interoperability with the Windows client PCs and servers, in the sense that it does not require the installation of software add-ons on these client PCs and servers.

(295)   More than two years after the release to market of Windows 2000 Professional and Windows 2000 Server, the following elements were still on the "to do list" of the Samba group: "*a Kerberos 5 client implementation in Samba that understands the proprietary MS PAC*", "*a UNIX based Kerberos 5 [Key Distribution Centre] that can issue Windows 2000 PACs*", "*the ability to read data from an Active [...] Directory Server via the authorisation credentials (TGT) received from the Windows 2000 Domain [Key Distribution Centre]*".[381]

(296)   It is only with Samba 3.0, released on 24 October 2003, that Linux or UNIX servers running Samba were "*able to join a [Active Directory domain] as a member server [that is to say, a server that is not a domain controller] and authenticate users using LDAP/Kerberos*".[382]

(297)   The *Official Samba-3 HOWTO and Reference Guide*, published on 14 November 2003, states:

> "Samba-3 […] cannot truly function as an Active Directory Primary Domain Controller. The protocols for some of the functionality of Active Directory Domain Controllers have been partially implemented on an experimental only basis. Please do not expect Samba-3 to support these protocols. Do not depend on any such functionality either now or in the future. The Samba Team may remove these experimental features or may change their behaviour. This is mentioned for the benefit of those who have discovered secret capabilities in Samba-3 and who have asked when this functionality will be completed. The answer is maybe or maybe never!"[383]

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[380]   Free Software Foundation Europe's submission at the Oral Hearing on 13 November 2003, presentation by Jeremy Allison, Samba Team.

[381]   Samba, Development, printed from http://ftp.easynet.be/samba/devel on 20 May 2003. The Samba group further states on that Web page: "*The new ADS (Active Directory) work has gained us much in the ability to act as a server in an ADS domain, but nothing in becoming a [primary domain controller]*".

[382]   *Release notes of Samba 3.0*, printed from http://ftp.easynet.be/samba/whatsnew/samba-3.0.0.html on 19 November 2003.

[383]   *Official Samba-3 HOWTO and Reference Guide*, on page 56, 57, printed on 24 November 2003 from http://ftp.easynet.be/samba/docs.   Microsoft also puts forward Syntax's TotalNet Advanced Server ("TAS") and SCO's VisionFS, which are, "*like Samba, products created without access to Microsoft's source code that nonetheless permit Windows 2000 clients to obtain services from non-Windows servers using CIFS*". See Microsoft's submission of 17 November 2000, at paragraph 60. TAS and VisionFS

4.1.5.2 NDS for NT

(298)   Although Microsoft does not mention it as an interoperability solution, Novell's NDS for NT is an example of a product developed using reverse engineering techniques and that improves interoperability between a non-Microsoft work group server operating system and the Windows (here Window NT) domain architecture.

(299)   NDS for NT, which Novell describes in various submissions to the Commission,[384] was a software product marketed by Novell that could be installed on a Windows NT domain controller, and redirect to Novell's NDS (now eDirectory) all the calls from the client PCs of the domain to the SAM registry[385] of that domain controller. In its documentation on NDS for NT, Novell describes the product in the following way:

> "In designing this product Novell visited many customers who were asking for help in managing NT in their branch offices. This allows administrators to administer all aspects of the NT domain through NDS. In addition, NDS for NT has been designed so that any application requiring domain information will receive that information from NDS without requiring any modification to the application."[386]

(300)   Microsoft's Web page explains in the following terms how NDS for NT functions from a technical perspective:

> "In an unmodified Windows NT Server environment, the [SAM registry] holds information about users and their privileges, and is interrogated by Windows NT Server through a dynamic link library (DLL)[387] called SAMSRV.DLL. When a company installs NDS for NT on a computer running Windows NT Server 4.0, the installation process replaces[388] Microsoft's version of SAMSRV.DLL with a Novell version that re-routes all requests to a NDS server instead of the [SAM registry]. The NDS

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have the same shortcomings as Samba. They implement an outdated version of Microsoft's file services protocols. See Sun's submission of 7 January 2002, Annex F, (Case COMP/C-3/37.792 on pages 21720-21907)

[384]   See Novell's submissions of 13 April 1999 (Case IV/C-3/37.345 on pages 2237-2238), 19 February 2001, (Case COMP/C-3/37.792 on page 6800) and 10 January 2002 (Case COMP/C-3/37.792 on page 23150).

[385]   The SAM registry was the precursor of Active Directory in the Windows NT Server 4.0 operating system. See above, at recital (148).

[386]   See Novell Research January 1999, *An Introduction to NDS for NT v 2.0*, printed from http://developer.novell.com/research/appnotes/1999/january/03/a990103_.pdf on 23 January 2003. See also Novell, NDS for NT 2.01 Quick Start and Novell, *NDS for NT 2.01 Quick Start*, printed from http://www.novell.com/documentation/lg/ndsnt201/pdfdoc/quickst.pdf on 23 January 2003.

[387]   DLLs (Dynamic Link Libraries) are small software elements that are loaded in memory dynamically each time another component requires them (i.e. instead of being loaded with the main program that will make use of them).

[388]   In fact, the DLL is not physically removed from the computer, but renamed, and could be used again if the customer chooses to uninstall NDS for NT.

server then makes authentication and authorisation decisions based on the information stored in the NDS database."[389]

(301)   Novell points out that NDS for NT can run on a Windows NT Server but *not* on a Windows 2000 Server. According to Novell, the DLL that needs to be replaced in Windows 2000 in order to enable redirection is "signed" and Microsoft has not provided Novell with the information necessary for it to sign its "replacement DLL".[390] Microsoft does not contest this point.

4.2   Bundling Windows Media Player with Windows

4.2.1   *Microsoft's product releases and media software*

(302)   In August 1991, Microsoft shipped Windows 3.0 with so called "Multimedia Extensions", reflecting an enhancement by the same name to the architecture of Intel Pentium processors that improved the performance of multimedia applications.[391] Users could view still photographs and listen to sounds (in the .wav and MIDI file formats).[392] The Multimedia Extensions did not enable media streaming. Capability to play back downloaded video files was added in 1993 (the software package "Video for Windows" included the Media Player 2.0).[393]

(303)   Windows 95, released on 24 August 1995, included 32-bit media playback software and added support for MPEG4 v1 and v2 video codecs. Windows 95 did not offer end users media streaming.

(304)   In September 1996, Microsoft introduced the beta version of the NetShow server for basic delivery of live and on-demand multimedia content over *intra*nets where available bandwidth[394] is usually greater than over the Internet.[395]

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[389]   See Microsoft, *Understanding Novell's NDS for NT 2.0*, posted April 12, 1999, printed from http://www.microsoft.com/windows2000/server/evaluation/news/bulletins/nds2.asp on 21 January 2003.

[390]   See Novell's submissions of 13 April 1999 (Case IV/C-3/37.345 on pages 2237-3348), 19 February 2001, (Case COMP/C-3/37.792 on page 6800) and 10 January 2002 (Case COMP/C-3/37.792 on page 23150).

[391]   Microsoft's submission of 3 June 2001, on page 5 and Microsoft's *Computer Dictionary*, Fifth Edition, 2002, on page 343.

[392]   Microsoft's submission of 3 June 2001, on page 7. See also Microsoft's submission of 17 October 2003 (NERA), Exhibit 44, S. Kevorkian, *Microsoft and Streaming Media: A Profile*, on page 8.

[393]   Microsoft's submission of 3 June 2001, on page 7.

[394]   The term "bandwidth" designates the data transfer capacity, or speed of transmission, of a digital communications system as measured in "bits per second" ("bit" stands for "binary digit" and is the smallest unit of information handled by a computer.

[395]   *Microsoft Introduces NetShow, A Platform for Delivering Multimedia Content Over Intranets*, 16 September 1996, http://www.microsoft.com/presspass/press/1996/sept96/NetShwpr.asp.

(305)   On 21 July 1997, Microsoft and RealNetworks (then called Progressive Networks) announced an agreement to collaborate on streaming media.[396] As part of the deal, Microsoft licensed RealAudio and RealVideo 4.0 codecs for incorporation into its NetShow streaming server and RealPlayer 4.0 for inclusion (together with Microsoft's own NetShow client) in Microsoft Internet Explorer.[397] RealPlayer 4.0 required less bandwidth and could thus stream audio across the Internet to users connected to the Internet via a modem (narrowband). Microsoft also bought a minority stake (USD 30 million) in RealNetworks.

(306)   In August 1997, Microsoft acquired the streaming media company VXtreme to obtain advanced compression technology, which dynamically adjusted to available bandwidth.[398] In October 1997, Microsoft announced that Progressive Networks' RealPlayer 4.0 was included in Internet Explorer 4.0.[399] In December 1997, Microsoft released DirectShow API SDK, a low level media layer technology spanning Microsoft media client and server software.

(307)   On 4 May 1998, Microsoft announced the public beta release of its "*new universal player, the Microsoft Media Player*" capable of streaming media across the Internet as well as the beta release of NetShow 3.0 server.[400] Microsoft Media Player included playback support for MPEG, QuickTime, and RealAudio and RealVideo content.[401]

(308)   On 25 June 1998, Microsoft introduced Windows 98.[402] The streaming NetShow player was distributed along with Windows 98 on the Windows 98 installation CD. The NetShow player, however, was not installed as part of any of the four default installations that Windows 98 offered to users.[403]

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[396] *Time Line of Microsoft and RealNetworks Relationship*, November 1998, http://www.microsoft.com/presspass/features/1998/11-18RNrelationship.asp.

[397] *Microsoft and Progressive Networks Collaborate on Streaming Media*, 21 July 1997, Microsoft press release. See http://www.microsoft.com/presspass/press/1997/jul97/pronetpr3_95.asp. See also *Microsoft Delivers "The Web the Way You Want It" With Preview Release Of Microsoft Internet Explorer 4.0*, 15 July 1997, http://www.microsoft.com/presspass/press/1997/Jul97/prev2pr.asp. See also Microsoft's submission of 17 October 2003 (NERA), Exhibit 44, S. Kevorkian, *Microsoft and Streaming Media: A Profile*, on page 9.

[398] *Microsoft Announces Acquisition of VXtreme; Rolls Out Streaming Multimedia Strategy With Release of NetShow 2.0*, 5 August 1997, http://www.microsoft.com/presspass/press/1997/aug97/vxpr.asp

[399] *Microsoft Internet Explorer 4.0 Now Available; Delivers "The Web the Way You Want It" to Users Worldwide*, 1 October 1997, http://www.microsoft.com/presspass/press/1997/Oct97/ie4availpr.asp

[400] *Microsoft Releases Public Beta Version of Enhanced Windows-Based Streaming Multimedia Technologies*, 4 May 1998, http://www.microsoft.com/presspass/press/1998/May98/mltechpr.asp

[401] *Microsoft Releases Public Beta Version of Enhanced Windows-Based Streaming Multimedia Technologies*, 4 May 1998, http://www.microsoft.com/presspass/press/1998/May98/mltechpr.asp

[402] *Microsoft Windows 98 Available Today*, 25 June 1998, http://www.microsoft.com/presspass/press/1998/Jun98/98AVALMA.asp. See also Microsoft's submission of 17 October 2003, NERA, at footnote 7.

[403] See RealNetworks' email of 5 January 2004, on pages 1-4. See also Microsoft's submission of 7 February 2004, on page 66.

(309)   In parallel, Microsoft's new media player was commercially released on 7 July 1998 for download (for Windows 95, Windows 98 and Windows NT 4.0 operating systems) under the name of Windows Media Player 6.[404]   WMP 6 allowed for the first time for streaming playback over the Internet.[405]   It supported RealAudio 4.0, RealVideo 4.0, ASF, AVI[406], WAV, MPEG and QuickTime formats, and provided users with a single player for viewing content in the most popular formats.[407]   In November 1998, Microsoft withdrew from its investment in RealNetworks.

(310)   Windows 98 Second Edition, released on 5 May 1999, included WMP 6.   Successor versions of Windows (Windows Me,[408] Windows 2000 Professional[409] and Windows XP[410]) all came with Microsoft's streaming media player included.[411]   Windows Media Player is installed on the computer as a non-removable component of Windows.

(311)   In August 1999 (beta release in April 1999[412]), Microsoft released the Windows Media Technologies 4 architecture including Windows Media Player, Windows Media Services and Windows Media Tools (ASF authoring and editing tools for converting files from other formats, such as MPEG, and MP3, to ASF[413]).   It included Microsoft's proprietary digital rights management technology for the first time.[414]   The software no longer natively supported RealNetworks' or QuickTime's formats.

(312)   In July 2000, Microsoft released the beta version of the Windows Media Technologies 7 architecture.[415]   It included Windows Media Player (including jukebox functionality), Windows Media Format, Windows Media Rights Manager, Windows Media Encoder and Windows Media SDK.

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[404]   See also Microsoft's submission of 17 October 2003 (NERA), Exhibit 44, S. Kevorkian, *Microsoft and Streaming Media: A Profile*, on page 9.

[405]   *Key Corporations, Internet Sites and Industry Vendors Announce Deployment*, Support, 7 July 1998, http://www.microsoft.com/presspass/press/1998/Jul98/StrmTcpr.asp.   See also Microsoft's submission of 17 October 2003 (NERA), Exhibit 44, S. Kevorkian, *Microsoft and Streaming Media: A Profile*, on page 9 and of 7 February 2004, on page 49.

[406]   The abbreviation "AVI" stands for "Audio Video Interlaced".   This video format was created by Microsoft and provides a framework for various compression algorithms.

[407]   *Key Corporations, Internet Sites and Industry Vendors Announce Deployment*, Support, 7 July 1998, http://www.microsoft.com/presspass/press/1998/Jul98/StrmTcpr.asp

[408]   Released on 9 June 2000.

[409]   Released on 17 February 2000.

[410]   Released on 25 October 2001.

[411]   WMP is also bundled with the Internet Explorer (bundled with Windows) and the MSN service.

[412]   *Microsoft Announces Beta Release of Windows Media Technologies 4.0*, 13 April 1999, http://www.microsoft.com/presspass/press/1999/Apr99/WMT4Betapr.asp.

[413]   See above at recital (113).

[414]   Microsoft's submission of 17 October 2003 (NERA), Exhibit 44, S. Kevorkian, *Microsoft and Streaming Media: A Profile*, on page 9.

[415]   *Microsoft Delivers Industry's Most Advanced Digital Media Platform With Windows Media Technologies 7*, http://www.microsoft.com/presspass/press/2000/Jul00/AdvancedPlatformPR.asp, 17 July 2000.

(313)   In March 2001, Microsoft announced the availability of beta versions of Windows XP with WMP 8. Microsoft released Windows XP on 25 October 2001. WMP 8 was not available separately for download from Microsoft's Web site. WMP 8 did not provide for native MP3 ripping (burning MP3 files onto CD-ROMs) support but required a plug-in for this functionality.

(314)   In September 2002, Microsoft announced the beta release of Windows Media 9 Series, the latest of Microsoft's media technology versions, including WMP 9. Windows Media 9 Series was commercially available as of 7 January 2003.[416]

4.2.2   Microsoft's behaviour following the US Judgment

(315)   Section III.H of the US Settlement (and of the US Judgment) provides that Microsoft shall allow OEMs and consumers to enable or remove end-user access to Microsoft Middleware Products. Windows Media Player is one of the products in the category of Microsoft Middleware Products. Microsoft complied with this provision with the release of Windows 2000 Professional Service Pack 3 on 1 August 2002 and Windows XP Service Pack 1 on 9 September 2002.[417] It is noteworthy that the US Judgment - based on a liability finding for monopoly maintenance (not tying) - did not oblige Microsoft to unbundle WMP from the operating system, nor has Microsoft allowed for such unbundling on its own initiative. The effect of Microsoft's implementation of the US Judgment on competition and its shortcomings with a view to the specifically exclusionary effect of tying is addressed at recitals (796) to (798).

5   ECONOMIC AND LEGAL ASSESSMENT

(316)   Under Article 82 of the Treaty, any abuse by one or more undertakings having a dominant position within the common market or in a substantial part of it is prohibited as incompatible with the common market in so far as it may affect trade between Member States.

(317)   Under Article 54 of the EEA Agreement, any abuse by one or more undertakings of a dominant position within the territory covered by the Agreement or in a substantial part of it is prohibited in so far as it may affect trade between the contracting parties to the Agreement.

(318)   Microsoft is an undertaking within the meaning of Article 82 of the Treaty and Article 54 of the EEA Agreement. Its relevant conduct affects the whole of the EEA.

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[416]   See *Final Release of Windows Media 9 Series Starts Next Wave of Digital Media*, printed on 7 January 2003 from http://www.microsoft.com/presspass/press/2003/Jan03/01-079SeriesFinalReleasePR.asp.

[417]   See Microsoft, *Microsoft Settlement Program Milestones*, August 2002 printed from http://www.microsoft.com/presspass/legal/aug02/08-05settlementmilestones.asp on 8 January 2003.

(319)   Insofar as Microsoft's conduct affects trade between Member States, Article 82 of the Treaty applies. As regards the effects on competition in Norway, Iceland and Liechtenstein, and the effects on trade between the Community and those countries, as well as between those three countries, Article 54 of the EEA Agreement applies.

(320)   Microsoft does not earn more than 33% of its EEA turnover in the EFTA Member States. Therefore, pursuant to Article 56 (1) (c) and Article 56 (3) of the EEA agreement, the Commission is competent in this case to apply both Article 82 of the Treaty and Article 54 of the EEA Agreement.[418]

5.1   The relevant markets

5.1.1   The relevant product markets

(321)   A relevant product market comprises all those products and/or services which are regarded as interchangeable or substitutable by the consumer, by reason of the products' characteristics, their prices and their intended use (demand-side substitutability).

(322)   Supply-side substitutability may also be taken into account when defining markets in those situations in which its effects are equivalent to those of demand substitution in terms of effectiveness and immediacy. This means that suppliers are able to switch production to the relevant products and market them in the short term without incurring significant additional costs or risks in response to small and permanent changes in relative prices.[419]

(323)   In this section, the Commission will define the three markets that are relevant to this Decision: the market for client PC operating systems, the market for work group server operating systems, and the market for streaming media players.

5.1.1.1   Client PC operating systems

5.1.1.1.1   Demand-side substitutability

(324)   From the perspective of a client PC user, a client PC operating system has special characteristics that make it suitable for a particular use, namely to manage the PC hardware and to offer the user an interface to interact with the computer and run applications. The products listed in Sections 3.2.2.2 and 3.2.3 are operating systems that are designed and marketed specifically as operating systems for client PCs.

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[418]   In order to prevent unnecessary repetition, any references to "Article 82 of the Treaty" refers to both Article 82 of the Treaty and Article 54 of the EEA Agreement.

[419]   Commission notice on the definition of relevant market for the purposes of Community competition law (OJ C 372, 9.12.1997, p.5), at paragraph 20.

(325)   Operating systems intended for different computers (such as servers) are, as a rule, not used on client PC hardware. Generally, such use would not be technically feasible, or would deprive the user of most of the hardware capabilities of his machine, or of the software capabilities of the operating system. Other software products such as applications cannot substitute for operating systems, since they require an operating system to take advantage of the hardware capabilities of the PC. As such, from the perspective of client PC users, client PC operating systems fulfil a specific demand by reason of their characteristics and intended use.

5.1.1.1.1.1 Intel and non-Intel compatible client PC operating systems

(326)   A distinction could be made between client PC operating systems for Intel-compatible and for non Intel-compatible PCs (for example, Apple Macintosh). A client PC operating system designed to run on an Intel-compatible PC will as a rule not run unmodified on a non-Intel compatible PC (such as a Macintosh[420]) – for example, it will need to be re-engineered and then re-compiled to the different processor.[421] The same applies to a client PC operating system designed to run on a non-Intel compatible PC if one attempts to run it on an Intel-compatible PC. However, the question of the inclusion of operating systems for Intel-compatible and non-Intel-compatible PCs in the definition of the relevant market can be left open since the difference will not be such as to alter the result of the assessment of Microsoft's market power.

5.1.1.1.1.2 Operating systems for other client appliances are not substitutable

(327)   Other client appliances include personal digital assistants ("PDA") or "intelligent" (or "smart") mobile phones.

(328)   These devices perform certain functions that are similar to the functions of client PCs. They offer some computing power and storage space, and certain applications are available both on client PCs and on such devices. Finally, they offer connectivity to networks and can be used to access resources on them, for example, resources on the Internet. Similar to a client PC, they require an operating system to manage the hardware and to offer a programming platform for applications.

(329)   However, from a demand perspective, there are very concrete differences between these devices and a client PC, such as the size of the screen and the limited

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[420]   In spite of the fact that the term "PC" is often used for "Intel-compatible PC", and therefore in such a context, may not refer to a non-Intel compatible PC such as a Macintosh. However, as outlined above at recital (86), on the basis of functionalities provided, the Macintosh falls within the definition of a client PC pursuant to the terminology given in the present Decision.
[421]   Admittedly, software products can "emulate" a virtual processor on top of which the binary can run. This is nevertheless not a standard use of an operating system.

functionalities compared to a client PC.[422] Moreover, the operating systems of these devices are not designed to support the full range of complex applications that those of client PCs do.

(330)   As such, the operating systems installed on such client devices cannot be regarded as competitive substitutes for client PC operating systems.

5.1.1.1.1.3 Server operating systems are not substitutable

(331)   Most of the operating systems for client PCs and servers are written on the basis of a small number of code bases: the various UNIX code bases, DOS (which was the basis for Windows 95, Windows 98 and Windows Me), Windows NT (which is the basis for Windows 2000 and Windows XP), and Linux. The code base may be the same for a vast range of computers, from client PC to mainframe.

(332)   However, differentiated operating system products are developed on each of those code bases, by adding specific layers of software in order to target different user needs according to the type of computer on which it is to be used. These differences between client PC and server operating systems are visible for each of the code bases referred to at recital (331). Indeed for all these "multi-purpose" operating system code bases that can be used across the whole range of computers, there is already a separate client PC operating system written on this code base and marketed on the client PC operating system market. Commercially therefore, both categories of products are treated separately, and vendors sell client PC and various server operating system products at different prices according to the functionalities that need to be fulfilled.

5.1.1.1.1.4 Conclusion

(333)   In conclusion, there are no realistic substitutes on the demand-side for client PC operating systems.

5.1.1.1.2 Supply-side substitutability

(334)   Supply-side substitutability may also be examined when defining markets in those situations in which its effects are equivalent to those of demand substitution in terms of effectiveness and immediacy (see recital (322) above). In this context, it has to be determined whether in response to a small but significant and non-transitory increase of price, undertakings active outside the market for client PC operating systems

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[422]   This was also the view of the US Circuit Court of Appeals for the District of Columbia when it considered this issue in 2001: "*The District Court found that because information appliances (handheld devices etc.) fall far short of performing all of the functions of a PC, most consumers will buy them only as a supplement to their PCs [...]. We adhere to that conclusion.*" - Judgment in *USA vs. Microsoft* of the US Circuit Court of Appeals, District of Columbia Circuit, 28 June 2001, on page 17.

could easily switch production into client PC operating systems in order to compete more intensely on that market.

(335)   It should be highlighted that developing a new operating system is very costly and time consuming. This is because modern operating systems are very large and sophisticated software products. For example, Windows XP includes several tens of millions of lines of code.[423] Any undertaking which might account for such supply-side substitutability needs to already have access to and the ability to modify the source code of an operating system in order to be able to switch production effectively and immediately to PC operating systems. Therefore, the analysis of supply-side substitutability can be restricted to other operating systems.

(336)   The production of software is subject to increasing returns at all output levels. Nearly all of the costs of producing software are fixed costs related to the development of an initial/new version of a software product (that is to say, upfront costs). Therefore, whilst these fixed development costs will be high, once the initial version has been developed and tested, the marginal cost of producing an extra copy will be very low.

(337)   However, to enter the client PC operating system market, the operating system vendor would have to overcome significant barriers to entry.

(338)   From a marketing perspective, the vendor would need to persuade OEMs that there would be consumer demand for its operating system to be installed on client PCs. To do so it would have to engage in aggressive advertising of its product as a client PC operating system. This would entail significant costs and expenses, since its product was not on the market before, and familiarity with a given "look and feel" is of paramount importance for many customers. [424]

(339)   This would in any case be insufficient from a technical perspective. Operating systems for other devices (for example, servers, other client devices) would need to be considerably modified in order to take advantage of the capabilities of a different hardware, and would not offer the rich and easy-to-use user interface that is necessary for client PC operating systems. As a consequence, it would be necessary to modify the source code of the operating system to adapt it to the client PC operating system market. Such a process constitutes a significant investment,

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[423]   Professor Appel, who testified in the course of the US proceedings, stated: *"I have found that Microsoft's source code constitutes at least 38 millions lines of code"*. See page 39 of direct testimony of Dr. Andrew W. Appel, 2 April 2002, p 39-40, *United States of America v Microsoft Corporation* (Civil action No. 98-1232) (CKK) and State of New York, *et al* v Microsoft Corporation (Civil action No. 98-1233) (CKK), printed from http://www.cs.princeton.edu/~appel/ms on 18 June 2003.

[424]   See Microsoft's submission of 21 October 2003 (M. Iansiti), on page 5 *"A successful software platform will also provide an intuitive and powerful user interface that gives users a consistent way to manage their applications, files and devices."*

involves taking a significant commercial risk and relates to a time frame that would be longer than what is normally considered under supply-side substitution.[425]

(340)   Finally, the demand for such a new client PC operating system will be small if it is not able to support a large number of applications. A customer will not buy (and an OEM will not distribute) an operating system if no (or very few) applications are able to run on it. Therefore, any company wishing to switch resources into client PC operating systems would have to simultaneously develop a critical mass of applications that would be able to run on this platform. This is prohibitively expensive and time consuming. As outlined below at recital (459), no company at this time has the technical skills or the financial means to overcome that barrier.

(341)   In conclusion, software developers not producing client PC operating systems would not be able to switch their production to client PC operating systems without incurring significant additional costs and risks, and the timeframe for such switching of resources would go significantly beyond that which is relevant when examining supply-side substitutability.

5.1.1.1.3 Conclusion

(342)   By reason of its specific characteristics and the lack of realistic substitutes, the market for operating systems for client PCs constitutes a relevant product market for the purposes of this Decision.

5.1.1.2 Work group server operating systems

(343)   A second relevant market identified by the Commission is that for work group server operating systems.

5.1.1.2.1 Demand-side substitutability

(344)   In order to determine the boundaries of the relevant market, the Commission has in particular examined the tasks performed by different server operating systems.[426]

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[425]   Even for Microsoft, which is not only present, but dominant on the client PC operating system market, the development of a new version from the beginning of the programming work to the release to market has as a rule been much longer than a year. For instance, for Windows XP, the beta testing period alone took more than a year, from October 2000 to October 2001. See Microsoft's press release dated 31 October 2000: *Microsoft Delivers First Beta Release of Next Version of Windows, Code-Named "Whistler"*, printed from http://www.microsoft.com/presspass/press/2000/Oct00/Whistler1PR.asp on 4 September 2003 and Microsoft's press release *Windows XP is Here!*, printed from http://www.microsoft.com/presspass/press/2001/oct01/10-25XPOverallPR.asp on 5 May 2003.

[426]   In its submissions following the supplementary Statement of Objections, Microsoft states that "*The Third SO identifies as a product market server operating systems that run on server computers that cost less than $25,000 and perform specified tasks*" (Microsoft submission of 17 October 2003, p. 6), and "*The third SO defines the server operating systems market on the basis of server computer prices (which are dominated by hardware, not software) and on the workloads for which server computers are used.*" (NERA submission of 30 November 2003, on page 5 - "*The Commission's Refusal to Supply*

(345)   As outlined above in Section 3.1.4, "work group server operating systems" are operating systems designed and marketed to deliver collectively file, print and group and user administration services to relatively small numbers of client PCs linked together in a small to medium-sized network. The operating system products described in Sections 3.2.2.3 and 3.2.4 have been developed and are marketed to carry out those tasks. As such, work group server operating systems fulfil a specific pattern of demand by dint of their technical characteristics and their intended use.

(346)   In contrast, other server operating systems do not need to interoperate as fully as work group server operating systems with the client PCs in an organisation, and perform different tasks. As outlined above in Section 3.1.4, higher-end servers generally carry out mission-critical tasks. These impose higher requirements on both the hardware and the software. Operating systems running on these higher-end servers have to be more reliable and have more features than those of work group server operating systems, and as such, are optimised to fulfil other requirements, such as support for large databases or time and resource consuming computation. In doing so, they fulfil a different demand. Similarly, operating systems installed on servers at the "edge" of networks which perform specific tasks, such as Web serving or firewall serving, also fulfil a different demand. On this basis, operating systems for these other servers are not substitutes for work group server operating systems.

(347)   The following recitals will show first, that on the basis of market evidence gathered in the course of the investigation, work group servers fulfil a distinct set of inter-related tasks that are demanded by consumers. Second, contrary to other operating systems, work group server operating systems are optimised to fulfil these tasks. Third, Microsoft's pricing strategy confirms the absence of demand-side substitutability between work group server operating systems and other server operating systems.

5.1.1.2.1.1 Market evidence show that work group servers fulfil a distinct set of inter-related tasks

(348)   Evidence gathered by the Commission in the course of its investigation has confirmed that work group server tasks constitute a distinct set of linked tasks which are demanded by customers.

(349)   In response to the Commission's 2003 market enquiry, a significant majority of the respondents (70 out of 85, or 82%) have identified that in their organisations, a specific type of server performs file and print, and group and user administration tasks.[427]

(350)   What is more, at least 51 out of 83[428] respondents (61%) consider that these tasks (file, print and group and user administration)[429] form part of a set of interrelated server tasks that "go together".[430]

(351)   This is because these tasks represent the core everyday services required by client PC users.[431]   A typical user is first identified/authenticated, and then will create or modify files, print them and exchange or share them. As such, these tasks are carried out by dedicated work group servers which are sometimes referred to as "*infrastructure servers*",[432] or servers intended to support infrastructure functionality.[433]

(352)   By way of illustration, several respondents lay emphasis on the need for a single point of administration or for single sign-on identification of the users accessing the resources of the network, or more generally on the issue of managing access to network resources.[434]   Other respondents consider that it is a question of costs - by using the same operating system for all these tasks, savings can be made, which are linked not only to the cost of the operating system itself, but also to technical simplification and familiarity with the operating system.[435]

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[427]   In addition, the respondents identified that support for non-mission critical applications such as e-mail packages should be included as a further core work group server task.   However, many such respondents qualified this answer with additional information.   The relevance of this for market definition is outlined further at recitals (355)-(356) below.

[428]   Two respondents did not answer the question.

[429]   Support for non-mission critical applications such as e-mail packages was also integrated by many users into this set of interrelated tasks, although with certain qualifications. See below at recitals (355)-(356).

[430]   See responses to Question 1 of the questionnaire attached to the Commission's Article 11 letters of 28 May 2003 and 4 June 2003, see above at recital (8).

[431]   In its response to the supplementary Statement of Objections (pages 42-43), Microsoft takes issue with the Commission's Article 11 enquiry. It states that the Commission was wrong in asking the enquiry respondents whether they devoted particular servers, as opposed to particular server operating systems, to particular tasks.   The Commission cannot agree with it.   Indeed, customers use (and often purchase) servers as a bundle of hardware and software (see above at recital (68)).   Therefore, this was not a meaningful question that the Commission could have asked (similarly, customers also buy client PCs as a bundle of hardware and software, and yet there is a distinct market for the client PC operating system software).   As such, it was appropriate for the Article 11 enquiry to focus on the bundle of hardware and software.

[432]   See, for example, responses by Entity I06 (dated 10 June 2003) and by Entity I13 (dated 13 June 2003). Entity I30 (response dated 11 June 2003) describes work group tasks as "*infrastructure services*".

[433]   Statement by [Confidential] provided by Microsoft.

[434]   See, for example, response by Entity I46-16, Entity I46-17 and Entity I46-18 (all three from Entity I46, response dated 16 June 2003), by Entity I62 (dated 5 June 2003), by Entity I30 (dated 12 June 2003).

[435]   See, for example, responses by Entity I46-19, (response dated 16 June 2003), by Entity I60 (dated 12 June 2003) and by Entity I62 (dated 10 June 2003).

(353)   In this respect, it is interesting to note that, in the responses to the Commission's 2003 market enquiry, entities that use NetWare for group and user administration services also do so for file and print services. It is very seldom that companies mix one operating system for file and/or print with a different one for group and user administration. There is therefore a high degree of correlation between the choice to rely on a given operating system product for file services, and the choice to rely on it also for print services and group and user administration services.[436]

(354)   Microsoft argues that *"IT professionals report that each server operating system used for file & print is also used often for all other tasks. Only NetWare has a tighter relationship between usage for file & print and group and user administration tasks than for file & print and all other tasks."*[437] This, however, is incorrect. Both for Novell *and* Windows, the high degree of correlation between the workload shares of the operating system for file services, print services and group and user administration services is not matched when one considers different types of services.[438]

(355)   A majority of respondents (62 out of 85, or 73%) indicate that they value the flexibility that is offered if the same work group server operating system that manages file and print and group and user administration is also able to carry out e-

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[436]   Correlation coefficients can be calculated on the basis of the responses to Question 5 of the questionnaire attached to the Article 11 letters sent on 16 April 2003. In this regard, the correlation coefficient between the workload share of NetWare for file services and the workload share of NetWare for print services is 0.95; if one considers print services and group and user administration services, the figure is 0.94; as regards file services and group and user administration services, it is 0.86 (these figures are calculated on the basis of the responses of 65 of the 102 entities referred to above at footnote 17, the other responses being incomplete; these 65 entities represent over 700,000 client PCs). The corresponding figures for Windows (figures calculated on the basis of the responses of 52 entities, which together represent above 700,000 client PCs) are 0.89, 0.79 and 0.75. These figures are echoed for Mercer. As regards the responses to Mercer's Survey II, the correlation coefficient between the workload share for "file and print services" and that for "group and user administration services" for NetWare is 0.86 (0.62 for Windows). The corresponding figure based on the responses to Mercer's Survey III is 0.84 (0.73 for Windows). It should be noted that it is not surprising that NetWare is the server operating system for which the correlations are highest, since for the other server operating system families, the figures are "polluted" by the fact that a distinction should ideally be made between the various versions, targeted at various server tasks.

[437]   See Mercer Report attached to Microsoft's submission of 31 October 2003, on page 5.

[438]   Both for Windows and for NetWare, the correlation between the file workload share, the print workload share, and the group and user administration workload share is much higher than the correlation between any of these three workload shares and any of the other tasks (irrespective of whether the figures from the Commission 2003 market enquiry or those of Mercer's surveys are used). By way of illustration, on the basis of the responses to the Commission 2003 market enquiry, the correlation coefficient for Windows between the workload share for file services and that for e-mail services is 0.11; when one considers print services and e-mail services, the figure is 0.07; for group and user administration services and e-mail services, it is 0.04. If one considers Mercer's Survey II, the correlation coefficient between Windows workload share for file and print services and Windows workload share for e-mail services is 0.17, for group and user administration services and e-mail services, the figure is 0.18. As regards Mercer's Survey III, these figures are respectively 0.23 and 0.22. The correlation coefficients between file, print and user administration and other tasks (for example, Web serving, firewalls, support for non-mission critical applications or support for mission critical applications) are similarly low.

mail services and support other non-mission critical applications.[439]   Indeed, some respondents point out that support for e-mail is a task that is naturally related to the provision of the core work group server services (that is to say, file, print and group and user administration services),[440] or that small sites in particular will run their internal e-mail application on work group servers.[441]

(356)   Therefore, support for non-mission critical applications (of which e-mail is the most widely used) is often a task that is also fulfilled by work group server operating systems (in conjunction with the provision of file, print and group and user administration services).   However, a not insignificant minority of respondents[442] indicate that they operate their e-mail services on dedicated servers exclusively devoted to that task, and hence disagree that support for e-mail and collaboration services "goes together" with the other work group server tasks.[443] For the purposes of market definition in this Decision therefore, the Commission takes the position that the core (interrelated) tasks that are carried out by work group server operating systems are the provision of file services, that of print services and that of group and user administration services.

(357)   The Microsoft customer statements also correspond with the Commission's analysis of the market. These statements were presented to the Commission by Microsoft with a view to making a point on interoperability - essentially, that due to the prevalence of heterogeneous computing environments, there cannot be a problem of interoperability in the market.

(358)   However, the statements confirm that there are different server "tiers" used for different tasks, and that the servers that fulfil the work group server tasks that the Commission has outlined (that is to say, the provision of file, print, and group and user administration services) constitute a specific category of cheaper servers that run predominantly Windows and NetWare. In contrast, mission critical applications (for

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[439]   Question 2 of the questionnaire attached to the Commission's Article 11 letters of 28 May 2003 and 4 June 2003 (see above at recital (8)).

[440]   See, for example, Entity I46-18 and Entity I46-21 (both from Entity I46, response dated 16 June 2003), Entity I71 (dated 19 June 2003), Entity I04 (dated 10 June 2003), Entity I25 (dated 17 June 2003).

[441]   See, for example, responses by Entity I49 (dated 10 June 2003), Entity I14 (dated 19 June 2003), Entity I18 (dated 12 June 2003), Entity I25 (dated 17 June 2003), Entity I02 (dated 12 June 2003), Entity I28 (dated 12 June 2003), Entity I28 (dated 10 June 2003).

[442]   See, for example, responses by Entity I46-13, Entity I46-15 (both from Entity I46, response dated 16 June 2003), Entity I53 (dated 11 June 2003), Entity I11 (dated 12 June 2003), Entity I64 (dated 16 June 2003), Entity I22 (dated 12 June 2003), Entity I72 (dated 5 June 2003), Entity I23 (dated 10 June 2003), Entity I37 (dated 13 June 2003), Entity I9-1, Entity I9-7 (both from Entity I09, response dated 18 June 2003), Entity I27 (dated 11 June 2003), Entity I76 (dated 17 June 2003) and Entity I40 (dated 11 June 2003). Those entities suggest that whereas file, print and workstation management services go together, e-mail and collaboration services may be separated. Entity I28 (response dated 12 June 2003) considers that File/Print/e-mail go together but that collaboration services should be treated separately.

[443]   In addition, the correlation coefficients between e-mail and the file, print and group and user administration tasks are relatively low (see above at footnote 438).

example, Enterprise Resource Planning,[444] billing or payroll applications,[445] flight planning[446]) and large databases[447] are usually run on larger UNIX servers and in mainframes.

5.1.1.2.1.2 Server operating system workloads are optimised according to the tasks they have to fulfil

(359)   Microsoft states that "*even if system configurations (primarily hardware) may be optimized for particular types of workloads, the operating systems are not. Precisely the same version of Windows (and other operating systems) used on servers dedicated to file and print workloads is also installed on servers used for application serving and web serving, which the Commission excludes from the market*".[448] Microsoft therefore argues that any distinction between different categories of server is entirely down to hardware differences, and not to any differences in the operating system that is installed on the different servers.[449]   As such, it argues that the same operating system is functionally interchangeable across the whole range of servers. Microsoft has been consistent with this line of argument in each of its replies to the Commission's three Statements of Objections.[450]

(360)   In this respect though, Microsoft's own product descriptions are telling, and correspond with the Commission's analysis of the market. Describing its Windows 2000 Server family, Microsoft in fact presents three different products which are clearly marketed to fulfil different consumer demands. These differences relate both to the tasks to be carried out and the hardware on which the operating systems are installed.

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[444]   See, for example, statements by [Confidential], [Confidential], [Confidential], [Confidential], [Confidential] submitted by Microsoft.

[445]   See, for example, statements by [Confidential], [Confidential], [Confidential], [Confidential], [Confidential], [Confidential] submitted by Microsoft.

[446]   See statement by [Confidential] submitted by Microsoft.

[447]   See, for example, statements by Armée de Terre, BP, Bundesverwaltungsamt, itij (Portuguese Ministry of Justice), Italian Navy, ONCE.

[448]   Microsoft (NERA) response to supplementary Statement of Objections, 17 October 2003, "*The Commission's Refusal to Supply Case: A Review of the Economic Evidence*", at paragraph 20.

[449]   Microsoft also argues that "*there is also demand-side substitution across server systems of different prices*" stating that for large organisations in particular, server systems (hardware and software) of different sizes are readily substitutable. See Microsoft (NERA) response to supplementary Statement of Objections, 17 October 2003, *The Commission's Refusal to Supply Case: A Review of the Economic Evidence*, at paragraphs 31-32. This ignores the fact that the Commission's market definition is software-based. In any case, the examples NERA quotes (without being too specific) with respect to server consolidation appear to generally relate to consolidation of servers carrying out data center tasks rather than providing work group server services.

[450]   See, for example Microsoft (NERA) response to second Statement of Objections, at paragraph 136.

(361)   Windows 2000 Server is presented as the "*the entry-level version*"[451] of the Windows 2000 Server operating system, and "*is the right solution for workgroup file, print, and communication servers*".[452]

(362)   In contrast, Windows 2000 Advanced Server is:

"*the server operating system for line-of business applications and e-commerce. Windows 2000 Advanced Server includes all the features and application availability of Windows 2000 Server, with additional scalability and reliability features, such as clustering, designed to keep your <u>business-critical applications</u> up and running in the most demanding scenarios […] The Windows 2000 Advanced Server operating system contains all the functionality and reliability of the standard version of Windows 2000 Server, plus <u>additional features for applications that require higher levels of scalability and availability</u>. This makes Advanced Server the right operating system for essential business and e-commerce applications that handle heavier workloads and high-priority processes.*" [453]

(363)   In further contrast, Windows 2000 Datacenter Server provides "*maximum reliability and availability*" and constitutes:

"*the best platform for large-scale line-of-business and enterprise.com backend usage [...] Windows 2000 Datacenter Server [...] is the right operating system for running mission-critical databases, enterprise resource planning software. [...] Windows 2000 Datacenter Server is designed for enterprises that need very reliable high-end drivers and software.*"[454]

(364)   The differences also relate to the hardware on which the operating systems are installed. As regards the hardware upon which the operating system will run, Microsoft specifies that Windows 2000 Server "*scales from 1 to 4 processors and up to 4 gigabytes*", Windows 2000 Advanced Server "*scales from 1 to 8 processors and up to 8 gigabytes*" and Windows 2000 Datacenter Server "*scales from 1 to 32 processors and up to 64 gigabytes*".[455]

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[451]   http://www.microsoft.com/windows2000/serverfamily/default.asp, printed on 26 November 2002.
[452]   http://www.microsoft.com/windows2000/server/default.asp, printed on 12 May 2003.
[453]   http://www.microsoft.com/windows2000/advancedserver/evaluation/business/overview/advanced.asp, printed on 20 May 2002, also in Annex A of Novell's submission of 10 January 2002 (emphasis added).
[454]   http://www.microsoft.com/windows2000/datacenter/default.asp, printed on 20 May 2002, also in Annex A of Novell's submission of 10 January 2002 (apart from last sentence), emphasis added.
[455]   Microsoft, *Choosing the Right Operating System*, printed on 14 January 2003 from: http://www.microsoft.com/windows2000/server/howtobuy/choosing/default.asp.

(365)   A similar distinction applies to the Windows 2003 Server family of products. The basic Windows 2003 Server offering, Windows 2003 Server, Standard Edition is described as "*the ideal multipurpose network operating system for the everyday needs of organizations of all sizes, but especially small businesses and workgroups*"[456] and is "*designed for small organizations and departmental use, Windows Server 2003, Standard Edition, delivers intelligent file and printer sharing, secure Internet connectivity, centralized desktop policy management, and Web solutions that connect employees, partners, and customers*".[457]

(366)   In contrast, Windows 2003 Server, Enterprise Edition, the successor to Windows 2000 Advanced Server, "*builds on the capabilities of Windows Server 2003, Standard Edition, by adding reliability features needed for business-critical applications*"[458] Windows 2003 Server, Datacenter Edition, the successor to Windows 2000 Datacenter, "*is built for mission-critical applications that demand the highest levels of scalability, availability, and reliability*".[459]

(367)   The Windows 2003 Server family brings a new server operating system product to the range - Windows 2003, Web Edition. This product "*is designed for building and hosting Web applications, pages, and services*".[460] Microsoft highlights that "*Windows Server 2003, Web Edition, is designed specifically for dedicated Web serving needs*"[461] and that it "*can be used solely to deploy Web pages, Web sites, Web applications, and Web services*".[462]

(368)   Microsoft therefore sells different server operating system products which are targeted at different consumer demands according to the functionalities that need to be fulfilled.[463] It must be noted that the description of the basic version of the

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[456]   See   http://www.microsoft.com/windowsserver2003/evaluation/overview/default.mspx#overviews, printed on 12 May 2003.

[457]   See http://www.microsoft.com/windowsserver2003/evaluation/overview/standard.mspx, printed on 12 May 2003.

[458]   See   http://www.microsoft.com/windowsserver2003/evaluation/overview/default.mspx, printed on 12 May 2003.

[459]   See   http://www.microsoft.com/windowsserver2003/evaluation/overview/default.mspx, printed on 12 May 2003.

[460]   See   http://www.microsoft.com/windowsserver2003/evaluation/overview/default.mspx, printed on 12 May 2003.

[461]   See http://www.microsoft.com/windowsserver2003/evaluation/overview/web.mspx, printed on 12 May 2003.

[462]   See   http://www.microsoft.com/windowsserver2003/evaluation/overview/web.mspx,   printed   on 12 May 2003.

[463]   This is also the case for other software-only server operating system vendors. For example, Red Hat describes its basic Red Hat Enterprise Linux ES operating system as "*ideally suited for network, file, print, mail, Web, and custom or packaged business applications*", whilst its Red Hat Enterprise Linux AS core operating system is targeted "*for high-end and mission-critical systems*" and is described as "*the ultimate solution for large departmental and datacenter servers.*" See http://www.redhat.com/software/rhel/es/ and http://www.redhat.com/software/rhel/as/, printed on 9 January 2004. In its submission of 7 February 2004 (page 7), Microsoft makes the point that the basic version of Red Hat's operating system, Red Hat Enterprise Linux ES, can also perform non-work group

Windows server operating system (Windows 2000 Server, and Windows 2003 Server, Standard Edition) corresponds to the core work group server services identified by the Commission.

5.1.1.2.1.3 Microsoft's pricing strategy confirms the absence of demand-side substitutability

(369) Despite the very different server operating system products marketed and sold by Microsoft, Microsoft states that "*the [server operating] system vendor has no way of knowing the uses to which it will be put and cannot effectively price discriminate on the basis of use*"[464] and that "*the ability of any software vendor to price discriminate according to workloads is limited*"[465]. Microsoft does nevertheless concede that "*there is one exception to this general proposition. In order to compete more effectively with Linux, which is available for free, Microsoft markets a low-priced version of Windows Server 2003 that can be used solely to deploy Web pages, Web sites, Web applications, and Web services. Use of this version of Windows Server 2003 to run applications or to act as a domain controller is expressly prohibited*".[466]

(370) Windows 2003, Web Edition is indeed sold at a different price (USD 399[467]) to other versions of the Windows 2003 server operating system. However, Microsoft's statement that Windows 2003, Web Edition is only an exception is contradicted by Microsoft's own marketing and pricing policy.[468]

(371) Windows 2003 Server, Standard Edition with 5 CALs costs USD 999, and with 10 CALs costs USD 1,199. 5 additional CALs cost USD 199, so the price for Windows 2003 Server, Standard Edition with 25 CALs would be USD 1,796. In contrast, Windows 2003, Enterprise Edition with 25 CALs costs USD 3,999.[469] In further contrast, Windows 2003, Datacenter Edition costs above USD 10,000.[470]

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tasks. However, Microsoft does not address the point of why Red Hat markets two different versions of its server operating system targeted at different consumer demands (according to the functionalities that need to be fulfilled).

[464] See Microsoft (NERA) response to the supplementary Statement of Objections, on page 11.

[465] NERA (Microsoft) response to the supplementary Statement of Objections, on page 12.

[466] See Microsoft's response to the supplementary Statement of Objections, on pages 39-40.

[467] See http://www.internetnews.com/ent-news/article.php/2068951, printed on 12 May 2003.

[468] See Novell's submission of 10 January 2002, Annex A, page 4. See also http://www.microsoft.com/windows2000/advancedserver/howtobuy/pricing/default.asp, printed on 20 November 2003.

[469] That Windows 2003, Web Edition fulfils a specific type of demand is also demonstrated by its pricing - it is priced at USD 399, under half the price of the lowest-priced version of Windows 2003 Server, Standard Edition (see http://www.internetnews.com/ent-news/article.php/2068951, printed on 12 May 2003).

[470] Windows 2003 Server Datacenter Edition, and Windows 2000 Datacenter are not available direct from Microsoft, but only from OEMs. By way of example, a version of Windows 2003 Server, Datacenter Edition for 1-4 processors is available from the Web site of MNJ Technologies for USD 12,725.43 (see http://reviews.cnet.com/Microsoft_Windows_Server_2003_Datacenter_Edition__complete_package/4 014-3513_9-30557253.html?q= and http://www.mnjtech.com/scripts/site/site.product/id/IBM65579, both printed on 20 November 2003). Versions of Windows 2003 Server, Datacenter Edition for more than 1-4 processors are available for higher prices.

(372)   The differences in price of the different versions of the Windows 2003 server operating system are therefore significant. They are summarised in Table 3, together with the descriptions of the various Microsoft product offerings that have already been outlined in the preceding recitals.

Table 3: Windows 2003 Server prices and product descriptions

Windows server operating system	Product description	Price (USD)
Windows 2003 Server, Web Edition	"*designed for building and hosting Web applications, pages, and services*"	**399**
Windows 2003 Server, Standard Edition (25 CALs)	"*designed for small organizations and departmental use, [...] delivers intelligent file and printer sharing, secure Internet connectivity, centralized desktop policy management, and Web solutions that connect employees, partners, and customers*"	**1,796**
Windows 2003 Server, Enterprise Edition (25 CALs)	"*builds on the capabilities of Windows Server 2003, Standard Edition, by adding reliability features needed for business-critical applications*"	**3,999**
Windows 2003 Server, Datacenter Edition	"*is built for mission-critical applications that demand the highest levels of scalability, availability, and reliability*"	**10,000+**

(373)   There is a very similar pattern of marketing and pricing for the different versions of the Windows 2000 server operating system (with the exception that there was no "Web Edition" for Windows 2000). This is summarised in Table 4:

Table 4: Windows 2000 Server prices and product descriptions

Windows server operating system	Product description	Price (USD)
Windows 2000 Server (25 CALs)[471]	*"the right solution for workgroup file, print, and communication servers"*	**1,799**[472]
Windows 2000 Advanced Server (25 CALs)	*"the right operating system for essential business and e-commerce applications that handle heavier workloads and high-priority processes"*	**3,999**[473]
Windows 2000 Datacenter Server	*"the best platform for large-scale line-of-business and enterprise.com backend usage. Windows 2000 Datacenter Server is the right operating system for running mission-critical databases, enterprise resource planning software"*	**10,000+**[474]

(374)   Windows 2003, Web Edition is therefore not simply "*one exception*", but is one version amongst a range of different server operating systems sold by Microsoft at different prices, and which are targeted at different uses. In this regard, the lack of prominence given by Microsoft throughout its replies to the Statements of Objections to the significantly different prices of the various versions of its server operating system (although these had been outlined in some detail in the supplementary Statement of Objections) is telling.

(375)   At the Oral Hearing, when questioned on the significantly different pricing of the various versions of its server operating system, Microsoft attempted to explain the differences according to the intensity of use of the intellectual property rights in the

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[471]   Microsoft no longer sells Windows 2000 Server with 25 Client Access Licences. However, the fact that the price of Windows 2000 Server is different to Windows 2000 Advanced Server does not change because of this. Microsoft currently sells Windows 2000 Server with 5 Client Access Licences for USD 999 and Windows 2000 Server with 10 Client Access Licences for USD 1,199 (see http://www.microsoft.com/windows2000/server/howtobuy/pricing/default.asp, printed on 20 May 2002 and 20 November 2003). The 5 extra Client Access Licences therefore cost USD 200. On this basis the price for Windows 2000 Server with 25 Client Access Licences would again be USD 1,799.

[472]   See for example Novell's submission of 10 January 2002, Annex A, page 4. See also http://www.microsoft.com/windows2000/server/howtobuy/pricing/default.asp, printed on 20 May 2002 and 20 November 2003.

[473]   See for example Novell's submission of 10 January 2002, Annex A, page 4. See also http://www.microsoft.com/windows2000/advancedserver/howtobuy/pricing/default.asp, printed on 20 May 2002 and 20 November 2003.

[474]   See for example Web printouts of 20 November 2003, printed from http://www.mnjtech.com/scripts/site/site.search/page/1/action/search/search_token/WSV2000%20DATACENTER/ and http://www.mnjtech.com/scripts/site/site.product/id/IBM65577. This gives a price for Windows 2000 Datacenter of USD 25,414.52 (which is the same as the price of Windows 2003 Server, Datacenter Edition for 1-8 processors on the same OEM's Web site).

server operating system,[475] and highlighted that higher-level versions of its server operating system could also carry out the same work group server tasks (file and print, and group and user administration) that are fulfilled by its basic server operating system.[476]

(376)   Even if higher-level operating systems are capable of fulfilling the same basic work group server tasks as the standard version, the point is that they are not marketed to do so. It would be extremely cost-inefficient to purchase a higher-level server operating system in order to fulfil the function of a work group server operating system. This is confirmed by Microsoft's own marketing material: "*the three offerings in the family – Windows 2000 Server, Advanced Server, and Datacenter Server – allow you to tailor your investment to provide the level of system availability that's appropriate for your various business operations, without overbuying for operations that don't require maximum uptime*".[477] Microsoft itself does not therefore put forward as a realistic market proposition that customers wanting the basic work group server tasks should consider a higher-level server operating system.[478]

(377)   One other point needs to be mentioned with regard to the different prices of Microsoft's server operating system products. Windows 2003, Web Edition contains a licensing restriction on what use the product can be put to. No such restrictions exist for the other Windows server operating system products. The Commission assumes that this is why Microsoft attempts to present Windows 2003, Web Edition

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[475]   Microsoft makes the same point in its submission of 7 February 2004 (page 5), when it states that "*it charges for its operating systems based in part on the intensity with which its intellectual property is being used.*"

[476]   Microsoft also makes this point in its reply to the supplementary Statement of Objections: "*More expensive versions of Windows Server 2003 offer greater scalability and reliability, by offering features like hot swappable memory and clustering that permit them to run mission- critical applications for long periods of time without having to be shut down for maintenance. But those more expensive versions provide the same authentication services and file and print services as the base version of the Windows Server 2003.*" Microsoft's submission of 17 October 2003, NERA Report on Interoperability, on pages 38-39. Microsoft repeats this point in its submission of 7 February 2004 (page 8) when it states that: "*Microsoft charges more for Windows Server 2003 Datacenter Edition because it offers advanced features, such as clustering support and hot swappable memory, that enable enterprise customers to run mission-critical applications for extended periods of time without having to shut their server computers down for maintenance*", but that "*the price differential is not based on the ability to provide different kinds of services to Windows client and server operating systems. In fact, Windows Server 2003 Datacenter Edition provides the same authentication services and file and print services as Windows Server 2003 Standard Edition and can run any application written to run on the base version of the operating system.*"

[477]   This text, an excerpt from Microsoft's Web site, is referred to by Novell, which concludes: "*Microsoft itself expects customers to identify the Windows 2000 product that is appropriate for their needs, and not to buy a more sophisticated product*". See Novell's submission of 29 January 2002, Appendix A *Workgroup Server Operating System Market Definition and Dominance*, on page 5.

[478]   Microsoft's submission of 7 February 2004 (pages 9-10) also re-states several arguments about the efficiency of a higher-level server operating system fulfilling the functions of a work group server operating system from a supply-side substitution perspective. These are addressed in Section 5.1.1.2.2 below.

as "*one exception*", despite the significantly different prices of the four Windows 2003 Server products. However, it cannot be argued that although there are significantly different prices, because there is no licensing restriction for the other products, Microsoft could have no way of knowing to what uses these products will be put. This would ignore Microsoft's own practice of clearly identifying different consumer demands, targeting its different products explicitly at these distinct demands, and then pricing accordingly.

(378)   Microsoft also argues that its basic server operating system product (for Windows 2000 - Windows 2000 Server; and for Windows 2003 - Windows 2003 Server, Standard Edition) which the Commission has identified as being targeted at the work group server operating system market also fulfils non-work group server workloads: "*the base version of Windows Server 2003, which is the version of the operating system referenced in the Third SO, can be used to provide a wide range of functions in addition to authentication services and file and print services. Many of these functions, such as providing proxy services or firewall services, are expressly excluded from the Commission's market definition. Yet, the very same copy of Windows Server 2003 can be used at the same time on the very same server computer to provide authentication services and file and print services as well as other services the Commission says would place the operating system in a different market*".[479]

(379)   It should first be noted that this sentence mischaracterises the content of the Statement of Objections. The Commission has not stated that an operating system optimised for providing the core work group server services cannot perform other tasks. Rather, the Commission has found that without prejudice to all the tasks that a work group server operating system can fulfil, the ability to collectively provide file, print and group and user administration services is an essential feature of work group server operating systems, which are designed, marketed, purchased and used essentially to carry out this set of interrelated tasks.[480]

(380)   In any case, any argument that Microsoft may make in this respect[481] is invalidated by Microsoft's pricing behaviour as regards its own work group server operating system product, Windows 2003 Server, Standard Edition. For this product, Microsoft price discriminates according to whether the product is used for the provision of core work group server services. This is because a company that wants to use Windows 2003 Server, Standard Edition for work group server tasks needs to purchase CALs in addition to the server licence fee according to the number of client

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[479]   Microsoft submission of 17 October 2003, on pages 37-38.
[480]   In this regard, see also correlation coefficient figures in footnotes 436 and 438.
[481]   See, for example Microsoft (NERA) submission of 30 November 2003 ("*There Is No Market For 'Work Group Server Operating Systems'*"), at paragraph 23.

PC users for whom the product will provide core work group server services.[482]   In contrast, CALs are not required if the company wants to use the product for "*unauthenticated*" tasks (such as firewall, proxy and cache serving).[483]

(381)   By way of example, a company with 25 employees that is being provided work group server services by a server running Windows 2003 Server, Standard Edition will be charged USD 1,796 (see recital (371)).   If the same company wants Windows 2003 Server, Standard Edition to provide firewall serving for these same 25 users, the price will be USD 718 (as there is no charge for CALs).[484]   As such, Microsoft's own pricing behaviour demonstrates that although work group server operating systems may be able to perform other tasks in addition to providing core work group server services, this does not mean that there should be a reconsideration of the market definition.

(382)   In light of the above considerations, it can be concluded that contrary to Microsoft's assertions, it is possible to price discriminate according to workload and therefore the intended use by customers.   Microsoft itself markets different versions of its server operating system product, and is able to discriminate between different customer demands by charging significantly different prices for its different versions of the Windows server operating system according to the workloads that they will fulfil. One of these different versions is targeted at the work group server operating system market.

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[482]   See *Microsoft Licensing Product Use Rights*, on page 57, printed from http://download.microsoft.com/download/a/5/f/a5fc3270-2fe6-4536-b228-6b333ab8569d/pur.pdf on 9 January 2004 (from http://www.microsoft.com/licensing/resources/default.asp, printed on 9 January 2004). This document lists as the key server services which require CALs as authentication services, file services, printing services and remote access service.

[483]   See http://www.microsoft.com/windowsserver2003/howtobuy/licensing/caloverview.mspx, printed on 9 January 2004 ("*Windows CALs are not required when access to the server software is unauthenticated and conducted through the Internet*").
In its submission of 7 February 2004, Microsoft re-states (see also recital (375)) that the price of its Windows 2003 Server, Standard Edition product is based "*in part on the intensity with which its intellectual property is being used*" – i.e. that the number of CALs a customer must obtain depends on the number of his authenticated clients, and hence that product pricing is based on usage levels (see Microsoft's submission of 7 February 2004, on page 5). Microsoft makes a similar point with regard to other operating systems, in particular NetWare (see Microsoft's submission of 7 February 2004, at pages 5-6).   It is indeed the case that a work group server operating system vendor such as Microsoft *in part* charges more for its overall product according to the number of users being "served" by the operating system (this appears as reasonable commercial practice, and is also Novell's pricing practice). However, this is not relevant to the separate issue of different prices for the product in question being charged according to whether the product is used for work group or non-work group tasks, which Microsoft *also* does. In this respect, Microsoft does not directly address the points made in paragraph (380).

[484]   See Sun's presentation at the Oral Hearing (Lexecon, Slide 14), 14 November 2003.

5.1.1.2.1.4 Importance of interoperability with the client PCs

(383)   As work group server services are intimately linked to the usage of client PCs in an organisation and are delivered to client PC users as an inter-related, distributed service,[485] they are sometimes referred to as the "*standard desktop service*".[486] As such, they require a very good level of interoperability with the client PCs in the organisation. The importance of interoperability with client PCs for work group server operating systems is confirmed by evidence submitted by Microsoft itself.

(384)   In its Survey III, Mercer asked IT executives to rate various attributes on the importance they had in their choice of which server operating system to deploy for work group server functions. 83% of respondents gave to "*interoperability with the Windows workstations*" a rating of 4 or 5 on a scale from 1 (low importance) to 5 (high importance).

(385)   In this regard, it is interesting to also note the results of Mercer's Survey I, where IT executives were asked what considerations affected their general IT purchasing decisions (that is to say, without limitation to work group servers). Respondents were allowed to select up to three decision considerations from a list of thirteen. 30% of the respondents mentioned "*Ease of integration with existing environment*" or "*Ease of integration with planned future environment*" as one of their three major decision considerations.

(386)   Although Mercer's Survey I and Mercer's Survey III are not fully comparable (*inter alia* because the survey methods are different), it should not be surprising that the importance of interoperability is much more clear-cut for work group server operating systems than for other kind of server products. Other servers do not always interoperate with the client PCs in an organisation as fully as work group servers do (this is so in particular since one the key elements of the "group and user administration services" is the management of the client PCs).

5.1.1.2.1.5 Conclusion

(387)   It results from the above that there are no products that, from the demand-side perspective, exercise sufficient competitive pressure on work group server operating systems such that they should be included in the same relevant product market.

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[485]   See, for example response by Entity I17 (dated 12 June 2003) to Question 1 of the questionnaire attached to the Commission's Article 11 letters of 28 May 2003 and 4 June 2003.
[486]   See, for example response by Entity I06 (dated 10 June 2003).

5.1.1.2.2 Supply-side substitutability

(388) As is the case with client PC operating systems, it has to be determined whether in response to a small but significant and non-transitory increase of price, undertakings active outside the market for work group server operating systems could easily divert resources in order to compete more intensely in the market for work group server operating systems.

(389) Microsoft argues that the same operating system for servers is interchangeable across all levels of server.[487] Indeed, Microsoft states that *"the core operating systems used by Sun and the other UNIX vendors for their workstation and server operating systems are the same regardless of the cost of the hardware"*.[488] On this basis, Microsoft argues that *"the basic point [is] that the same core operating systems are used for servers inside and outside the entry-level server market defined by the SO, and that there are no obstacles to virtually instantaneous supply-side substitution."*[489] At the Oral Hearing, Microsoft argued (using an example of simple lego blocks) that higher-level server operating systems had all the functionalities of more basic server operating systems, but that they also included more complex features and functionalities.[490] Therefore, according to Microsoft, by simply switching off/disabling the more complex functionalities in a higher-level server operating system, a company would instantaneously have a product which could enter the "work group server operating system" space (illustrated by removing some of the lego blocks). As such, Microsoft's argument is that there must be a broader market definition than that used by the Commission, namely that for all server operating systems. Microsoft's assertions are, however, invalid for the following reasons.

(390) It is a fact that Microsoft's development strategy with respect to Windows 2000 has been to develop a product that includes features relating to various types of server and client PC tasks and *then* to enable and disable those features in order to target the different patterns of demand. Windows 2000 Professional (targeted at client PCs), Windows 2000 Server, Windows 2000 Advanced Server and Windows 2000 Datacenter Server thus share significantly the same code base, and the same applies to Microsoft's Windows 2003 server range of products.

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[487] Microsoft (NERA) response to the Commission's second Statement of Objections, at paragraph 133.
[488] Microsoft (NERA) response to the Commission's second Statement of Objections, at paragraph 138.
[489] Microsoft (NERA) response to the Commission's second Statement of Objections, at paragraph 146
[490] See also Microsoft (NERA) submission of 30 November 2003, *The Commission's Refusal to Supply Case Against Microsoft: An Overview of the Economic Evidence*, on page 8: *"all of the operating systems typically used in the [supplementary Statement of Objections]'s purported market are the same as, or are subsets of, their brand mates used on high-end server computers."*

(391)   However, this does not mean that there is one product market encompassing all the operating system products of that code base. Microsoft itself implicitly admits this principle through its implicit acceptance of a separate market for (client) PC operating systems despite the fact that: (i) in support of its instantaneous supply-side substitution argument, it makes frequent references to the core operating system of Sun/UNIX being the same from the desktop to the highest server[491]; and (ii) its assertion that "*From the outset, Windows NT was designed to provide client and server versions built on the same code base.*"[492] If Microsoft were consistent in its argument that higher level server operating systems can simply be stripped down/disabled in order to have an operating system which can fulfil work group server tasks, then this argument should *a fortiori* extend down to client PC tasks - a client PC operating system should be an even more stripped-down version of a (work group) server operating system.[493]

(392)   The reasons why Microsoft's supply-side substitutability argument does not put into question the definition of a relevant market for work group server operating systems are very similar to the ones that have been outlined in Section 5.1.1.1.2. above with respect to client PC operating systems.

(393)   In this regard, for the reasons outlined at recital (335) above, any undertaking which might account for supply-side substitutability needs to already have the source code of an operating system in order to be able to switch production effectively and immediately to work group server operating systems. Therefore, the analysis of supply-side substitutability can be restricted to other operating systems.

(394)   As regards client PC operating systems, Microsoft's own experience shows that it took 4 to 5 years and very significant amounts of money (for the leading client PC operating system vendor) to successfully enter the work group server operating system market.[494]

(395)   As regards, other server operating systems (typically, higher-end server operating systems, but also operating systems for servers at the "edge" of networks), it needs to be examined whether vendors of these products could enter the work group server

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[491]   See for example Microsoft (NERA), response to the Commission's second Statement of Objections, at paragraph 138.
[492]   Microsoft's submission dated 17 November 2000, at paragraph 47.
[493]   Microsoft was questioned on this point at the Oral Hearing, but did not answer it directly. Neither did it address the point in its post-Oral Hearing submission of 30 November 2003.
[494]   The first Windows work group server operating system was Windows NT, the code base for which took a significant amount of time to develop: "*We originally thought we could produce the first Windows NT system in a little over two years. It actually ended up taking us four and a half years to the first release in the summer of 1993.*" In *Inside Windows 2000*, by David A. Solomon and Mark E. Russinovich, Microsoft Press, 2000

operating system market as a reaction to a small but significant non-transitory increase in the price of work group server operating systems.

(396)   In this respect, the present lack of success of UNIX and Linux in the work group server operating system market (as demonstrated in Section 5.2.2.2 below) shows that it is not sufficient for these products which are successful as higher-end or edge server operating systems to be simply marketed for work group server tasks. If versions of those products were to compete *more aggressively* on the latter market, they would have to be substantially modified.[495]

(397)   Therefore, the task faced by a vendor of a non-work group server operating system wishing to market it on the work group server operating system market is not just "slimming it down" or disabling/enabling tasks to be able to carry out work group server tasks on different servers. By far the most work required is in adapting the operating system to provide the services required to interoperate with and manage the client PCs.[496]

(398)   In this context, in order to compete more intensely in the work group server operating system market on the basis of an operating system for non-work group servers, it would be necessary to develop and test a new product. As is the case for client PC operating systems,[497] this process of development and testing would require significant time and investments. For example, Microsoft, which by 1997 was already a work group server operating system vendor, announced the delivery of the Beta 1 version of what was at the time called Windows NT 5.0 on 23 September 1997.[498] However, the final version of what became Windows 2000 was only launched on 17 February 2000,[499] that is to say, some 29 months later. This

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[495]   As has been outlined at recital (336) above, once the first copy of an operating system has been developed, the marginal cost of producing an extra copy will be very low. Moreover, a virtually infinite amount of copies can be produced as there is virtually no physical capacity constraint. As a result, as regards the supply-side substitutability that could come from vendors of non-work group server operating systems able to provide work group server services, increasing output is in fact already exhausted. See Novell's submission of 10 January 2002, Appendix A, on page 8.

[496]   See Section 5.1.1.2.1.4 in this regard. See also Sun (Lexecon), submission of November 2001, at paragraph 147: "*Firms attempting to enter work group servers by modifying existing operating systems (e.g. for enterprise servers) also face overwhelming obstacles. Even if the [operating system] in the two different server markets seemed technically identical, this would not mean that it is economically easy for suppliers of enterprise level [operating system] to enter the market for work group servers. This is because work group servers need to inter-operate easily with PC desktops and enterprise level servers do not.*"

[497]   See above at paragraph (339).

[498]   See Microsoft press release dated 23 September 1997 *Windows NT 5.0 Beta Delivered to Over 200,000 developers* printed on 9 May 2003 from Microsoft's Web site, at http://www.microsoft.com/presspass/press/1997/Sept97/WinNT5Pr.asp.

[499]   See Microsoft's press release dated 17 February 2000, *Windows 2000, the Next Generation of PC Computing, Available Worldwide Today*, printed on 18 June 2003 from Microsoft's Web site, at http://microsoft.com/presspass/press/2000/Feb00/W2KavailablePR.asp.

timeframe is beyond what is relevant to consider supply-side substitution at the market definition stage.[500]

(399)   Therefore, other operating system vendors, including in particular vendors of server operating systems, would not be able to switch their production and distribution assets to work group server operating systems without incurring significant additional costs and risks and within a time framework sufficiently short so as to consider that supply-side considerations are relevant in this case. Beyond its general assertions of *"immediate substitution"*,[501] Microsoft has not addressed the points outlined at recitals (391) to (398) above, all of which were raised in the supplementary Statement of Objections.[502]

(400)   In conclusion, Microsoft's argument on supply-side substitution must be rejected.[503]

5.1.1.2.3 Conclusion

(401)   By reason of its specific characteristics and the lack of realistic substitutes, the market for work group server operating systems constitutes a relevant product market.

5.1.1.3 Streaming media players

(402)   Media players are client-side software applications, the core functionality of which is to decode, decompress and play (and further allow to process) digital audio and video files downloaded or streamed over the Internet (and other networks). Media players are also capable of playing back audio and video files stored on physical carriers such as CDs and DVDs. As with other application software, a media player consists of a Graphical User Interface and the underlying technology, that is to say, the software code, which enables multimedia playback functionality. The following sections will first examine whether a media player is a product distinct from an operating system; demand side and supply side substitution will then be addressed.

(403)   In the framework of this Decision, the market for streaming media players is not examined as a market where Microsoft might occupy a dominant position at the date

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[500]   In addition and as noted, a very good level of interoperability with client PC operating systems is required by such brand new work group server operating systems. However, as will be outlined below (see Section 5.2.2.3), there are barriers to entry related to interoperability resulting from Microsoft's conduct.
[501]   Microsoft (NERA) submission of 17 October 2003, *The Commission's Refusal to Supply Case: A Review of the Economic Evidence*, paragraph 27.
[502]   At paragraphs 57-65 of the supplementary Statement of Objections.
[503]   As Sun (Lexecon) pointed out at the Hearing, "*The fact that Microsoft is able to systematically price discriminate indicates that supply-side substitution is not a significant factor*" Sun's presentation at the Oral Hearing, on 14 November 2003 (Lexecon, Slide 18).

of adoption of this Decision, but as a reference market in which to locate the products and vendors that are foreclosed by Microsoft's tying of WMP.

5.1.1.3.1   A streaming media player is a product distinct from an operating system

(404)   Microsoft contends that "*it is inappropriate to consider multimedia playback functionality to be a product separate from an operating system*".[504] This contention is based on the fact that no client PC would be shipped without substantial multimedia functionality, including the capability to play audio and video content streamed over the Internet.

(405)   However, as will be shown below at recitals (800) to (813) media players are products distinct from operating systems. This is *inter alia* demonstrated by the existence of stand-alone media player software that can be installed on PCs and by the existence of software vendors specialised in supplying media player products (such as Real Networks). The fact that customers expect to be able to play media content on their computer does not imply that the operating system should include the media player. For instance, consumers value finding a word processor already installed on their computer (and OEMs often ship their client PCs with such a programme preinstalled). To the Commission's knowledge, Microsoft has however not contested that word processors and operating systems belong to separate relevant product markets.[505]

(406)   Microsoft's contention that media players are not separate from operating systems must therefore be rejected.

5.1.1.3.2   Demand side substitutability

5.1.1.3.2.1   Classical playback devices do not exert competitive constraints on media players

(407)   In its Decision in *AOL/Time Warner*[506] under the Merger regulation,[507] the Commission stated that player software constitutes, due to the attendant specific demand structure, a relevant product market.[508]

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[504]   Microsoft's submission of 1 December 2003, on page 24.

[505]   In fact, Microsoft refers at places to "*markets for applications and application development software*" (to which word processors would belong) which do not include client PC operating systems. See for example Microsoft submission of 17 November 2000 (NERA report at paragraph 107).

[506]   Commission Decision 2001/718/EC in Case COMP/M.1845 - AOL/Time Warner, OJ L 268, 9.10.2001, p. 28. At paragraphs 17 to 27 and 35 to 41 the Commission defined markets for the supply of narrow-band (music) and broad-band content via the Internet as distinct from those for music, films and TV programmes supplied through traditional distribution channels.

[507]   Council Regulation (EEC) No 4064/89 of 21 December 1989 on the control of concentrations between undertakings (OJ L 395, 30.12.1989, p. 1; corrected version in OJ L 257, 21.9.1990, p. 13), as last amended by Regulation (EC) No 1310/97 (OJ L 180, 9.7.1997, p. 1).

[508]   See paragraph 31 of the Decision in AOL/Time Warner . The decision focused on digital *music* files. The relationship between media players and audio players is characterised by the fact that a media

(408)   Classical play back devices such as CD and DVD players are no substitutes for media players as they offer a very limited subset of the media player functionalities. Indeed, the only common feature between a computer and these classical playback devices is that they can all play CDs or DVDs. In addition to this basic function, media players are the rendering devices for digital content stored and accessible over the Internet.

(409)   Using a media player, consumers can access and receive digital media files (be they music or images) immediately from any computer with Internet access, without having to visit a store, irrespective of the time and the location. They can, for example, download individual music tracks, instead of playing back the entire album or a single, and create customised compilations. Such compilations, due to the compressed form of the data, can be stored on mobile devices which allow for distinctly longer playback times than a traditional portable CD player.[509] Media players can furthermore receive streamed content over the Internet thereby allowing end users to follow live-events (webcasting).

(410)   The fact that classical playback devices meet a different demand from that targeted by media players is also reflected in the economics of these offerings. For instance, the price of a CD/DVD player is approximately EUR 100 and higher whereas the price for a media player is below EUR 30.

5.1.1.3.2.2 Only media players with similar functionalities exert competitive constraints on Windows Media Player

(411)   WMP is the only media player available in the market that provides, for no apparent price, all the functionalities currently available in a media player (the current WMP 9 delivers most importantly digital audio and video playback both via download and streaming, DRM support, Internet radio tuner, DVD playback support, an integrated media guide from WindowsMedia.com, audio CD creation, one-click transfer of digital music to portable devices, and personalisation for users).[510]

(412)   According to Microsoft, the following media players provide equivalent functionalities to WMP (in particular media streaming): RealOne Player (RealNetworks), QuickTime player and iTunes (Apple), Winamp (Nullsoft), MusicMatch, Media Jukebox, Ashampoo and VLC Mediaplayer.[511] While functionally these players would thus appear to constitute ready substitutes for

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player is a substitute for an audio player while an audio player is in itself no adequate substitute for a media player as it lacks digital video capabilities.

[509]   For example, Apple's iPod in the 15GB version is able to store 3,700 songs. See http://store.apple.com/1-800-MY-APPLE/WebObjects/AppleStore/

[510]   Microsoft's submission of 17 October 2003, on page 91.

[511]   Source: Annexes E, I and J to Microsoft's submission of 17 October 2003, NERA.

WMP, one aspect deserves attention. Except for RealOne Player and QuickTime Player, the media players mentioned by Microsoft depend on third parties' codecs and file formats. MusicMatch Jukebox, for example, licenses and relies on the Windows Media codec and also supports MPEG formats. Winamp supports MP3, WAV and Microsoft's WMA format (Winamp does not support RealNetworks' formats).[512] The VLC Mediaplayer supports, for example, MPEG and DivX codecs.[513] Ashampoo[514] distributes the Ashampoo Media Player, which is based on Windows and plays *"over twenty file formats"* (including Windows Media formats, MP3, and Ogg Vorbis).[515]

(413)   To the extent, therefore, that these media players depend on third parties' proprietary technologies, such as Microsoft's, for format support, they are not likely to constrain the third parties' behaviour.[516]

(414)   A number of other media players do not provide media streaming and some other functionalities. Some, for instance, focus on playing audio (MusicMatch).[517] Others, like Macromedia Flash Player are perceived as focussing on animation.[518] The question arises whether media players with more limited functionalities can be considered to exert sufficient competitive constraints on the streaming media players listed above.

(415)   Consumers want media players which are able to play *and* stream audio[519] and video files.[520] For the end user to use several media players to interact with digital content,

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512   See above, at recital (142).
513   www.videolan.org
514   Founded in 1999, Ashampoo is a company registered in Germany. See http://ashampoo.com/, printed on 9 December 2003.
515   See http://www.ashampoo.com/frontend/products/php/product.php?idstring=0014.
516   See *Commission notice on the definition of relevant market for the purposes of Community competition law*, at paragraph 16. See also paragraph 2 of the notice: "*The objective of defining a market in both its product and geographic dimension is to identify those actual competitors of the undertakings involved that are capable of constraining their behaviour and of preventing them from behaving independently of an effective competitive pressure.*"
517   Although MusicMatch Jukebox users can watch music videos to the music tracks in Windows Media format.
518   Flash can play MP3 audio as part of a Flash movie. In the Commission's market enquiry content providers and content owners were asked: "*[...] Would you consider MacroMedia's Flash technology to be a viable technology to deploy and provide your digital content? Please explain your answer.*" (Article 11 letter dated 16 April 2003, at Question 5). 8 of 12 respondents answered in the negative (Entity T10, Entity T14, Entity T17, Entity T18, Entity T20, Entity T34, Entity T19, Entity T13). One respondent answered affirmatively and three answers were inconclusive. The same question was answered by 6 content owners. 4 of them answered in the negative (Entity T4, Entity T8, EntityT9, Entity T5; Entity T6 answered in the affirmative; Entity T7 did not answer this question).
519   Microsoft's submission of 17 October 2003, on page 90: "*They also want the ability to download audio and video files from the Internet and to play those files on their PCs, and they want to be able to listen to streaming Internet radio.*"
520   As regards streaming, Microsoft states that consumers want inter alia to "*play radio, watch television, participate in videoconferences and view political debates over the Web*", all of which presuppose media streaming. (Microsoft's submission of 21 October 2003 (M. Iansiti), *Platform Integration and its Implications for Media Players and Operating Systems*, on page 14).

streamed audio and video is technically possible but provides for a lesser user experience as he has to manage different user technologies such as the user interface[521] of the media player.[522] Also, software developers and content providers, who use media players as platforms for their products, are interested in *streaming* media players as these provide them with *"a range of new opportunities"*[523] These opportunities include applications such as paid online music and entertainment services[524], news broadcasts, films, distance education and training, interactive TV, gaming, corporate marketing and communications, videoconferencing, employee training programmes, and internal and external presentations.[525] While a streaming media player is therefore a substitute for media players which deliver less functionality, substitution the other way round is not readily available as less performing media players do not satisfy specific consumer demand, such as demand for streaming or for video playback.

5.1.1.3.3 Supply side substitutability

(416) As for supply side substitutability, the question arises whether, if the price of streaming media players were increased, developers of other software applications including non-streaming media players could, in the short term and without significant costs, provide streaming media players.

(417) It should be first noted that to develop, innovate and promote a new media player including codecs, formats, DRM and media streaming technology requires significant investments in terms of research, development and promotional efforts. For example, Apple introduced its media streaming technology only in 1999.[526] MusicMatch states that it cannot *"[...] feasibly develop its own proprietary DRM system. Put simply, though conceptually possible, the undertaking would be too large and complex for a company the size of MUSICMATCH. By comparison, for*

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[521] Microsoft's submission of 21 October 2003 (M. Iansiti), *Platform Integration and its Implications for Media Players and Operating Systems*, on pages 5 and 12.

[522] In 1998, for example, Microsoft advertised WMP as *"[a] single player with the ability to play back most popular local and streamed multimedia file types [...] eliminating the need for users to have multiple players installed on their PCs."* (*Key Corporations, Internet Sites and Industry Vendors Announce Deployment*, Support, 7 July 1998, printed from http://www.microsoft.com/presspass/press/1998/Jul98/StrmTcpr.asp)

[523] Microsoft's submission of 17 October 2003, on page 85.

[524] See for instance OD2's new digital music platform (beta release) based on WMP 9 called SonicSelector which is *"the first platform to offer Streaming on a PayAsYouGo basis"*. OD2 press release of 26 January 2004, at http://www.ondemanddistribution.com/eng/press/pressdetails.asp?id=261.

[525] See Microsoft's submission of 17 October 2003 (NERA), Exhibit 44, S. Kevorkian, *Microsoft and Streaming Media: A Profile*, on page 12 listing *"several streaming applications"* for consumer entertainment, media delivery and corporate needs.

[526] *Apple Introduces QuickTime Streaming Server Software - The First Open Server for Internet Streaming,* 20 April 1999, press release, http://www.apple.com.au/pr/library/1999/9904/qtstream.html, printed 22 May 2003.

example, Microsoft reportedly spent more than USD 200 million and programming years to develop its proprietary DRM system."[527]

(418)   It must be taken into account that existing media technologies are often proprietary and protected through IP rights.[528]   A case in point is streaming technology.   For illustration, Microsoft *bought* Vxtreme in 1997 in order to acquire a smart streaming technology adjusting to available bandwidth.[529]   Another example for the importance of IP rights is Burst.com's legal action against Microsoft's Windows Media 9 Series for infringement of Burst.com's patents over innovative media transmission software which eliminates buffering delays when streaming.[530]

(419)   That market entry is difficult is confirmed by the responses received during the Commission's market enquiry in April 2003.   Content providers[531] and content owners[532] were asked whether they considered that there were barriers to entry for possible alternative providers of novel technologies.[533]   16 out of the 18 companies which responded saw themselves in a position to answer that question.[534]   13 of these 16 companies - including major content owners, such as Entity T4, Entity T5, Entity T7, Entity T8 and Entity T9, and major content providers, such as Entity T14, Entity T16 and Entity T20 - answered in the affirmative.[535]

(420)   The network effects[536] characterising the media software markets (see below at recital (879) *et seq.*) translate into entry barriers for new entrants.[537]   A streaming

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[527]   MusicMatch's submission of 8 July 2003, on page 6.

[528]   Entity T3's submission of 3 June 2003, answer to Question 8.

[529]   *Microsoft Announces Acquisition of VXtreme; Rolls Out Streaming Multimedia Strategy With Release of NetShow 2.0*, 5 August 1997, http://www.microsoft.com/presspass/press/1997/aug97/vxpr.asp.   As stated in the US Findings of Facts, Microsoft identified the "streaming media market" as a strategic ground in 1997.   Payment of up to USD 65 million for a streaming software company was authorised in order to accelerate Microsoft's effort to seize control of streaming media standards.   Two weeks later, Microsoft signed a letter of intent for the acquisition of a streaming media company called VXtreme. (Findings of Fact of 5 November 1999, United States District Court for the District of Columbia, *United States v. Microsoft Corporation*, Civil Action No. 98-1232 and 1232 (TPJ), at paragraph 112)

[530]   See *Burst.com Files Patent & Antitrust Lawsuit Against* Microsoft, 19 June 2002, http://www.burst.com/new/newsevents/pressrelease001.htm.

[531]   12 companies responded to the Commission: Entity T10, Entity T11, Entity T12, Entity T13, Entity T14, Entity T15, Entity T16, Entity T17, Entity T18, Entity T19, Entity T20, Entity T34.

[532]   6 companies: Entity T4, Entity T5, Entity T6, Entity T7, Entity T8 and Entity T9.

[533]   Question 17 of the request sent to content owners on 16 April 2003: "Do you consider that there are barriers to entry for possible alternative providers of Technologies which would not be based on the existing Technologies such as, for example RealNetworks, Microsoft, Apple (QuickTime), MP3/MPEG-4?"; question 17 of the request sent to content providers on 16 April 2003: "*Do you consider that there are barriers to entry for possible alternative providers of novel Technologies?*"

[534]   Entity T10 and Entity T6 did not conclusively answer this question.

[535]   Entity T11, Entity T13, Entity T14, Entity T16, Entity T17, Entity T19, Entity T20, Entity T34, Entity T4, Entity T5, Entity T7, Entity T8 and Entity T9.

[536]   A product market is said to exhibit network effects when the overall utility derived by consumers who use the product in question is dependent not only on their private use of the product, but also on the number of other consumers who use the product.   Such a network effect is a direct network effect.   An indirect network effect occurs when the value of a good to a user increases as the number and variety of complementary products increase.

media player would not meet with significant consumer demand if there was no or no significant amount of corresponding digital content which this player could play back. Entity T9, for example, states that

> "[t]here are substantial network effects in this market. No one will invest in a Technology unless they are confident that others will use it, which requires that the Technology already be in the hand of many users. These network effects raise the bar still further for new entrants, who would need to find a way to simultaneously get their products into the hands of millions of users."

> "There are also big economies of scale and scope – a new provider of technologies would need to enter the market immediately, get a lot of consumers playing back in its Technology, convince a substantial amount of content providers to encode in its Technology, and make its Technology fully compatible with several other technologies (such as applications built on top of streaming media players). Doing all of those things simultaneously seems extremely difficult for a new entrant."[538]

> "As mentioned above in response to question 15, Entity T9 views LiquidAudio as having the best solution, but virtually none of Entity T9's intermediaries use it because it has no reach. This is a case where a superior Technology vis à vis consumer experience and security (LiquidAudio) falls behind because of lack of reach."[539]

(421) It results from the above that viable supply side substitution into the streaming media player market could only take place from software vendors which develop a streaming media player in the timeframe examined under supply substitution relying on licences of the requisite technology, codecs and formats from the existing vendors or standards organisations (MPEG).[540] This is due to the barriers to entry and the indirect network effects characterising the market.

(422) [0]To the extent that such licences are controlled by already existing vendors (such as Microsoft), such supply side substitution is not likely to have a disciplinary effect on

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[537]   Microsoft's submission of 17 April 2002 (NERA), at paragraph 26.
[538]   Entity T9's submission of 12 June 2003, at answer 17.
[539]   Entity T9's submission of 12 June 2003, at answer 33. Question 33 of the Commission request dated 16 April 2003 asked content owners: "*Is the Technology's reach, i.e. how many users can or will be able to interact with the Technology (and content), a significant factor in deciding which Technology to support? In other words, how if at all does the presence of certain client software on personal computers (or devices) influence your decision to use certain Technologies?*"
[540]   See *Commission notice on the definition of relevant market for the purposes of Community competition law* , at paragraph 20, footnote 4: "*That is such a period does not entail a significant adjustment of existing tangible and intangible assets.*"

the competitive behaviour of the vendors involved.[541] It may well even be in the interest of a vendor to license its proprietary technology for use in other media players in order to increase uptake of the underlying formats (including DRM) and codecs, expecting, first, to gain a decisive advantage in a market which is characterised by network effects and, second, to increase its return on investment from server-side software sales.[542]

(423)   In the context of discussing the effect of the inclusion of WMP with Windows, Microsoft itself takes issue with the presentation by Time Warner of media players (Sonique, Whisset) depending on Microsoft's technologies as contenders and submits that "*[n]one of these companies appears to be in practice a true competitor of Microsoft's media playing technologies.*"[543]

(424)   But even if the foregoing considerations are set aside, and Microsoft's contention that the market for streaming media players is larger is examined - since regard would need to be had to vendors of non-streaming media players or media players that only play audio - this would not alter two significant legal propositions: (i) WMP's and Windows Media Format *usage* shares remain as high as they are under the streaming media player market definition[544] (see recital (900) *et seq.*); and (ii) Microsoft's tying forecloses competing media player vendors' products regardless of whether they stream, as a streaming media player *is* a full functional substitute for a non-streaming media player while the reverse is not true.

5.1.1.3.4   Conclusion

(425)   By reason of its specific characteristics and the lack of realistic substitutes, the market for streaming media players constitutes a relevant product market.

5.1.2   The relevant geographic market

(426)   According to the Commission Notice on the definition of the relevant market for the purposes of Community competition law, a relevant geographic market is defined as follows: "*The relevant geographic market comprises the area in which the undertakings concerned are involved in the supply and demand of products or services, in which the conditions of competition are sufficiently homogeneous and*

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[541]   See *Commission notice on the definition of relevant market for the purposes of Community competition law*, at paragraphs 2 and 20.

[542]   Microsoft states that it distributes its media player as part of Windows to increase the sales of its client and server operating systems: "*since Microsoft's streaming server software runs on servers using its own Windows NT/2000 server operating system, the increased use of its streaming formats leads to additional demand for its server operating systems*" (Microsoft's submission of 17 April 2002, NERA, at paragraph 29)

[543]   Microsoft's submission of 17 April 2002, NERA, on page 7.

[544]   Usage share of media players such as Ashampoo or VL Player are not even retained in the list of the most popular applications by Media Metrix or Nielsen.

which can be distinguished from neighbouring areas because the conditions of competition are appreciably different in those areas."[545]

(427)   The relevant geographic market for client PC operating systems, work group server operating systems and media players is world-wide. The objective conditions for competition are essentially the same across the world. PCs and servers are manufactured by a large number of companies that operate on a world-wide scale such as IBM, Compaq, or Dell. In order to sell computers with the operating system (and a media player) already installed, such manufacturers obtain the necessary licences from the software manufacturers. Generally, a single world-wide licence agreement is entered into between the computer manufacturer and the software manufacturer. The computers are then sold on a world-wide scale. Neither import restrictions, transport costs or technical requirements constitute significant limitations. Language-specific demand characteristics regarding the relevant software exist but, in so far as the supply-side is concerned, do not constitute an obstacle for swift supply on a global basis in accordance with language-related preferences. The entire world can therefore be regarded as the relevant geographic market.

5.2   Dominant position

(428)   A dominant position under Article 82 of the Treaty has been defined by the Court of Justice of the European Communities as "*a position of economic strength enjoyed by an undertaking which enables it to prevent effective competition being maintained on the relevant market by affording it the power to behave to an appreciable extent independently of its competitors, its customers and ultimately of the consumers*".[546]

5.2.1   Client PC operating systems

(429)   In its response to the supplementary Statement of Objections, Microsoft acknowledged that it held "*a dominant position in the supply of operating systems that run on personal computers ('PCs')*".[547] The following recitals will show that Microsoft holds a dominant position which exhibits extraordinary features since it controls the quasi-standard of the relevant market in question, and has done so for some time. Microsoft's dominance relies on very high market shares and significant barriers to entry.

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[545]   Commission notice on the definition of relevant market for the purposes of Community competition law (OJ C 372, 9.12.1997, p.5)

[546]   See judgment in Case 27/76 United Brands v Commission [1978] E.C.R. 207, at paragraph 65.

[547]   Microsoft's submission of 17 October 2003, on page 1.

5.2.1.1   Market shares

(430)   Third party estimates of market shares and the evidence gathered during the
        investigation highlight the extraordinary position of Microsoft in the market.

(431)   In 2000, Microsoft's market share[548] in terms of *new client PC operating system
        licences* was, according to IDC,[549] 92.1% when measured by unit shipments and
        92.8% measured by revenues.[550]   In 2001, this figure had risen to 93.2% when
        measured by unit shipments and 95.4% by revenues.[551]   In 2002, it had further risen
        to 93.8% when measured by unit shipments and 96.1% by revenues.[552]   Microsoft is
        forecast to maintain these 90%+ market shares in the coming years.[553]   If operating
        systems for Intel-compatible PCs excluding the Macintosh operating system are
        looked at (see recital (326) above), Microsoft holds an even greater share of the
        market.

(432)   Moreover, Microsoft's extremely high market shares have not come about recently.
        In 1996, Microsoft had a market share of 76.4%, and since 1997 has held market
        shares of consistently over 80%,[554] and of over 90% since 2000.[555]

(433)   In terms of *installed base* (which reflects *inter alia* past sales), IDC's evaluation is
        that Windows (all versions) has grown from 84.6% to 92.8% between 2000 and
        2002.[556]   The results of the Commission's 2003 market enquiry are in line with these
        figures.   The responses received during the Commission's 2003 market enquiry

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[548]   In the client PC operating system market, market share data measured in units shipped may to some
        extent be more informative than revenue-based figures.   Indeed, end-users typically desire one copy of
        an operating system per client PC.   Moreover, the client PC operating system market is one
        characterised by network effects, so that being able to attract a wide number of users is a key
        competitive advantage for a client PC operating system product.   "*To the extent that a firm's share is
        greater using the dollar sales measure, this indicates that the firm's products are positioned towards
        the high end of the market.   Since users typically desire a single copy of software per computer, unit
        sales tend to be a better measure of (market) share than dollar sales.*"   See Michael Katz and Carl
        Shapiro, *Antitrust in Software Markets*, September 1998, page 14 (at:
        http://faculty.haas.berkeley.edu/shapiro).
[549]   International Data Corporation describes itself as "*the premier global market intelligence and advisory
        firm in the information technology and telecommunications industries*".   See
        http://www.idc.com/en_US/st/aboutIDC.jhtml;jsessionid=RDV3XQCQ0RP24CTFA4FCFFAKMUDY
        WIWD.
[550]   IDC, *Worldwide Client and Server Operating Environments Forecast, 2002-2007*
[551]   IDC, *Worldwide Client and Server Operating Environments Forecast, 2002-2007*
[552]   IDC, *Worldwide Client and Server Operating Environments Forecast, 2002-2007*
[553]   IDC, *Worldwide Client and Server Operating Environments Forecast, 2002-2007*
[554]   See first Statement of Objections, at paragraph 246.
[555]   Microsoft's enduring high market shares were also highlighted by the US District Court for the District
        of Columbia. Referring to operating systems for Intel-compatible PCs, it held that: "*[e]very year for the
        last decade, Microsoft's share of the market for Intel-compatible PC operating systems has stood above
        ninety percent.   For the last couple of years the figure has been at least ninety-five percent, and
        analysts project that the share will climb even higher over the next few years*". See Findings of Fact of
        5.11.1999, United States District Court for the District of Columbia, *United States v Microsoft
        Corporation*, Civil Action No. 98-1232 and 1232 (TPJ), at paragraph 35.
[556]   IDC, *Worldwide Client and Server Operating Environments Forecast, 2002-2007,* on page 17.

cover a total amount of approximately 1.2 million to 1.3 million client PCs. More than 1.15 million (more than 87%) of them run Windows (all versions).

(434)   Microsoft's share of the market thus only allows for fringe competition. The main alternative to Microsoft's client PC operating system product would be Apple's Mac OS, assuming that it is included in the relevant market. In 2002, this client PC operating system held a market share of 2.9% when measured in unit shipments and 2.2% when measured in revenue.[557] Table 5 summarises Microsoft's market shares and those of its competitors since 2000 in the client PC operating system market:

Table 5: Client PC operating system market shares since 2000 (%)

Operating system	2000		2001		2002	
	Units	Revenues	Units	Revenues	Units	Revenues
Windows	92.1	92.8	93.2	95.4	93.8	96.1
Apple (Mac OS)	3.9	3.3	3.1	2.4	2.9	2.2
Linux	1.7	0.5	2.3	0.4	2.8	0.4
Others	2.4	3.3	1.3	1.8	0.5	1.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: IDC, *Worldwide Client and Server Operating Environments Forecast, 2002-2007*

(435)   Very large market shares, of over 50%, are considered in themselves, and but for exceptional circumstances, evidence of the existence of a dominant position.[558] Market shares between 70% and 80% have been held to warrant such a presumption of dominance.[559] Microsoft, with its market shares of over 90%, occupies almost the whole market – it therefore approaches a position of complete monopoly, and can be said to hold an overwhelmingly dominant position.[560]

5.2.1.2   Continuity of Microsoft's market power

(436)   As has been highlighted at recital (432), Microsoft has held very high market shares in the client PC operating system market for many years. As such, Microsoft has enjoyed an enduring stability and continuity to its market power. However, prior to its acceptance that it held a dominant position in the market (see recital (429) above) Microsoft had argued that since the Commission's allegations related to Windows 2000 Professional, and since this version of Microsoft's client PC operating system

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[557]   IDC, *Worldwide Client and Server Operating Environments Forecast, 2002-2007*

[558]   See Judgment of the Court of Justice in Case C-62/86 Akzo v Commission [1991] E.C.R. I-3359, at paragraph 60 and Judgment of the Court of First Instance in Case T-228/97, Irish Sugar v Commission [1999] E.C.R. page II-2969, at paragraph 70.

[559]   Judgment of the Court of First Instance in Case T-30/89, Hilti v Commission [1991] E.C.R. p. II-1439, at paragraph 89, confirmed by the Court of Justice in Case-53/92 P, [1994] E.C.R. I-667.

[560]   Advocate General Fennelly talked of a concept of "*superdominance*" and highlighted the "*particularly onerous special obligation*" affecting an undertaking which enjoys a position of "*overwhelming dominance verging on monopoly*" in his opinion in Joined Cases C-395/96 P & C-396/96 P, *Compagnie Maritime Belge and others v. Commission* ("*Cewal*") [2000] ECR I-1365, opinion of Advocate General Fennelly, at paragraph 137.

accounted for only 10% of Windows client PC operating systems sold in 2000,[561] then this market share was too small to be the basis for any analysis relating to abuse of a dominant position.

(437) Microsoft's assertion was at odds with its pleas elsewhere for the Commission to undertake an analysis which takes into account the dynamic factors at play in this "new economy" industry. These factors must be properly recognised. Given Microsoft's near-ubiquity in the product market as a whole, any changes that it introduces in a more recent version of its client PC operating system will very soon be the reference standard for the market as users upgrade to newer versions.

(438) In industries exhibiting strong network effects, consumer demand depends critically on expectations about future purchases. If consumers expect a firm with a strong reputation in the current (product) generation to succeed in the next generation, this will tend to be self-fulfilling as the consumers direct their purchases to the product that they believe will yield the greatest network gains.[562] The question for Windows users then is not so much *if* they should migrate to newer versions of Windows, but *when* to do so.[563] Even customers who do not immediately plan to migrate their client PCs to newer versions of Windows will factor in their anticipated platform in their current purchase decisions concerning complementary (for example, server-side) software.[564]

(439) Microsoft uses various levers to favour the migration towards new versions: providing an easy migration path by ensuring "backward-compatibility", which guarantees, for example, that successive versions of Windows retain the ability to run key applications developed for earlier versions, advocating to software developers the use of new features of the Windows platform, which means that increasingly the most recent applications will no longer run in fully compatible mode on older versions of Windows and, eventually, discontinuing support for previous versions of the operating system.

(440) The figures in the Microsoft customer statements together with the complementary information that the Commission obtained from those customers by means of requests for information sent in February 2002 and from the results of the

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[561] See Jordi Gual and Atiliano Jorge Padilla: *Market Definition and Dominance in Client and Server Operating Systems*, at paragraph 12, attached to Microsoft's submission of 16 November 2001.

[562] Microsoft reports that although the technology itself and its capabilities were extremely important, Cinergy, one of US' leading diversified energy companies, elected to standardise on a Microsoft Operating System and the Microsoft Office suite of applications as they were confident in Microsoft's staying power in the industry (http://www.microsoft.com/business/licensing/enterprise/casestudies.asp, printed on 20 May 2002).

[563] See GartnerAdvisory, *Win2000 in 2000: Cases for and against Desktop Migration*, Monthly Research review, 1.1.2000.

[564] See GartnerAdvisory, *Windows 2000 Migrations: Policy and Communication*, Research Note, Tactical Guidelines, 26.6.2000.

Commission's 2003 market enquiry illustrate the nature of the take-up of Microsoft's latest client PC operating systems.

(441)   The 46 Microsoft customer statements correspond to a picture of the market in 2000-2001. They cover a population of above 800,000 client PCs.[565] Close to 94% of these were equipped with different versions of Windows. At least 49,281 (6%) were either UNIX SPARC (around 29,000), Apple (less than 250) or dumb terminals (around 20,000).

(442)   At least 311,275 client PCs were using NT 4.0 (close to 38% of the total). At least 155,135 were using Windows 95/98 (close to 19% of the total). A few more than 12,000 were still using Windows 3.1 (less than 1.5% of the total) and at least 18,285 were already using Windows 2000 (around 2.2% of the total).

(443)   In fact, only one firm was already using Windows 2000 in significant numbers.[566] The other Windows 2000 users were testing it in very small numbers of client PCs (in general around 100 client PCs).

(444)   It must be noted that many entities did not indicate precisely the repartition of their client PCs between the different Windows operating systems. However, these entities indicated that most of their client PCs were using either NT 4.0 or Windows 95/98.

(445)   Out of the approximately 1.2 to 1.3 million client PCs covered by the Commission's 2003 market enquiry, more than 530,000 (more than 40%) of those client PCs were already running Windows 2000 Professional or Windows XP Professional.[567] In addition, for more than 80% of all client PCs, the respondents have already migrated or already taken the decision to migrate to Windows 2000 Professional or Windows XP Professional.[568]

(446)   This trend is in line with the data obtained from IDC. Within the Windows range, the increasing take-up of first Windows 2000, and then Windows XP on the PC is clearly demonstrated.

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[565]   Several entities do not specify the number of client PCs in their respective organisations.

[566]   Novo Nordisk, with 16,000 client PCs.

[567]   Question 3 of the questionnaire attached to the Commission's Article 11 letters sent on 16 April 2003. It is also noteworthy that virtually no usage of Windows XP Home Edition was reported by the respondents. Indeed, Windows XP Home Edition is not designed for professional usage. It is not eligible to Microsoft's volume licensing scheme. Microsoft's contention that "*customers who do not want [features such as IntelliMirror, File Compression, Encrypted File System, Group Policy client, Active Directory client, Roaming User Profiles or Kerberos client] have the option of buying the Home edition*" is not relevant. See NERA's report attached to Microsoft's submission of 16 November 2001, at paragraph 217.

[568]   See responses to Questions 3 and 4 of the questionnaire attached to the Commission's Article 11 letters sent on 16 April 2003.

Table 6: Evolution of new Windows PC licence shipments (in thousands)

Operating system	2000	2001	2002	2003[569]
Windows 95	12,685	2,200	200	20
Windows 98	60,088	21,400	9,800	2,017
Windows Me	2,239	26,700	100	1
Windows NT	13,681	4,300	300	101
Windows 2000	9,513	34,100	25,200	8,068
Windows XP	-	14,500	78,200	110,991
Total Windows	**98,206**	**103,200**	**113,800**	**121,198**
Windows 2000 or XP share	**9.7%**	**47.1%**	**90.9%**	**98.2%**

Source: IDC Worldwide Windows Client Operating Environments, 2002-2007

(447) In summary, any attempt to focus on Windows 2000 ignores the backward and forward looking dynamic links between various versions of Windows, and hence paints an inaccurate picture of market reality. Therefore, any argument that only the market shares of individual versions of Windows to which specific allegations refer should be used must be rejected.

5.2.1.3   Barriers to entry

(448) The nature of the barriers to entry in the client PC operating system market serves to reinforce the conclusion that Microsoft holds a dominant position in this market. These barriers to entry derive from the network effects in the market.

(449) The regular daily use of a client PC involves running applications on it. The overall utility that a consumer derives from a client PC operating system therefore depends on the applications he can use on it and that he expects to be able to use on it in the future. Conversely, Independent Software Vendors ("ISVs") write applications to the client PC operating systems that are most popular among users.[570] In other words, the more popular an operating system is, the more applications will be written to it and the more applications are written to an operating system, the more popular it will be among users.[571]

(450) This mechanism, which can be formalised in terms of indirect network effects, more generally applies to platform software, that is to say, software that exhibits APIs that can be used by applications. ISVs will develop to the platform that enables them to reach the highest possible number of users. The higher the number of users of a given platform, the greater the number of ISVs that write to that platform. In turn,

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[569]   The 2003 figures are forecasts.

[570]   This applies to all applications, be they mass-market ones such as word-processing, or more niche-level applications

[571]   This analysis is recognised by Microsoft – "*Economic discussions of software usually emphasize the importance of network effects in commercial software – the fact that the more popular a platform is, the more applications are written for it, which in turn reinforces its popularity.*" – Microsoft (NERA) response to supplementary Statement of Objections, at paragraph 39.

there will be a greater number of applications available for the platform, and the utility derived by computer users who deploy this platform will be higher.

(451)   In his testimony before the US District Court on 18 April 2002, Microsoft's Chairman Bill Gates described this network effect dynamic:

> "*Early on, [Microsoft] recognized that [, as] more products became available and more information could be exchanged, more consumers would be attracted to the platform, which would in turn attract more investment in product development for the platform. Economists call this a 'network effect', but at the time we called it the 'positive feedback loop'.*"[572]

(452)   The degree of ubiquity that Windows has attained on client PCs has been described at recitals (431) and (433). The quasi-totality of commercial applications written for client PCs are therefore written to Windows as a platform.[573]

(453)   Although in theory possible, it would be extremely difficult, time-consuming, risky and expensive to develop an alternative client PC operating system, with *a priori* no application able to run on it, because users are very unlikely to buy an operating system without a wide range of applications already available, tested and used by other people. Therefore, for a new operating system product to enter the client PC operating system market, it would be necessary that such a product is either able to support a critical mass of existing Windows-dependent applications, or a comparable critical mass of applications already written for the new platform.

(454)   As regards the Windows-dependent applications, these are applications developed to use and to rely on the Win32 API. As such, it would be necessary to implement the almost complete Win32 API on the new client PC operating system product. Microsoft does not disclose a specification for the Win32 API and it would thus be necessary to reverse-engineer the relevant specifications.

(455)   Such an option is not commercially viable. As Sun puts it:

> "As testament to the practical impossibility of reverse engineering all of these connections, the market reveals no company which has succeeded in

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[572]   Direct Testimony of Bill Gates, Civil Action No. 98-1233 (CKK), at paragraph 25, printed from http://www.microsoft.com/presspass/trial/mswitness/2002/billgates/billgates.asp on 8 January 2002.

[573]   By way of illustration, a 2002 Evans Data Corporation report (covering both client PCs and servers) found that 75% of developers wrote applications for the Windows platform, the next most popular operating system being Linux and Solaris with 6.7% and 5.2% respectively. Moreover, these figures is likely to underestimate the prevalence of the Windows platform for applications for client PCs, since they also include server applications, and since Linux and Solaris have greater prominence as server operating systems than as client PC operating system. See Evans Data Corporation report, "*Enterprise Development Management Issues*", page 22, June 2002.

such a reverse engineering effort. The barriers and costs are competitively prohibitive. The Win32 API set alone, for example, includes over 2500 separate interfaces, each of which implicates a series of actions which take place somewhere within the over 40 million lines of compiled source code that makes up the Microsoft Windows operating systems. […]

"Several years ago, Sun embarked on an ambitious program called 'WABI' designed to reverse engineer the then-existing Win32 APIs so that Sun's operating system could serve as a platform for software applications written to the Microsoft Environment. After dedicating millions of dollars and years of engineering to reverse engineer a much less complex version of Microsoft Windows NT, Sun abandoned the project after it became clear that a successful implementation of the APIs was unobtainable and economically unfeasible."[574]

(456)   The example of Sun's WABI project is echoed by that of IBM, to which the US District Court points in discussing the difficulty of reverse-engineering the Win32 API: "*in late 1994, […] introduced its Intel-compatible OS/2 Warp operating system and spent tens of millions of dollars in an effort to attract ISVs to develop applications for OS/2 and in [a failed] attempt to reverse-engineer […] part of the Windows API set*".[575]

(457)   The example of IBM also shows that "breaking" the "positive feedback loop" by convincing software developers to develop to an alternative platform is not a viable option either.   Following the introduction of its Intel-compatible OS/2 Warp operating system product, IBM went to huge efforts to convince application developers to adopt this as an alternative platform to Windows. Despite the financial resources and technical ability of IBM, OS/2 never obtained more than 10% of the market and hence never succeeded in effectively challenging Microsoft's leadership in the market for client PC operating systems.[576]   IBM no longer markets a client PC operating system.

(458)   In essence, the dynamic between the Windows client PC operating system and the large body of applications that is written to it is self-reinforcing. In other words, applications developers have a compelling economic incentive to continue writing applications for the dominant client PC operating system platform (that is to say, Windows) because they know that the potential market will be larger.

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[574]   See Sun's submission of 10 November 1999, Case IV/C-3/37.345, p. 3869-3870.
[575]   See Findings of Fact of 5 November 1999, United States District Court for the District of Columbia, *United States v Microsoft Corporation*, Civil Action No. 98-1232 and 1232 (TPJ), at paragraph 46.
[576]   See Findings of Fact of 5 November 1999, United States District Court for the District of Columbia, *United States v Microsoft Corporation*, Civil Action No. 98-1232 and 1232 (TPJ), at paragraph 46.

(459)   In conclusion, the "positive feedback loop" protects Microsoft's high market shares in the client PC operating system market from effective competition from a potential new entrant. The term "applications barrier to entry" has been coined to describe this phenomenon.[577]

(460)   In its response to the first Statement of Objections, Microsoft referred to Professor Schmalensee's testimony in *US et al. vs. Microsoft*, in which Professor Schmalensee pointed out that, "*if Microsoft were a monopolist with its Windows products, then the Windows price would be higher by about the factor 10 or 20 than the actual price*".[578] However, there is significant evidence that the protection granted by the applications barrier to entry enables Microsoft to behave to a very large extent independently of its competitors, its customers and ultimately of consumers.

(461)   As regards competitors, the fringe competition constituted by Linux is a case in point. Linux, which has been developed under the open source model, can be technically pre-installed on PCs at virtually no cost by OEMs. Whilst the first versions of Linux were fairly difficult to use for non-technicians, the product is widely considered to have matured at the end of the 1990s and now there is no significant difference in terms of ease of use between Windows and most commercial Linux operating systems. Microsoft's financial performance on the market, however, does not seem to have been affected by the emergence of such a rival. Microsoft has not substantially altered its pricing policy and business model, and it has remained very successful.

(462)   Microsoft can also behave independently of its direct customers, the OEMs. Windows appears as a must-carry product for a client PC vendor. One of the most striking examples is IBM. Although IBM developed its own operating system for client PCs, it was nevertheless obliged to offer its own PCs equipped with the operating system of its direct competitor, Microsoft.

(463)   In fact, Microsoft can behave independently of its end-customers. Microsoft is fully aware of this, as is shown by the following excerpts from Microsoft's internal communication:

> "The Windows API is so broad, so deep, and so functional that most ISVs would be crazy not to use it. And it is so deeply embedded in the source code of many Windows apps that there is a huge switching cost to using a different operating system instead. [...]

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[577]   See Findings of Fact of 5 November 1999, United States District Court for the District of Columbia, *United States v Microsoft Corporation*, Civil Action No. 98-1232 and 1232 (TPJ), at paragraph 37 *et seq.*

[578]   See Microsoft's submission of 17 November 2000, Christian von Weizsäcker, *Comments on the Commission's Statement of Objections Filed against Microsoft*, at paragraph 35.

It is this switching cost that has given customers the patience to stick with Windows through all our mistakes, our buggy drivers, our high TCO, our lack of a sexy vision at times, and many other difficulties. […] Customers constantly evaluate other desktop platforms, [but] it would be so much work to move over that they hope we just improve Windows rather than force them to move.

In short, without this exclusive franchise called the Windows API, we would have been dead a long time ago."[579]

"The Windows franchise is fueled by application development which is focused on our core APIs"[580]

(464) Microsoft's financial performance is consistent with its near-monopoly position in the client PC operating system market. In 2002, Microsoft split its turnover and profit figures into product segments for the first time. According to the most recent available figures, which are for the US fiscal year 2003 (year ending 30 June 2003), for its Windows PC client operating system range of products (which essentially make up the Microsoft's "Client" product segment), Microsoft incurred costs of USD 1,994 million and received revenues of USD 10,394 million, resulting in an operating income of USD 8,400 million.[581] This means that for its client PC operating system product, Microsoft operated on a profit margin[582] of approximately 81%.[583] This is high by any measure.

5.2.1.4   The applicability of traditional anti-trust analysis to "new economy" industries

(465) Prior to its acceptance that it held a dominant position in the market (see recital (429) above), Microsoft had contended that the traditional analytical approach to market definition and market power that has been used by antitrust authorities is not well suited to so-called "*new economy*" industries. Microsoft had seemed to consider that "*an industry under the sway of Moore's law[584] cannot be analysed properly by the methods conventionally applied to market analysis in competition law cases*".[585]

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[579]   Internal Microsoft memo drafted for Bill Gates by C++ General Manger Aaron Contorer dated 21/02/97 - see Sun's submission on evidentiary material dated 11 August 1999 at Tab. 2 (Case IV/C-3/37.345 page 3704).

[580]   Internal memo from Senior Vice President Bob Muglia to Developer Tools Division dated 16 August 1996. See Sun's submission on evidentiary material dated 11 August 1999 at Tab. 4 (case IV/C-3/37.345 pages 3657-3660).

[581]   Microsoft Form 10-K SEC filing for the period ended June 30, 2003 at http://www.sec.gov/Archives/edgar/data/789019/000119312503045632/d10k.htm, printed on 18 November 2003.

[582]   Profits as a percentage of revenues.

[583]   In other words, Microsoft recouped its costs to the tune of 521% (revenues as a percentage of costs).

[584]   Microsoft's *Computer Dictionary* gives the following definition for "Moore's law". "*In the early days of the computer revolution, [...] Intel cofounder Gordon Moore [...] predicted that the number of*

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(466)   Essentially, Microsoft had attempted to make a general point that in "IT industries" (including hardware and software), the forms of competition were different from those of "old economy" industries, and hence that the notion of "dominance" would be inappropriate. A product which might presently give the appearance of being in a strong or dominant position in the market would in fact be at constant risk of being displaced by a completely new product, which would currently not be a demand substitute in the traditional sense. By extension, the implication was that there would be no position of entrenched market power in such industries.

(467)   By way of example, Microsoft had charted the development of the computer industry, arguing that with the continuing rise of processing power, several "revolutions" had occurred, starting with a shift from high-powered, hardware-based, centralised computers in the 1960s and 1970s, carrying through to the rise of the PC in the 1980s, and continuing more recently with the growth of the Internet. Microsoft's submissions had also hinted at more "revolutions" that could take place in the future: namely that in future, other "client" devices which connect to servers such as handheld and wireless devices could replace client PCs. In this regard, Microsoft had stated that its "*share of clients connecting to organisations network will decline over time as [Microsoft's] economic power in the [...] client operating system market declines with the growing importance of non-PC devices. Although it is difficult to predict the future, any forecasts of Microsoft's future position need to take into account changes that may affect the relative importance of PC operating systems for business networks*".[586]

(468)   That non-PC client devices do not currently constitute substitutes for client PCs has already been established above in defining the relevant market for client PC operating systems.[587]   This is the determining factor in any analysis of market definition and dominance in this context. However, Microsoft had seemed to argue that when assessing market power in "IT industries", it would be necessary to take into account not only demand-side and supply-side substitutability, barriers to entry etc., but also the permanent, although unforeseeable and unspecified, threat of a possible "technological revolution". In other words, products that are not demand-side or supply-side substitutes may well become so in the coming years.

transistors that could be put on an integrated circuit would double every year, and it did. Ten years later, Moore predicted that chip capacity would double every two years, and capacity has actually doubled every 18 months since then" Moore's law is generally used to characterise the exponential growth in the computing capacity of computer hardware since the beginning of the "computer revolution".

[585]   See Microsoft's submission of 17 November 2000, Christian von Weizsäcker, *Comments on the Commission's Statement of Objections Filed against Microsoft* at paragraphs 12 to 34.

[586]   Microsoft's submission of 17 November 2000, NERA Report, at paragraph 98.

[587]   See above, Section 5.1.1.1.

(469)   Such an argument is invalid. Even if it were to be the case that a dominant position might be limited in time, this does not in itself constitute a limitation to the *present* market strength of the dominant company.[588]

(470)   The specifics of any particular industry (be it "hi-tech" or "old economy") must of course be taken into account when analysing issues of market definition and market power. Differing characteristics will undoubtedly have an influence on the specific assessments that are reached. This, however, does not mean that no antitrust analysis could be applied to "new economy" markets.[589] In fact, the specific characteristics of the market in question (for example, network effects and the applications barrier to entry) would rather suggest that there is an increased likelihood of positions of entrenched market power, compared to certain "traditional industries".

5.2.1.5   Conclusion

(471)   In the light of Microsoft's very high market shares, and the high barriers to entry in the market, the Commission finds that Microsoft has a dominant position within the meaning of Article 82 of the Treaty on the market for operating systems for client PCs. An alternative market definition, excluding non-Intel-compatible operating systems, leads *a fortiori* to the same result, as the relevant market shares are even higher.

(472)   Microsoft has been dominant in this relevant market since at least 1996.[590] Its market share was already at a high level prior to that date and has consistently grown since then. Microsoft's dominance has therefore been strong and durable. Microsoft's dominance presents extraordinary features in that Windows (in its

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[588]   The US Circuit Court of Appeals for the District of Columbia reached the same conclusion, commenting on very similar arguments by Microsoft: "*Microsoft's argument fails because, even assuming that the software market is uniquely dynamic in the long term, the District Court correctly applied the structural approach to determine if the company faces competition in the short term. Structural market power analyses are meant to determine whether potential substitutes constrain a firm's ability to raise prices above the competitive level; only threats that are likely to materialise in the relatively near future perform this function to any significant degree. The District Court expressly considered and rejected Microsoft's claims that innovations such as handheld devices and portal websites would soon expand the relevant market beyond Intel-compatible PC operating systems. Because the company does not challenge these findings, we have no reason to believe that prompt substitutes are available. The structural approach, as applied by the District Court, is thus capable of fulfilling its purpose even in a changing market.*" Judgment in *USA vs. Microsoft* of the US Court of Appeals, District of Columbia Circuit, 28 June 2001, on page 17.

[589]   See for example *Antitrust in software markets*, by Michael Katz and Carl Shapiro, September 1998 (at: http://faculty.haas.berkeley.edu/shapiro, printed on 26 November 2002): "*Some commentators ... assert that, in the face of rapid technological change, current market positions, such as market shares, mean little [...] We are sympathetic to the view that the software industry has been driven by impressive advances in technology, and we certainly agree that enormous value has been generated in the software industry over the past twenty years, both for shareholders and for customers. However, we do not believe that technological or structural change is so great that the software industry should be immune from antitrust enforcement.*" (page 9)

[590]   When it held a market share of 76.4% (first Statement of Objections, at paragraph 246).[0]

successive forms) is not only a dominant product on the relevant market for client PC operating systems, but it is the *de facto* standard operating system product for client PCs.[591]

5.2.2 *Work group server operating systems*

5.2.2.1 Methodology for measuring market shares

(473)   In the following recitals, the market position of the various competitors in the work group server operating system market will be assessed by using two categories of proxies. The first category relies on estimates of new sales by IDC based on price-band proxies and workload shares for various tasks. The second category of proxies derives market shares from the responses to the Commission's 2003 market enquiry and from Mercer's customer surveys (installed base). Both categories lead to coherent (and similar) results.

5.2.2.1.1 Shipment or revenue measures

(474)   As outlined in Section 3.2, the business models on the work group server operating system market are quite different. In particular, some vendors sell work group server operating systems bundled with the hardware. As such, it is not possible to derive market shares directly in terms of software revenue.

(475)   An alternative method is to measure market shares in terms of units shipped. The main advantage of using unit shipments to measure market shares is that it factors in the impact of Linux-based operating systems in the market share measurement. In this respect, Microsoft states that:

> "the major drawback of using revenues is that they undercount the importance of server operating systems that hardware vendors and organisations can obtain for free, or for nominal cost, that have been created by the open-source movement. The best known of these is Linux. It is inappropriate to treat these alternatives as having no economic importance just because vendors and organisations do not have to pay for them."[592]

(476)   However, Microsoft also makes the point that various server operating systems are differentiated products, and that measuring by unit shipments can be distortive. The general argument in this respect is that unit shipments count one unit of a Windows server operating system in the same way as one unit of, for instance, a Solaris

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[591]   Indeed, this is recognised by Microsoft itself: "*Windows is the standard for a very large share of PCs [in the client operating system market]*", Microsoft's submission of 16 November 2001, report by Motta and Polo at paragraph 29.

[592]   See Microsoft's submission of 17 November 2000, NERA Report at paragraph 77.

operating system, whereas the two products could well be serving different numbers of users. Therefore, the argument is that using unit shipments to measure market shares artificially exaggerates the market share of server operating systems that serve fewer users. Microsoft argues that market shares should therefore rather be measured in terms of revenue generated by the hardware and the software.[593]

(477)   For these reasons, in its assessment of market shares and dominance in the work group server operating system market, the Commission will consider market shares measured both by unit shipments and hardware + software revenue.[594]

5.2.2.1.2   Measurement by price band and workload

(478)   As highlighted at recital (56) above, work group server operating systems are generally installed on relatively cheap server machine hardware, certainly in comparison to high-end servers which are used for mission-critical applications.

(479)   This has been confirmed by the results of the Commission's 2003 market enquiry, in which the entities surveyed were asked what price they would be ready to pay for a work group server.[595] 98% of the entities questioned (83 out of 85) stated that they would not be willing to pay more than EUR 25,000 for a work group server.[596] The Commission also asked the companies about their past and planned purchases of servers intended for file and print use.[597] Among the 8,236 past purchases of file and print servers mentioned by the respondents, 8,001 (97.1%) cost below USD 25,000, 233 between USD 25,000 and USD 100,000 (2.8%) and 2 above USD 100,000 (0.02%). In terms of revenue, 99.7% of those file and print server purchases were made within the USD 0-100,000 price band and 94% within the USD 0-25,000 price band. As regards the 2,695 purchases of file and print servers which were already planned, 100% of these purchases related to servers costing below USD 100,000, and 2,683 (99%; 98% in terms of revenue) related to servers below USD 25,000.

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[593]   See for example, Microsoft's submission of 16 November 2001, NERA Report, Section IV.B.
[594]   IDC computes server operating environment sales in terms of "units" and in terms of "factory revenue". IDC also computes "customer revenue", which includes *inter alia* the margin of value-added resellers. As regards revenues, the Commission will use the figures suggested by Microsoft, which are based on factory revenue.
[595]   Question 3 of the questionnaire attached to the Commission's Article 11 letters of 28 May 2003 and 4 June 2003.
[596]   In fact, of these firms, 55 stated that they would not be willing to pay more than EUR 10,000 for a work group server.
[597]   Question 8 and Question 9 of the questionnaire attached to the Commission's Article 11 letters sent on 16 April 2003.

(480) In tracking sales of servers and corresponding server operating systems, IDC has traditionally distinguished in its taxonomy between server class categories in terms of price-bands. In 2003, IDC has modified this taxonomy:

> "To represent the reality of price erosion among server systems and the increased capabilities of servers with lower price points, IDC has redefined the categories that represent the volume server market and midrange and high-end enterprise servers. […] In the past, IDC segmented the server market into three server class categories: the entry server market (consisting of all systems with an average sales value below $100,000), the midrange server market (consisting of all systems with an average sales value from $100,000 to $1 million), and the high-end server market (consisting of all systems with an average sales value above $1 million). IDC's new server class taxonomy segments the server market into three new server classes: the volume server market (consisting of all systems with an average sales value below $25,000), the midrange enterprise server market (consisting of all systems with an average sales value from $25,000 to $500,000), and the high-end enterprise server market (consisting of all systems with an average sales value (ASV) above $500,000). The midrange enterprise and high-end enterprise markets will be referred to collectively as the 'enterprise server market'."[598]

(481) This is consistent with comments made by several third parties, who have pointed out that, during the past five years, advances in technology, and the lower cost of computing which these have brought, have had the effect of lowering the prices of work group servers. [599]

(482) The IDC "low-end server market" or "volume server market" category represents a first proxy to calculate market shares in the work group server operating system market. However, it must be borne in mind that there are servers that fall within the relevant price band (servers costing below USD 25,000) and are not work group servers, but are devoted to specific tasks outside – or at the edge of – work group networks. A good example of such servers are Web servers or firewall servers that sit at the edge of the work group network and do not carry out work group server tasks.

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[598] See *IDC Server Research Taxonomy and Definitions*, April 2003.
[599] See for example CCIA's submission of January 14, 2002: "*Comments regarding market definition and dominance*", on page 9 and SIIA's submission of January 11, 2002: on page 22. These submissions refer to a price band of USD 100,000 that the Commission, consistent with IDC's practice at the time, had used in its first two Statements of Objections as the relevant price band proxy by which to measure market shares for work group server operating systems.

(483)   For the purposes of market share measurement and assessment of dominance, the use of a price band proxy therefore needs to be complemented by an additional form of measurement, namely shares by server operating system tasks.

(484)   Such data are compiled by IDC, which polls consumers with regard to the tasks (termed "workloads" by IDC) to which servers are put.[600] In cases where servers are dedicated to more than one workload, an allocation per workload for each server is specified. For example, if a USD 10,000 server is devoted 60% to one workload and 40% to a second workload, IDC indicates this as 0.6 of a server for the first workload and 0.4 of a server for the second workload.

(485)   The IDC figures allow for units and revenues for all servers to be calculated per sub-category (that is to say, workload). Further sub-divisions can be done according to the server's price. The entire dataset corresponds to IDC's general server tracker database, where market share figures for servers according to price band can be calculated (irrespective of server workload).[601]

(486)   IDC classifies eight broad server workload categories, and within each of these, identifies narrower individual sub-categories ("workload"). As regards work group server tasks: (i) the file and print task most closely corresponds to the IDC "*file/print sharing*" workload; and (ii) the group and user administration task most closely corresponds to the IDC "*networking*" workload.[602]

(487)   It must be highlighted, however, that neither of these workloads fit perfectly with the tasks that determine the work group server operating system market. For instance, as regards "*file/print sharing*", an expensive mission critical application server may print documents (for example, a mainframe printing invoices). As such, it might be counted as contributing to the "*file/print sharing*" workload, while it is not fulfilling an organisation's *work group server* needs.[603]

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[600]   See "*IDC Server Workload Methodology*", e-mail from Matthew Eastwood, IDC, dated 3 June 2003.

[601]   There are in fact two relevant IDC databases - the overall "*IDC Worldwide Quarterly Server Tracker*" which measures overall server figures, and the "*IDC Server Workloads 2003 Model*" (supplied by Microsoft) which also sub-divides these figures into measurements by workload. There are very small differences in the overall calculations between the two tables (in the order of 1-2%, such that there is no material difference to the analysis of market shares). In the present Decision, the Commission will use the official "*IDC Worldwide Quarterly Server Tracker*" for the figures relating to all servers within a given price band (i.e. without reference to workload), and the figures in the "*IDC Server Workloads 2003 Model*" supplied by Microsoft to measure the shares by workload.

[602]   Both these workloads are within the "*IT infrastructure*" category, which also includes the following workloads: "*Proxy caching. Includes applications that improve data centre performance by storing and serving content from the edge of the network*"; "*Security. Includes applications specifically designed for authentication and identification and typically performs 'firewall' services*"; "*Systems management. Includes applications that monitor and account for systems performance, resource planning, and resource allocation*".

[603]   Furthermore, Network Attached Storage (NAS) servers, which are not work group servers – see below at recitals (633)-(635) –, may be counted in the *File/print sharing* workload.

(488)   Similarly, the "*networking*" workload is described by IDC as follows: "*includes the following networking applications: directory, security/authentication, network data/file transfer, communication, and system data/file transfer*". This means that certain application servers including a directory service may be counted as contributing to the "*networking*" workload, although they are not work group servers. More generally, "*network data/file transfer, communication, and system data/file transfer*" may correspond to services that are not work group server services.[604]

(489)   Against this backdrop, the Commission will use as proxies to evaluate the respective positions of the various competitors in the work group server operating system market the IDC figures for operating systems installed on all servers sold at a price below USD 25,000, in conjunction with the figures for the "*file/print sharing*" and "*networking*" workload within this price band. In this regard, given that work group servers generally cost under EUR 25,000 (approximately USD 25,000) (see recitals (479) *et seq.*), the issue of non-perfect fit between work group tasks and IDC's workloads will be reduced. For instance, as regards "*file and print*", mainframes that print invoices (see recital (487)) will generally cost over USD/EUR 25,000, and as regards "*networking*", many application servers of the type outlined at recital (488) will also cost above USD/EUR 25,000.

(490)   In addition, the IDC figures will be supplemented by examining the results of the Commission's 2003 market enquiry, the Microsoft customer statements and Mercer's Survey II and Survey III.[605]   This will in particular provide insights into installed bases – whereas IDC tracks new sales of server systems.

5.2.2.2   Market shares

(491)   In 2002, of all servers shipped costing under USD 25,000, Windows' share measured by unit shipments stood at 64.9% according to IDC. Measured by revenues, the figure was 61.0%. Trailing significantly behind Windows is NetWare with a market share of 9.4% in terms of unit shipments and 8.5% by revenues. The various Linux vendors represent a combined share of 13.4% in unit shipments and 10.4% by revenues. The combined share of the UNIX vendors is 11.1% in unit shipments and 18.6% by revenues.[606]

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[604]   IDC also uses a "*workgroup*" sub-category, which relates to "*applications that let users collaborate and share information.*" As such, this workgroup category does not directly relate to the work group server tasks referred to by the Commission in the present Decision. It should also be noted that some companies may consider e-mail applications to come within the "*workgroup*" sub-category.

[605]   In these sets of studies, file, print and group and user administration workloads have been examined without distinguishing in terms of server hardware price.

[606]   Source: IDC Worldwide Quarterly Server Tracker. The revenue figures in this paragraph refer to "*factory revenues*". The picture hardly changes if "*customer revenues*" are used – the 2002 market share under this measure are: Microsoft – 59.7%, Novell – 9.1%, Linux – 10.4%, and Unix – 19.1% (these appear to be the revenue figures used in the *IDC Server Workloads 2003 Model* supplied by Microsoft).

(492) As has been highlighted at recitals (482) to (490), in order to more accurately analyse work group server operating system market shares, the focus needs to be put more explicitly on work group server operating system tasks. The following recitals outline the various figures obtained for Microsoft and its major competitors.

5.2.2.2.1 Microsoft

(493) According to IDC, in 2002, Windows' share for the "*file/print sharing*" workload amongst servers costing under USD 25,000 stood at 66.4% when measured by unit shipments and at 65.7% when measured by revenues (increasing from 55.6% measured by unit shipments and 54.7% measured by revenues in the year 2000).[607] For the "*networking*" workload, the corresponding figures were 66.7% when measured by unit shipments, and 65.2% when measured by revenues.[608]

(494) Therefore, when focussing on workloads that correspond to core work group server tasks, Microsoft's share of operating systems installed on servers under USD 25,000 is essentially the same as or higher than Microsoft's total market share figures for operating systems installed on all servers under USD 25,000.

(495) These results are echoed by the Commission's enquiry, where the respondents were asked to indicate, for various services provided by servers to the Windows-based client PCs in their organisation, the approximate share of the workload which was performed by various operating system families.[609] Windows is very strong when focussing on the core work group server services, and less strong for other tasks. In terms of installed base, the enquiry indicates that Windows accounts for an average of:

(i) 71% of the entities' print server workload;

(ii) 68% of the entities' file server workload;

(iii) 72% of the entities' group and user administration workload.

(496) In contrast, for other tasks, Windows has relatively low usage shares. For instance, Windows accounts for an average of 26% of firewall server workload, and for 46% of mission-critical application serving workload.

(497) The results of the Commission's 2003 market enquiry are confirmed by the figures from Mercer's Survey II and Survey III. In those surveys, Mercer asked respondents to allocate the total workload for various tasks by server operating system. The tasks

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[607] Source: Microsoft - IDC Server Workloads 2003 Model.
[608] Source: Microsoft - IDC Server Workloads 2003 Model.
Microsoft's share of the "*e-mail*" task for servers costing under USD 25,000 was 67.8% when measured by unit shipments, and 67.7% when measured by revenues.
[609] Question 5 of the questionnaire attached to the Commission's Article 11 letters sent on 16 April 2003.

defined by Mercer in those surveys and that are closest to the definition of work group server services are: (i) *"File and Print"*; and (ii) *"Group and user administration (e.g. authentication, directory)"*.

(498)   The average workload shares for Windows obtained for these tasks as a result of Mercer's Survey II are 60% for *"File & Print"* and 64% for *"Group and User Administration"*.   The corresponding figures for Survey III are 65% for *"File & Print"* and 66% for *"Group and User Administration"*.

(499)   Taken together, these various figures in conjunction with the figures mentioned at recital (491) indicate that Microsoft's market share figures for work group server operating systems are, at a conservative estimate, **at least 60%**.

5.2.2.2.2   Other vendors

5.2.2.2.2.1 Novell (NetWare)

(500)   The Commission's 2003 market enquiry shows a significant overlap between the successive versions of NetWare and Windows NT 4.0 and 2000 Server as work group server operating system products.   87% of the respondents have more than 90% of their print workload either on Windows or NetWare servers.   The corresponding figures for file services and group and user administration are 84% and 81% respectively.

(501)   When looking at IDC's *"file/print sharing"* workload for servers costing under USD 25,000, the share of NetWare measured by units stood in 2002 at 23.6% (22.4% when measured by revenues).[610]   The corresponding figures for *"networking"* were 12.7% and 12.0% respectively.[611]

(502)   In terms of installed base, the Commission's enquiry indicates that NetWare accounts for an average of 24% of the entities' print workload. The corresponding figures for file services and group and user administration services are 25% and 21% respectively.

(503)   It follows from the figures referred to at recital (491) and recitals (501)-(502) that NetWare's market share is in the region of **10 to 25%**.

5.2.2.2.2.2 Linux vendors

(504)   When focussing on work group server operating system tasks, the share of the Linux products taken as a whole ("Linux's share") tends to be lower than when considering

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[610]   Source: Microsoft - IDC Server Workloads 2003 Model.
[611]   Source: Microsoft - IDC Server Workloads 2003 Model.

all servers sold at a price below USD 25,000. Based on IDC's figures,[612] Linux's share of servers costing under USD 25,000, when focussing on the "*file/print sharing*" workload was 4.8% in 2002 (and 3.9% when measured by revenues). The corresponding figure for "*networking*" was 13.4% when measured in units (10.8% in 2002 measured by revenues); however, as outlined in recital (486) above, the "*networking*" workload also includes non-work group server operating system tasks.

(505) Linux's main strength in servers under USD 25,000, and hence what is behind its general figures in this segment, comes from outside work group server operating systems tasks. Its strongest areas per IDC workload data for servers under USD 25,000 are "*scientific/engineering*" (2002 market share of 32.3% by shipments, 21.4% by revenues), "*security*" (2002 market share of 29.0% by shipments, 21.2% by revenues), "*Web serving*" (2002 market share of 25.2% by shipments, 20.3% by revenues), "*proxy caching*" (2002 market share of 23.8% by shipments, 19.2% by revenues) and "*streaming media*" (2002 market share of 19.2% by shipments, 15.6% by revenues).[613]

(506) In terms of installed base, according to the Commission's 2003 market enquiry,[614] Linux/Samba[615] has a very limited presence. Of the 102 entities responding to the Commission's enquiry, only 19 used Linux/Samba servers for file and print tasks. Out of those 19 entities, 13 stated that the corresponding servers in fact served less than 5% of their client PCs or that Linux represented altogether less than 5% of their file, print or group and user administration workload.[616] In fact, there were only three examples of entities making a not insignificant use of Linux/Samba.[617] As such, out of a total of more than 1.2 million client PCs, less than 70,000 (less than 5.8%) were served by Linux/Samba servers for file and print tasks.[618]

(507) It follows from the figures referred to at recital (491) and recitals (504)-(506) that Linux's market shares are in the region of **5 to 15%**.

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[612] Source: Microsoft - IDC Server Workloads 2003 Model.
[613] Source: Microsoft - IDC Server Workloads 2003 Model.
[614] Question 26 of the questionnaire attached to the Commission's Article 11 letters sent on 16 April 2003.
[615] For a definition of Samba, see above at recitals (293) *et seq*. Linux/Samba is the typical Linux work group server operating system.
[616] Question 5 of the questionnaire attached to the Commission's Article 11 letters sent on 16 April 2003.
[617] These entities are Entity I19 (response dated 5 May 2003), Entity I48 (response dated 7 May 2003) and Entity I01 (response dated 6 June 2003). As regards Entity I48, the Samba/Linux servers seem to be only used for conversion of Microsoft Office-files into non-editable pdf-files via Print services.
[618] Moreover, only two respondents indicated that they had the intention to add additional Linux/Samba servers (Entity I19 and Entity I18). As regards Entity I18, the addition will concern only 5 servers and 2% of the total client PCs (about 450 among more than 25,000 client PCs).

5.2.2.2.2.3 UNIX vendors

(508) The figures mentioned at recital (491) overestimate the position of the UNIX products in the work group server operating system market, where this operating system product has only a marginal position. Indeed, when focussing on work group server tasks, for the IDC "*file/print sharing*" workload for servers costing under USD 25,000, UNIX's share in 2002 measured by shipments was 4.6% (7.4% when measured by revenues).[619] For the "*networking*" workload, the corresponding figure was 6.4% (10.8% when measured by revenues).[620]

(509) The Commission's 2003 market enquiry confirms the very limited use of UNIX for work group server operating system tasks.[621] Only 4 of the companies questioned (4% of the total) used UNIX/AS/U[622] to provide file and print, and only one for a substantial number of client PCs.[623] Moreover, no other respondent indicated that it had the intention to add additional UNIX/AS/U equipped servers.

(510) The responses to the market enquiry confirms that where UNIX is used, it is mainly for supporting mission critical applications,[624] for firewalls[625] and/or Internet[626] facing Web servers, and to a lesser extent for support for internal e-mail, in particular in conjunction with Domino, a groupware package sold by Lotus.[627]

(511) The Microsoft customer statements also highlight this picture. Whilst all of the 46 organisations for which Microsoft provided statements were using UNIX products, only two of them were doing so on work group server.[628] Out of these two, [Confidential] was somewhat atypical, since it had mainly Sun SPARC workstations.

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[619] Source: Microsoft - IDC Server Workloads 2003 Model.

[620] Source: Microsoft - IDC Server Workloads 2003 Model.

[621] Question 27 of the questionnaire attached to the Commission's Article 11 letters sent on 16 April 2003.

[622] For more details on AS/U, see above at recitals (211) *et seq*.

[623] The four companies in question are Entity I47, Entity I68, Entity I01 and Entity I9-2. For Entity I47, Entity I68 and Entity I9-2, the UNIX/AS/U servers serve less than 20 client PCs. For Entity I01, the UNIX/AS/U servers only provide print services.

[624] See, for example responses by Entity I15 (dated 28 April 2003), Entity I53 (dated 7 May 2003), Entity I11 (dated 22 April 2003), Entity I18 (dated 7 May 2003), Entity I3 (dated 12 May 2003), Entity I24 (dated 9 May 2003), Entity I16 (dated 14 May 2003), Entity I64 (dated 5 May 2003), Entity I34 (dated 7 May 2003), Entity I73 (dated 6 May 2003), Entity I75 (dated 29 May 2003), Entity I59 (dated 14 May 2003), Entity I38 (dated 8 May 2003), Entity I58 (dated 8 May 2003), and Entity I17 (dated 12 May 2003).

[625] See, for example responses by Entity I15 (dated 28 April 2003), Entity I3 (dated 12 May 2003), Entity I24 (dated 9 May 2003), Entity I8 (dated 13 May 2003), Entity I34 (dated 7 May 2003), Entity I29 (dated 8 May 2003), Entity I50 (dated 30 April 2003), Entity I59 (dated 14 May 2003), Entity I43 (dated 19 May 2003), Entity I67 (dated 14 May 2003), Entity I32 (dated 8 May 2003), Entity I57 (dated 15 May 2003).

[626] See, for example, responses by Entity I48 (response dated 7 May 2003), Entity I16 (dated 14 May 2003), Entity I22-2 (from Entity I22, response dated 27 May 2003).

[627] See, for example, responses by Entity I67 (dated 6 June 2003), Entity I45 (dated 7 May 2003), Entity I16 (dated 14 May 2003).

[628] [Confidential] and Entity 31 in Annex K to Microsoft's submission dated 16 November 2001.

(512)   It follows from the figures referred to at recital (491) and recitals (508)-(511) that UNIX vendors' combined market share is in the region of **5 to 15%**.

5.2.2.2.2.4 Other vendors: Apple (Mac OS X) and IBM (OS/2 Warp server)

(513)   There is hardly any trace of these two work group server operating systems (the sales of which are not tracked by IDC's Server Workloads Model) either in the 46 Microsoft customer statements or in the Commission's 2003 market enquiry.[629] The two references to OS/2 in the responses to the 2003 market enquiry are cases of migration from OS/2 to Windows.[630]

5.2.2.2.3 Conclusion

(514)   The Commission has examined a variety of data in order to measure Microsoft's market share. These comprise various sets of IDC figures, figures from the Commission's 2003 market enquiry, and the results of Mercer's two 2003 surveys. All these data sets confirm that Microsoft holds by far the leading market share - in every measure, it has a share of at least 50%, and for most measures, its figures are in the 60-75% range.   Such market shares are consistent with a presumption of dominance in the work group server operating system market according to the case-law outlined in paragraph (435). This conclusion is corroborated by evidence (again from both the IDC figures and the Commission's 2003 market enquiry) that Microsoft's main rival, NetWare, is in a weak position, and that other operating systems, such as Linux and UNIX, have a limited presence in the market.

5.2.2.3 Barriers to entry

(515)   Microsoft argues that the "server industry" does not exhibit significant barriers to entry and that therefore, even high market shares would not be indicative of a dominant position.   According to Microsoft, "*network effects [would be] less important for server software than for other software*".[631]

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[629]   Mac OS X was only launched in 2002, hence later than the dates of compilation of the 46 statements.

[630]   Entity I16 and Entity I74 migrated away from OS/2 to Windows NT, Entity I46-18 (from Entity 46) intends to migrate away from OS/2 to Windows Server 2003.

[631]   Microsoft's response to the Commission's first Statement of Objections, NERA report, at paragraph 81.

(516)   However, as pointed out above,[632] whilst only file, print and group and user administration constitute the core work group server services, work group server operating systems can be used to run applications. Furthermore, Microsoft's own internal communication shows that the "positive feedback loop" can play a similar role in server operating system markets to the one it plays on the client PC operating system market, and even explicitly draws the analogy between the two markets:

> "*NT is on a path to win in a huge way on the server. We are essentially at the same point in server application development that Windows was on the desktop in 93. Every serious application vendor has plans to aggressively support NT.*"[633]

(517)   Furthermore, the studies by Mercer that Microsoft has submitted to the Commission suggest that there are other network effects in the work group server operating system market.

(518)   In this regard, Survey III is particularly relevant. In this survey, Mercer asked IT executives to rate various attributes on the importance that the attributes had in their choice of which server operating system to deploy for work group server functions.

(519)   Among the 13 attributes tested by Mercer in its Survey III, "*Available skill-sets and cost/availability of support (in-house or external)*" was rated 4 or 5 on a scale from 1 (low importance) to 5 (high importance) by 214 of the 296 respondents (72%).

(520)   This means that the easier it is to find technicians skilled in using a given work group server operating system, the more customers are inclined to purchase that work group server operating system. In turn, however, the more popular a work group server operating system is among customers, the easier it is for technicians (and the more willing are technicians) to acquire skills related to that product. This mechanism can be formalised from an economic perspective in terms of network effects.[634]

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632   See above at recital (59).

633   See Internal Microsoft e-mail from Senior Vice President Bob Muglia to Chairman Bill Gates dated 12/07/1997, in Sun's submission on evidentiary material dated 11 August 1999 at Tab. 25 (case No IV/37.345 pages 5417 to 5419).

634   Microsoft states that "*such routine attributes of purchase decisions cannot sensibly be regarded as 'barriers to entry' because they are equally applicable to essentially every purchasing decision made in connection with complex, durable products in every sector of the economy.*" (Microsoft submission of 7 February 2004, at page 16). This statement is incorrect. The situation to which the Commission is referring to in the present case has many features that will not necessarily be present in other markets for "*complex, durable products*". This is for instance the case because the cost of administration of work group server operating systems is a substantial portion of the total cost of ownership (TCO). In that respect, by way of illustration, in a study comparing Windows and Linux for four workloads (network infrastructure, print serving, file serving, and security applications), IDC finds the following average repartition of a five-year TCO according to categories of costs: *62.2% for staffing*, 23.1% for downtime, 5.3% for training, *4.6% for software*, .4% for hardware, 0.4% for outsourcing. See *Windows 2000 versus Linux in Enterprise Computing, an IDC White Paper sponsored by Microsoft*, printed from: http://www.microsoft.com/windows2000/migrate/unix/tco.asp on 20 July 2003, on page 3. A

(521)   The following quote by one of the IT executives (from a "*Spanish Services Firm*") asked by Mercer as part of Survey I constitutes a good illustration that specifically mentions work group server operating system products (Novell): "*We used to have a lot of Novell. Two years ago, we started to switch. The new technical staff that we were hiring were more expert on NT. [...] We have one Novell server left for printing. That will be replaced by a Windows 2000 server*".[635]

(522)   This mechanism is also apparent in answers to the Commission's 2003 market enquiry. Indeed, Microsoft itself points to some examples when it refers to "*Entity I19, who uses Window servers to provide file and print services to Windows clients [...] because of 'internal Windows-competence' that IT staff has with Windows operating systems*", and to Entity I37, whose "*choice of Windows servers [is] driven [inter alia] by the fact that 'competences are easier to find on Windows than on other operating systems'*".[636]

(523)   There are, beside the presence of network effects, other characteristics in the work group server operating system market that suggest that there are barriers to entry. For instance, among the attributes tested by Mercer, "*established record as proven technology*" was rated 4 or 5 by 215 of the 296 respondents. "*Expected long-term vendor support and development of platform (investment protection)*" was rated 4 or 5 by 220 of the 296 respondents. The importance of these factors indicates the obstacles that a new entrant will have to overcome, and the fact that doubts about the viability of a given product will trigger a self-reinforcing mechanism which will accelerate the risk that this product will not be viable in the market.

(524)   Finally, Microsoft's behaviour in the market of withholding interoperability information (as outlined in Section 5.3.1) also builds an additional (artificial) barrier to entry in the market.[637] As has been outlined in Section 5.1.1.2.1.4, there is a strong need for client PC operating systems and work group server operating systems to interoperate. Therefore, if a work group server operating system vendor encounters obstacles to interoperability, these will act a barrier to entry in the market.

(525)   In conclusion, the work group server operating system market exhibits barriers to entry (including Microsoft's behaviour of withholding interoperability

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further element that makes the reasoning carried out by the Commission in this instance not necessarily applicable to other "*complex, durable products*" is that, as evidenced by the responses to Mercer's surveys, skills gained by IT administrators are to a large extent *specific to a given product*.

[635]   Mercer Report of December 2001, on page 28.

[636]   Microsoft's submission dated 17 October 2003, Annex A.

[637]   See also submission by Sun (Lexecon) of 7 January 2002, at paragraph 157, and presentation by Sun (Lexecon) at the Oral Hearing (Slide 18).

information).[638] Given the importance of these barriers to entry, it is unrealistic to envisage potential competitors profitably entering the market.

5.2.2.4   Links with the client PC operating system market

(526)   Even if the Commission were to disregard Microsoft's present work group server operating system market share as an indication of dominance together with the barriers to entry that have been outlined, the conclusion to the effect that Microsoft has a dominant position is furthermore supported by the particular links between the client PC and work group server operating system markets. These markets are closely associated through commercial and technical links. Therefore, an isolated analysis of the competitive conditions on the market for work group server operating systems - ignoring Microsoft's overwhelming dominance in the neighbouring client PC operating system market - fails to deliver an accurate picture of Microsoft's true market power. Indeed, Microsoft's dominance over the client PC operating system market has a significant impact on the adjacent market for operating systems for work group servers.

(527)   In *Tetra Pak II*,[639] the Court of First Instance and the Court of Justice confirmed the Commission's global analysis of an undertaking's market power on two distinct markets on the basis of close associative links between those markets.[640] The Commission decision in that case considered the market in systems (both machinery and cartons) for the aseptic packaging of liquid foods in cartons and for the non-aseptic packaging of liquid foods in cartons (respectively "the aseptic market" and "the non-aseptic market"). The Court of Justice followed the Court of First Instance in considering the following links to warrant a global analysis of Tetra Pak's market power on both the aseptic *and* non-aseptic market:

(i)   a substantial proportion (35%) of Tetra Pak's customers had purchased both aseptic and non-aseptic packaging systems;

(ii)   the fact that Tetra Pak held nearly 90% of the market in the aseptic sector meant that, for customers, it was not only an inevitable supplier of aseptic systems but also a favoured supplier of non-aseptic systems;

(iii)   the main producers operated on both markets, thereby confirming the links between the markets;

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[638]   Microsoft's argument to the effect that Linux is a successful new entrant has been dealt with above. See recitals (598) to (610).

[639]   Commission Decision 92/163/EEC in Case IV/31043 - Tetra Pak II, OJ L 72, 18.3.1992, p. 1; Judgment of the Court of First Instance of 6 October 1994, Tetra Pak v Commission , Case T-83/91, [1994] E.C.R. II-755; Judgment of the Court of 14 November 1996 in Case C-333/94 P Tetra Pak v Commission ("*Tetra Pak II*") [1996] E.C.R. I-5951.

[640]   Judgment of the Court of 14 November 1996 in Case C-333/94 P Tetra Pak v Commission ("*Tetra Pak II*") [1996] E.C.R. I-5951, at paragraphs 21 to 23.

(iv)   furthermore, the Court found that Tetra Pak, by virtue of its quasi-monopoly in the aseptic sector, was able to focus its competitive efforts on the non-aseptic markets without fear of retaliation in the aseptic sector [641].

(528)   As a result, the Court of Justice held that Article 82 of the Treaty applied to conduct on the market where dominance had not been established in isolation, given that the quasi-monopoly enjoyed by Tetra Pak on the aseptic packaging markets and its leading position on the distinct, though closely associated, non-aseptic packaging markets placed it in a situation comparable to that of holding "*a dominant position on the markets in question as a whole*".[642]

(529)   A comparison of the relevant operating system markets and an evaluation of Microsoft's position on both reveals a degree of inter-relation which is similar to the one that was found to prevail in *Tetra Pak II*.

(530)   Typical organisations that purchase work group servers also need to purchase client PCs. Microsoft is active in both the client PC operating system market and the work group server operating system market. It enjoys a quasi-monopoly on the client PC operating system market and has a leading position on the market for work group server operating systems. The quasi-totality of customers who purchase work group servers run Microsoft's Windows on their client PCs (Microsoft's market share in client PC operating systems is above 90% - see Section 5.2.1.1.). The relevance of this associative link between both markets is illustrated by the following quote from Microsoft's internal correspondence:

> "A majority of the firms we have visited in the past year have told us that they want integration between the desktop and the operating system on the server and since they use Microsoft on the desktop, they should have Microsoft on the server. […] Jeff at Amerok told us that 'it was natural and easy to deploy NT because the desktop OS was Microsoft and GateWay Computers began bundling the Office Suite.' Integration and availability between the desktop and the messaging application are primary objectives among IT groups that service intelligent and demanding users."[643]

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[641]   Judgment of the Court of First Instance of 6 October 1994, <u>Tetra Pak v Commission</u> , Case T-83/91, [1994] E.C.R. II-755, at paragraphs 120 and 121 and Judgment of the Court of 14 November 1996 in Case C-333/94 P <u>Tetra Pak v Commission</u> ("*Tetra Pak II*") [1996] E.C.R. I-5951, at paragraphs 28 to 30.

[642]   Judgment of the Court of 14 November 1996 in Case C-333/94 P <u>Tetra Pak v Commission</u> ("*Tetra Pak II*") [1996] E.C.R. I-5951, at paragraph 31.

[643]   See Sun's Submission of evidentiary material of 14 October 1999, at Tab. 27, Microsoft internal study on *The Network Operating System Market*, September 1998, on page 16, emphasis added.
         In its submission of 7 February 2004 (page 11), Microsoft refers to this point by arguing that it is not the case that "*the choice of client operating systems dictates the choice of server operating systems by enterprise customers. The conclusion that "close associative" links with Windows client operating systems give Windows server operating system an anticompetitive advantage over rivals is unfounded.*" However, this argument relates to the question of the importance of interoperability in driving the

(531)   Similarly, a vast majority of OEMs that sell servers also supply client PCs, and are therefore dependent on Microsoft. This dependency is acknowledged, for example, by the Annual Reports of some such OEMs.[644] In addition, the possibility to upgrade their operating systems without necessarily buying new hardware implies a direct relationship between customers and the operating system vendor.

(532)   In addition to these *commercial* "associative links", there are *technological* links between the product markets in question. Client PCs and work group servers represent nodes in a computer network and are therefore physically linked with each other. The importance of interoperability with client PCs for work group server operating systems has been outlined above (recitals (383) *et seq.*).

(533)   In summary, there are substantial direct and indirect network effects, not only within each of the two different markets for client PC and work group server operating systems, but also between the two markets. The exploitation of those network effects with a view to leveraging its quasi-monopoly from the client PC operating system market to the work group server operating system market is at the root of the identified abuse of refusal to supply and will be defined in greater detail below (Section 5.3.1).

(534)   In line with the above, it can be concluded that, analogous to the situation in *Tetra Pak II*, the client PC and work group server operating system markets exhibit a number of strong associative links, both commercial and technological.

(535)   Microsoft nevertheless seems to argue that "*none of the 'special circumstances' mentioned by the Court in Tetra Pak II applies to the markets that are at the centre of the Commission's Statement of Objections against Microsoft*".[645]

(536)   Microsoft's arguments in that respect fall into two different categories: those that derive from Microsoft's incorrect market definition and those that derive from a misguided economic and legal analysis.

(537)   Statements such as "*Microsoft does not hold a leading (i.e. quasi-dominant) position in the relevant server operating system market*";[646] or: "*Microsoft's share of sales [in*

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uptake of Microsoft's work group server operating system products. This is analysed in Section 5.3.1.2.2 below.

[644]   By way of example, see HP, *Form 10-K, Annual Report pursuant to Section 13 or 15 (d) of the Securities Exchange Act of 1934 for the fiscal year ended October 31, 2001*, printed from http://investor.hp.com/edgar.cfm?Page=28 on 19 January 2003: "*We also have a dependency upon [...] Microsoft for various software products*". See also Compaq, *Form 10-K, Annual Report pursuant to Section 13 or 15 (d) of the Securities Exchange Act of 1934 for the fiscal year ended October 31, 2001*: "*Compaq's results could [...] be adversely affected should it be unable to effectively implement its technological and marketing alliances with other companies, such as Microsoft [...]*".

[645]   Paragraph 35 of *Market Definition and Dominance in Client and Server Operating Systems*, by Jordi Gual and Atilano Jorge Padilla, in Microsoft's submission of 16 November 2001.

the relevant market] is far from those normally considered dominant even for screening purposes"[647] are invalid, since they rely on Microsoft's contention that there is no relevant market for work group server operating systems. However, the preceding analysis has confirmed that Microsoft holds by far the leading position in such a market.

(538)   Microsoft's second line of argument relates to the idea that, "*unlike the aseptic and non-aseptic markets for the packaging of liquid foods, the markets for client and server operating systems exhibit substantially different demand and supply structures.*"[648] As such, "*the 'associative' links that played a crucial role in Tetra Pak II have no parallel in the Commission's case against Microsoft*".[649] In this respect, Microsoft's main point is that client and server operating systems are strict complements, and that as such, there is no incentive for Microsoft to leverage from one market to the other.[650] Microsoft's arguments are unfounded in both law and fact. As regards the law, the Court of First Instance and the Court of Justice in *Tetra Pak II* in no way specified whether the associative links between the two product markets had to be of a certain type (such that for example, the concept of "*a dominant position on the markets in question as a whole*" could not apply to products which were strict complements). As regards the facts, it is not the case that client and (work group) server operating systems are strict complements, not least because they are not used in fixed proportions.[651]

(539)   Microsoft's third argument is that there are no links between the two markets in question which would provide Microsoft with the means to leverage from one market to the other, since "*the 'technological' links discussed in the SO reflect the structure of a network system and play no [...] leveraging role [similar to that identified in Tetra Pak]*".[652] This argument is also wrong on the facts. It is precisely the *sui generis* technological interrelationship between client PC operating systems and work group server operating systems that has been outlined that constitutes one key element of the links between the two markets in question. The fact that there is a need for interoperability within work group networks, and the fact that Microsoft

[646]   Paragraph 35 of *Market Definition and Dominance in Client and Server Operating Systems*, by Jordi Gual and Atilano Jorge Padilla, in Microsoft's submission of 16 November 2001.
[647]   Paragraph 178 of NERA Report in Microsoft's submission of 16 November 2001.
[648]   Paragraph 35 of *Market Definition and Dominance in Client and Server Operating Systems*, by Jordi Gual and Atilano Jorge Padilla, in Microsoft's submission of 16 November 2001.
[649]   Paragraph 35 of *Market Definition and Dominance in Client and Server Operating Systems*, by Jordi Gual and Atilano Jorge Padilla, in Microsoft's submission of 16 November 2001.
[650]   This derives from the "one monopoly profit" theory, and is considered in greater detail in the "*Economic Analysis*" section
[651]   These issues are considered further in Section 5.3.1.4.2, where it is demonstrated that contrary to Microsoft's claims, there is indeed a strong incentive for it to leverage its dominance from the client PC operating system market to the work group server operating system market.
[652]   Paragraph 39 of "*Market Definition and Dominance in Client and Server Operating Systems*", by Jordi Gual and Atilano Jorge Padilla, attached to Microsoft's submission of 16 November 2001.

holds a near-monopoly in client PC operating systems is precisely what gives it the ability to leverage from the latter market to that for work group server operating systems through limitations on interoperability.[653]

(540)   Therefore, on the basis of the above-mentioned factors, Microsoft's claim that the analysis established by the Court in *Tetra Pak II* does not apply in this case must be rejected.

5.2.2.5   Conclusion

(541)   In the light of Microsoft's high market shares, the barriers to entry to the market and the links between the client PC operating system market and the work group server operating system market, it is concluded that Microsoft has a dominant position within the meaning of Article 82 of the Treaty in the market for work group server operating systems.[654]

5.3   Abuses

(542)   The fact that an undertaking holds a dominant position is not in itself contrary to the competition rules. However, an undertaking enjoying a dominant position is under a special responsibility not to engage in conduct that may distort competition.[655]

(543)   The Court of Justice defined the concept of abuse under Article 82 of the Treaty in the following terms:

> "The concept of abuse is an objective concept relating to the behaviour of an undertaking in a dominant position which is such as to influence the structure of a market where, as a result of the very presence of the undertaking in question, the degree of competition is weakened and which, through recourse to methods different from those which condition normal competition in products or services on the basis of the transactions of commercial operators, has the effect of hindering the maintenance of the degree of competition still existing in the market or the growth of that competition."[656]

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[653]   This is without prejudice to the question of whether Microsoft actually does restrict interoperability and the ensuing consequences, which has been discussed above in Section 4.1 and will be further dealt with in Section 5.3.1.

[654]   In light of the market share figures outlined in Section 5.2.2.2, Microsoft can be considered to be dominant in this market since 2002.

[655]   See Judgment of the Court of 9 November 1983 in Case 322/81, Michelin v Commision [1983] ECR 3461, at paragraph 57. See also above at footnote 560.

[656]   Judgment of the Court of 13 February 1979 in Case 85/76, Hoffmann-La Roche [1979] ECR 461, at paragraph 91.

(544) In *Tetra Pak II*, the Court of Justice highlighted that the fact that a dominant company's abusive conduct has its adverse effects on a market distinct from the dominated one does not detract from the applicability of Article 82 of the Treaty.[657]

(545) In the following, Microsoft's behaviour will be assessed pursuant to Article 82 of the Treaty. The behaviour assessed can be grouped in the following two categories: Microsoft's refusal to supply interoperability information (Section 5.3.1) and Microsoft's tying of WMP with Windows (Section 5.3.2).

5.3.1 Refusal to supply

(546) In the following recitals (recitals (547) to (791)), it will be established that Microsoft is abusing its dominant position by refusing to supply Sun and other undertakings with the specifications for the protocols used by Windows work group servers in order to provide file, print and group and user administration services to Windows work group networks, and allow these undertakings to implement such specifications for the purpose of developing and distributing interoperable work group server operating system products. As outlined above, it cannot be excluded that ordering Microsoft to disclose such specifications and allow such use of them by third parties restricts the exercise of Microsoft's intellectual property rights.[658]

(547) Although undertakings are, as a rule, free to choose their business partners, under certain circumstances a refusal to supply by a dominant undertaking may constitute an abuse of dominance pursuant to Article 82 of the Treaty, unless it is objectively justified. This may also be the case for a refusal to license intellectual property rights.

(548) In *Commercial Solvents*, the Court of Justice found that ICI (a subsidiary of Commercial Solvents Corp.) had engaged in a refusal to supply contrary to Article 82 of the Treaty. The Court concluded that "*an undertaking which has a dominant position in the market in raw materials and which, with the object of reserving such raw material for manufacturing its own derivatives, refuses to supply a customer, which is itself a manufacturer of these derivatives, and therefore risks eliminating all competition on the part of this customer, is abusing its dominant position within the meaning of Article 86 [now Article 82]*".[659]

(549) In *Télémarketing*, the judgment in *Commercial Solvents* was held to also apply "*to the case of an undertaking holding a dominant position on the market in a <u>service</u>*

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[657] Judgment of the Court of 14 November 1996 in Case C-333/94 P <u>Tetra Pak v Commission</u> ("Tetra Pak II") [1996] E.C.R. I-5951, at paragraph 25.

[658] As outlined above at footnote 249, Microsoft claims various intellectual property rights over the specifications in question, in particular patent, copyright and trade secret.

[659] Judgment in Joined Cases 6 and 7-73, <u>Commercial Solvents and Others v Commission</u> [1974] ECR 223, at paragraph 25.

which is indispensable for the activities of another undertaking on another market".[660] The Court of Justice stated that "*an abuse within the meaning of Article 86 [now Article 82] is committed where, without any objective necessity, an undertaking holding a dominant position on a particular market reserves to itself [...] an ancillary activity which might be carried out by another undertaking as part of its activities on a neighbouring but separate market, with the possibility of eliminating all competition from such undertaking*".[661]

(550) While *Commercial Solvents* and *Télémarketing* related to refusals to supply respectively a raw material and a service, *Magill* concerned the refusal of TV broadcasters to license intellectual property in the form of (copyright-protected) programme listings. The Court of Justice stated that "*the refusal by the owner of an exclusive right [copyright] to grant a licence, even if it is the act of an undertaking holding a dominant position, cannot <u>in itself</u> constitute abuse of a dominant position*".[662] It pointed out, however, that "*the exercise of an exclusive right by the proprietor may, <u>in exceptional circumstances</u>, involve abusive conduct*"[663] thereby clarifying that intellectual property rights are not in a different category to property rights as such. On this basis, the Court of Justice upheld the Commission's Decision (and the Court of First Instance's judgment) which mandated compulsory licensing of the right to reproduce the copyrighted programme listings.

(551) There were three sets of exceptional circumstances identified in *Magill*. First, the Court of Justice underlined that the dominant undertakings' refusal prevented the appearance of a new product which the dominant undertakings did not offer and for which there was a potential consumer demand. As such, the refusal was inconsistent in particular with Article 82 (b) of the Treaty, which provides that abuse as prohibited by Article 82 of the Treaty may consist in "*limiting production, markets or technical development to the prejudice of consumers*".[664] Second, along the lines of *Commercial Solvents*, the Court of Justice pointed out that the conduct in question enabled the dominant undertakings to reserve "*to themselves the secondary market of*

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[660]   Judgment in Case 311/84, <u>Télémarketing v CLT and IPB</u> [1985] ECR 3261, at paragraph 26, emphasis added. <u>Télémarketing</u> concerned a case where an undertaking that dominated the market for television advertising stopped accepting spot advertisements that indicated a telephone number to be used by the public to obtain further information, unless the number given for Belgium was that of its own subsidiary specialised in providing such "telemarketing" services.
[661]   Judgment in Case 311/84, <u>Télémarketing v CLT and IPB</u> [1985] ECR 3261, at paragraph 27.
[662]   Judgment in Joined Cases C-241/91 P and C-242/91 P, <u>RTE and ITP v Commission</u> [1995] ECR I-743, at paragraph 49, emphasis added.
[663]   Judgment in Joined Cases C-241/91 P and C-242/91 P, <u>RTE and ITP v Commission</u> [1995] ECR I-743, at paragraph 50, emphasis added. See also, for example, Judgment in Case T-198/98, <u>Micro Leader Business v Commission</u>, [1999] ECR Page II-3989, at paragraph 56.
[664]   Judgment in Joined Cases C-241/91 P and C-242/91 P, <u>RTE and ITP v Commission</u> [1995] ECR I-743, at paragraph 54.

weekly television guides by excluding all competition on that market".[665] Third, the refusal was not objectively justified.[666]

(552)   In *Tiercé Ladbroke*, the Court of First Instance stated that the refusal to supply could fall within the prohibition laid down in Article 82 of the Treaty where it "*concerned a product or service which was either essential for the exercise of the activity in question, in that there was no real or potential substitute, or was a new product whose introduction might be prevented, despite specific, constant and regular potential demand on the part of consumers*".[667]

(553)   In *Bronner*[668], a preliminary ruling on the basis of Article 234 of the Treaty, access to a nation-wide home-delivery scheme for newspapers was at stake. The Court of Justice concluded that there was in that specific case no obligation to deal pursuant to Article 82 of the Treaty, finding that access to the scheme was not indispensable for Bronner to stay in the newspaper market.

(554)   Microsoft interprets *Bronner* as requiring the Commission to show that (i) supply of the information is essential to carry on business; (ii) the refusal is likely to eliminate all competition; and (iii) the refusal is not objectively justified.[669] Microsoft argues that the Commission cannot prove any of these three elements. Contrary to what Microsoft asserts, it will be established below that this Decision is consistent with *Bronner*.[670]

(555)   On a general note, there is no persuasiveness to an approach that would advocate the existence of an exhaustive checklist of exceptional circumstances and would have the Commission disregard *a limine* other circumstances of exceptional character that may deserve to be taken into account when assessing a refusal to supply.

(556)   By way of illustration, in *Commercial Solvents* the Court of Justice noted that the entity that was refused the supply had previously been Commercial Solvents' customer.[671] Similarly, *Télémarketing* concerned a case where the dominant company *stopped* accepting spot advertisements that did not indicate its own

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[665]   Judgment in Joined Cases C-241/91 P and C-242/91 P, <u>RTE and ITP v Commission</u> [1995] ECR I-743, at paragraphs 55 and 56.

[666]   For the possibility to objectively justify a refusal see for instance, see the judgment in *Télémarketing*, at paragraph 27.

[667]   Judgment in Case T-504/93, <u>Tiercé Ladbroke v Commission</u> [1997] ECR page II-923, at paragraph 131.

[668]   Judgment in Case C-7/97, <u>Bronner</u> [1998] ECR I-7791.

[669]   See Microsoft's submission of 17 November 2000, at paragraphs 185-190 and Microsoft's submission of 16 November 2001, at paragraphs 171-179 and at paragraph 184.

[670]   Indeed, disclosure of interface information by Microsoft is indispensable for competitors in the work group server operating system market to carry on business. Microsoft's behaviour of progressively diminishing such disclosures risks eliminating competition in the market and cannot be objectively justified.

[671]   Judgment in *Commercial Solvents*, at paragraph 25.

subsidiary's telephone number.[672] While not a necessary condition for finding an abuse of a dominant position - there had been no previous supply relationships in *Magill* or *Bronner* - the disruption of previous levels of supply is therefore of interest when assessing instances of refusal to supply.

(557)   *Volvo* is another case in point for further circumstances having been mentioned as relevant by the Court of Justice in relation to a refusal to supply.[673] In *Volvo*, independent repairers wanted to make spare body parts for Volvo cars. Volvo held a registered design and was not prepared to grant a licence for a royalty. The Court stipulated that in itself, a refusal to license does not amount to abusive behaviour (to which it later referred in *Magill*[674]). Nevertheless, it added that the exercise of a holder's exclusive right might be prohibited by Article 82 of the Treaty if it involves "*certain abusive conduct such as the arbitrary refusal to supply spare parts to independent repairers, the fixing of prices for spare parts at an unfair level or a decision no longer to produce spare parts for a particular model even though many cars of that model are still in circulation*".[675] Also a reading of the judgment in *Micro Leader Business* indicates that the factual situations where the exercise of an exclusive right by an intellectual property right-holder may constitute an abuse of a dominant position cannot be restricted to *one* particular set of circumstances.[676]

(558)   The case-law of the European Courts therefore suggests that the Commission must analyse the entirety of the circumstances surrounding a specific instance of a refusal to supply and must take its decision based on the results of such a comprehensive examination.

(559)   It is against this backdrop that in the following sections, the relevant circumstances are examined under which Microsoft's refusal to supply occurs.

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[672]   Judgment in *Télémarketing*, at paragraph 5. The Commission took discontinuation of supply into consideration in Commission Decision 88/518/EEC , British Sugar, OJ L 284, 19.10.1988, p. 41, at paragraph 63: "*NB cannot be considered to be a new client of BS in relation to this refusal to supply. BS had supplied NB with industrial sugar before, [...]*" See also Commission Decision 92/213/EEC, British Midland, OJ L 96 10.4.1992, p. 34 at paragraph 26: "*Both a refusal to grant new interline facilities and the withdrawal of existing interline facilities may, depending on the circumstances, hinder the maintenance or development of competition. [...] It is unlikely that there is such justification when the dominant airline singles out an airline with which it previously interlined, after that airline starts competing on an important route, but continues to interline with other competitors.*"

[673]   Judgment of the Court of Justice of 5 October 1988 in Case 238/87, Volvo v Veng [1988] ECR 6211.

[674]   See above at recital (550).

[675]   Judgment of the Court of Justice of 5 October 1988 in Case 238/87, Volvo v Veng [1988] ECR 6211, at paragraph 9.

[676]   See also Micro Leader Business, at paragraphs 56 and 57.

5.3.1.1 Refusal to supply

5.3.1.1.1 Refusal to supply Sun

(560) Sun's request and Microsoft's behaviour in response to it have been described above.[677] Sun asked Microsoft to supply, *inter alia*, the specifications for the protocols used by Windows work group servers in order to provide file, print and group and user administration services to Windows work group networks and allow the use of such specifications for the purpose of developing and distributing interoperable work group server operating system products. Microsoft refuses to provide that information to Sun.

(561) Microsoft denies that there is a proper request and a refusal to supply interoperability information in this case.

(562) First, Microsoft argues that the market definition proposed by the Commission "*has the effect of excluding Sun from the product market, so whatever complaints Sun may have had about disclosures of information [...] have no relevance to the case*".[678] This is incorrect: Sun is present in the market for work group server operating systems (although its market share is very low). Sun's investment in PC NetLink shows Sun's interest in selling servers that deliver work group server functionality to Windows client PCs.[679] In any case, considering *inter alia* Sun's strong presence as a server vendor, even if it were absent from the work group server operating system market, *quod non*, it still would have an interest in entering that market. There is no reason why a refusal to supply an undertaking that has an interest in entering the market should be treated differently to a refusal to supply a company that is already present in the market. In *Magill¸* for instance, the company to which supply was refused was not competing in the market that was being monopolised − precisely because such supply had been refused.

(563) Second, Microsoft argues that it "*has consistently disclosed large amounts of interface information about its operating systems, a practice that continues with Windows 2000*" and that "*there is <u>therefore</u> no refusal to supply interface information in this case*".[680] This argument is incorrect. The fact that Microsoft discloses certain pieces of interface information does not mean that it does not refuse other pieces of interface information, or that it discloses enough interface information. As outlined above, most elements of the "*large amount of interface*

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[677]   See Section 4.1.2 above.
[678]   Microsoft's submission of 17 October 2003, on page 6.
[679]   For a description of Sun's investment in PC NetLink, see above at recitals (212) *et seq.*
[680]   Microsoft's submission of 17 November 2000, at paragraph 181 (emphasis added).

information" that Microsoft referred to are obsolete, or unrelated to the request at issue.[681]

(564)   Third, Microsoft argues that its refusal to provide Sun with the information that it has requested is not a refusal to supply interface information, because Sun's request was not directed at interface information.[682]   It has been established that it is factually incorrect to say that Microsoft does not refuse interface information to its competitors in the work group server operating system market.[683]   In this respect, it is also noteworthy that, in its application for initiation of proceedings by the Commission, Sun requested that "*the Commission order Microsoft to disclose and make available for use sufficient <u>interface information</u> to provide equality of attachment from the server environment to the Microsoft desktop (irrespective of whether the desktop is already part of a network which includes Microsoft server products)*".[684]   After having received a copy of Sun's complaint (and indeed after having received three statements of objections), Microsoft has persisted in its refusal.[685]

(565)   Fourth, to the extent that Microsoft's argument is that Sun's request was too broad because it was not limited to the interface information that was essential to market commercially viable work group server operating systems, this argument cannot be accepted either.   It is quite an unrealistic proposition to argue that Sun should have explained in detail what minimum level of disclosure of interoperability information relating to Active Directory and COM was sufficient for Microsoft to dispense with its obligations under Community competition law.   This would have been all the more difficult since the technologies at stake are complex, and were not fully known by Sun – this lack of information being precisely the reason underpinning Sun's request.

(566)   For the sake of clarity, since only the core work group server tasks of file, print and group and user administration are essential to compete in the work group server

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[681]   See Section 4.1.3 above.

[682]   For instance, Microsoft states that "*Sun's requests to Microsoft for information about features of Windows 2000 Server, including design details of the kind Sun seeks to obtain through this proceeding, were so broad that Microsoft could not accommodate them*" (Microsoft's submission dated 17 November 2000, at paragraph 131). An explicit reference is made to Mr. Green's letter and Mr. Maritz's response in footnote 176 appended to that paragraph. Microsoft further argues that Sun's "*demand was no more reasonable than a demand by Ford that DaimlerChrysler provide it with the blueprints for the newest engine created for use in Mercedes-Benz automobiles so Ford could copy that engine for use in its automobiles*" (Microsoft's submission of 17 October 2003, on page 50). This echoes another statement made by Microsoft in this proceeding that "*Sun's audacious demands far exceed the technologies it needs to ensure that Active Directory interoperates with Solaris*". Microsoft's submission of 16 November 2001, at paragraph 107.

[683]   See above, at recitals (199) *et seq.*

[684]   See Sun' submission of 10 December 1998, at paragraph 145 (Case IV/C-3/37.345 on page 4716) (emphasis added).

[685]   See above, at recitals (194) *et seq.*

operating systems, the only refusal at stake in this Decision is a refusal to provide a full specification of the protocols underlying the Windows domain architecture, which organises the way through which Windows work group servers deliver work group server services to Windows client PCs. The fact that Microsoft has also turned down Sun's request for information that would facilitate cross-platform portability of COM objects does not form part of the conduct treated in this Decision as a refusal to supply.

(567)   Finally, Microsoft's argument that "*the features about which Sun complains are on Windows 2000 Server, not Windows 2000 Professional*"[686] is worth mentioning. As such, its refusal to Sun would be unrelated to its client PC operating system dominance. However, "*the features about which Sun complains*" rely on code present in Microsoft's client PC operating system products.[687] Whilst it is true that Sun's request involves both client-to-server and server-to-server interoperability, in the present case the latter interconnections and interactions are functionally related to the client PC. This link back to the client PC operating system market implies that the competitive value of the information refused derives from Microsoft's market strength in the client PC operating system market. Insofar as Microsoft's refusal is considered abusive, the abuse derives from Microsoft's dominance on the client PC operating system market.

5.3.1.1.2   The refusal at issue is not a refusal to license source code

(568)   Microsoft interprets the letter by Mr. Green as "*a demand by Sun that Microsoft create a version of [...] Active Directory [...] that Sun could use on Solaris*".[688] Microsoft thus apparently argues that what Sun requested was a disclosure of source code written by Microsoft, and the right to copy or adapt that source code in order to integrate the copied or adapted code in its Solaris product.[689] This interpretation seems to derive from Mr. Green's statement that Sun believes that Microsoft should provide a "reference implementation" for some or all of the relevant technologies.

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[686]   Microsoft's submission of 17 November 2000, at paragraph 19.
[687]   See above, at recitals (177) *et seq*.
[688]   Microsoft's submission of 17 October 2003, on page 50.
[689]   At other places, Microsoft seems to suggest that it interprets Sun's request as a request to provide certain commercial products, for instance an "application" version of Active Directory that would run on Solaris. While other work group server operating system vendors such as Novell or Sun market a stand-alone version of their directory service product that runs on all the major competing work group server operating systems, Microsoft developed Active Directory for Windows only. Sun, however, did *not* refer to whether Microsoft should market cross-platform versions of Active Directory. To the extent that Microsoft's argument is based on the presence of the term "*reference implementation*" in Sun's letter, it must be borne in mind that, as outlined above, a reference implementation is only a complement and an illustration of a specification. The letter from Microsoft's Mr. Maritz that responds to Sun's request seems to be based on the same kind of misinterpretation, when Mr. Maritz mentions "COM for Solaris", which is a commercial product developed by Microsoft to run on Solaris. The focus of Sun's demand is on disclosure of *information*, not on Microsoft's commercial decisions to market specific products.

(569)   It bears reiteration, however, that the conduct that is relevant to this Decision is limited to Microsoft's refusal to supply a full specification of the protocols used by Windows work group servers to deliver work group server services to Windows work group networks, and to allow the use of that specification to build interoperable products.[690]

(570)   The distinction between interface specifications and implementation is important in this context.   As outlined above,[691] an interface specification describes *what* an implementation must achieve, not *how* it achieves it. In a report submitted by Sun, Professor Wirsing, a computer science professor, states that "*since it does not have to be executable [that is to say to run on a machine], a specification does not have to be concerned with details that are relevant to the implementation (e.g., memory allocation or details of most algorithms used in an actual realisation of the specification)*". Professor Wirsing illustrates this point by the following example. "*[It] is easy to specify when a sequence of numbers is ordered: every number in the sequence is smaller or equal to its successor in the sequence. It is a lot harder to describe an algorithm for sorting a sequence of numbers and to make sure that it is correct*".[692]

(571)   Not only is it therefore possible to provide interface specifications without giving access to all implementation details, but it has been outlined above that it is common practice in the industry to do so, in particular when open interoperability standards are set.[693] In this respect, it is also noteworthy that, under the US Communications Protocols Licensing Program, licensees are not granted access to Microsoft's *source code*, but to *specifications* of the relevant protocols.

(572)   In conclusion, Microsoft's refusal to supply as at issue in this Decision is a refusal to disclose specifications and allow their use for the development of compatible products. The present Decision does not contemplate ordering Microsoft to allow copying of Windows by third parties.

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[690]   This is consistent with Sun's complaint, which does not mention the need for a reference implementation, but only requires that Microsoft be ordered to submit "*interface information*". It is also consistent with the submission made by Sun on 10 November 1999 to describe "*the remedy which Sun believes is necessary to redress the anticompetitive conduct engaged in by Microsoft*", which explicitly refers to Microsoft supplying specifications.

[691]   See above, at recital (24).

[692]   See Martin Wirsing *et al.*, *Specification and Implementation of Interoperable Systems*, on page 1, in Sun's submission of 31 October 2003.

[693]   Various examples of this practice have been provided throughout the description of the relevant technologies,, for example, POSIX 1 (see above, at recital (42)), the Java technologies (see above, at recital (43)), X.500 (see above, at recital (55)), LDAP (*ibid.*), MIT Kerberos (see above, at recital (153)), NFS (see above, at recital (159)), CORBA (see above, at recital (165)).

5.3.1.1.3 Additional circumstances to consider

5.3.1.1.3.1 Microsoft's refusal to Sun is part of a general pattern of conduct

(573)   As outlined above, Microsoft has acknowledged that it does not intend to disclose the information requested by Sun to Sun or to any other work group server operating system vendor.[694]   Moreover, many competitors to Microsoft in the work group server operating system market have confirmed that they do not obtain sufficient interoperability information from Microsoft and feel that this puts them at a strong competitive disadvantage *vis-à-vis* Microsoft.[695]   Some of them (Novell, Samba) have argued that Microsoft refused to provide information that they had requested or failed to answer their requests.[696]

(574)   Some of Sun's competitors have received more of the relevant information than Sun has. This is for instance the case for SGI, Digital (now HP) and Compaq (now HP).[697]   But the licences granted to SGI and Digital only relate to Windows NT technology and not to Windows 2000 technology, whilst the licence granted to Compaq is, in Microsoft's own admission, of much more limited scope than the information requested by Sun,[698] and is aimed at providing a *"migration path"*[699] towards Windows.

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[694]   See above, at recital (194) *et seq.*
[695]   See for instance, and besides Sun, [Confidential], IBM (submission of 17 May 1999, Case IV/C-3/37.345, on pages 1945 to 1949), Novell (submission of 13 April 1999, Case IV/C-3/37.345, on pages 2235 to 2256). See also, for example, the submission by the Samba team provided by the Free Software Foundation at the Oral Hearing.
[696]   See, for example, Novell's submission of 19 February 2001 (answer to question 1): "*Certain features of Windows 2000 Pro, namely Intellimirror and EFS - Encrypted File system, require management by a directory. In Microsoft's case, it is Active Directory, which ships in Windows 2000 Server. Novell wants to be able to manage those features with NDS but can't unless we receive the APIs. We have asked for the APIs but they have simply said 'No'.*" See also, for example, the submission by the Samba team provided by the Free Software Foundation at the Oral Hearing.
[697]   See above, at recitals (218) *et seq.* and recitals (231) *et seq.*
[698]   For instance, Compaq is not authorised to adapt Tru64 UNIX so that it becomes a compatible domain controller in a Windows 2000 domain. See above, at recital (233). See also, for example, Microsoft's submission of 16 November 2001, at recital 105: "*The technologies that Sun requested and the technologies that Compaq received pursuant to the license are fundamentally different*".
[699]   See above, at recital (234).

(575) Microsoft's internal communications further illustrate that Microsoft's strategy ultimately applies *erga omnes*. Although Sun appears at times to be a designated target[700], the major part of Microsoft's internal communication speaks of UNIX generally, and draws parallels between UNIX and NetWare in terms of strategy choices for Microsoft:

> "[Do] we treat UNIX like NetWare or like Vines[701]? i.e., love it to death (invest a lot of money and kill it slowly) or ignore it (invest no money on the expectation it will die quickly).

> If we believe UNIX is more like NetWare, […] do we invest in coopting UNIX […] or do we invest in interoperating with DCE, the NetWare 4 of UNIX? If we decide to co-opt UNIX before DCE gets too strong of a foothold, what does that mean? I suggest it means NT security ([NTLM] today, MS Kerberos tomorrow), NT [Directory Service], and DCOM for communication, plus IIS and SMB file/print."[702]

(576) Microsoft's policy in licensing certain technologies necessary for interoperability with the Windows domain architecture is further evidence of Microsoft's strategy. At the Oral Hearing, Sun pointed to the following excerpts from testimony given to the US Courts by Mr. Dan Neault, who was Windows Source Licensing Program Manager in Microsoft in 1997:

> "[Question to Mr. Neault]: You, in fact, proposed the following; that AT&T would have to agree that it would not enter into any ASU license arrangement with certain specified Microsoft competitors, correct?

> [Answer]: Yes.

> Q: And those competitors included, among others, Sun Microsystems, Netscape, IBM, Apple, Oracle, Novell, correct?

> A: That's correct."[703]

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[700] See, for example, the transcript of a February 1997 speech by Bill Gates to Microsoft's sales force: "*What we are trying to do is use our server control to do new protocols and lock out Sun and Oracle specifically, while we work with PC manufacturers and [WISE] and others. Now, I don't know if we'll get to that or not, but that's what we're trying to do*", in Sun's submission of 14 October 1999, at Tab. 5, on page MSS 505490 (Case IV/C-3/37.345 on page 5823).

[701] Banyan Vines was one of the first network operating systems in the late 1980s.

[702] Microsoft internal e-mail of 18 April 1996 from Mark Ryland, to Jim Allchin, in Sun's submission of 14 October 1999 at Tab. 2. (Case IV/C-3/37.345 on page 5791)

[703] Excerpt from testimony by Windows Source Licensing Program Manager Dan Neault in AT&T v. Microsoft, presented by Sun at the Oral Hearing, at slide 6.

(577) In conclusion, Microsoft's refusal to supply Sun is part of a broader conduct of not disclosing interoperability information to work group server operating system vendors.

5.3.1.1.3.2 Microsoft's conduct involves a disruption of previous levels of supply

(578) It has been highlighted that the European Courts have given weight to circumstances where a refusal to supply constituted a disruption of previous levels of supply.

(579) In this case, many of the already limited disclosures that had been undertaken by Microsoft with respect to Windows NT have been discontinued with the development of Windows 2000.

(580) Because of Microsoft's licence of information to AT&T and the development of AS/U, it had been possible for Sun to adapt its work group server operating system products so that servers running them could be domain controllers in a Windows NT 4.0 domain.[704]

(581) Due to the lower level of disclosures for Windows 2000, many protocols that enable Windows 2000 domain controllers to provide enhanced group and user administration to the Windows 2000 domain are not available to Sun. The upshot of this is that a server running Solaris cannot act as a domain controller in a Windows 2000 domain, notwithstanding the fact that Solaris, as Windows 2000 Server or Windows 2003 Server, Standard Edition, includes a state of the art directory service.

(582) Microsoft explains that its products provide a certain degree of backward-compatibility, which means that new versions of its operating system products such as Windows 2000 continue to exhibit certain interfaces that were present in previous versions of its operating system products such as Windows NT 4.0. According to Microsoft, the previous disclosures would still be relevant, and there would therefore be no discontinuation of previous levels of supply.

(583) However, Windows NT 4.0 technology is already outdated technology. It is being replaced by the Windows 2000 technology, which is based on different protocols. Backward compatibility enables the migration to be smoother, but is not intended to offer a durable solution. The intended "end state" of a Windows 2000 domain is the "native-mode", where all Windows NT domain controllers have been upgraded to Windows 2000 and cannot be downgraded back to Windows NT.[705]

(584) In conclusion, by not disclosing the new interface specifications that organise the Windows 2000 domain while it previously disclosed part of the corresponding

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[704] See above, at recitals (212) *et seq.*
[705] See above, at recitals (170).

interface specifications for the Windows NT domain, Microsoft disrupts previous levels of supply.

5.3.1.2 Risk of elimination of competition

(585) In *Magill, Commercial Solvents* and *Télémarketing*, one of the constituent elements of the abuse finding was that the dominant undertakings' behaviour risked eliminating competition. In *Bronner*, the Court of Justice clarified that, for the judgment in *Magill* to be relied upon, it was necessary to show that supply is indispensable to carry on business in the market, which means that there is no realistic actual or potential substitute to it.

(586) In this case, Microsoft's behaviour as regards disclosures of interface information must be analysed against the backdrop of two key elements, which have been outlined above. First, Microsoft enjoys a position of extraordinary market strength on the client PC operating system market.[706] Second, interoperability with the client PC operating system is of significant competitive importance in the market for work group server operating systems.[707]

(587) A historic look at the work group server operating system market shows that Microsoft entered this market relatively recently.[708] UNIX vendors and Novell were the first developers with significant activity and success in this area. Customers had started to build work group networks that contained non-Microsoft work group servers[709] and Microsoft's competitors had a distinct technological lead.[710] The value that their products brought to the network also augmented the client PC operating systems' value in the customers' eyes and therefore Microsoft – as long as it did not have a credible work group server operating system alternative – had incentives to have its client PC operating system interoperate with non-Microsoft work group server operating systems. While entering the work group server operating system market, pledging support for already established technologies was important in gaining a foothold and the confidence of the customers.[711]

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[706] See above, at Section 5.2.1.

[707] See above, at recitals (383) *et seq*.

[708] Microsoft began working on the development of a server operating system in the early 1990s, but its first product that achieved a real success in the market place was Windows NT 4.0, released in 1996. See Microsoft's submission of 17 November 2000, at paragraphs 47and 50.

[709] Microsoft points out that "*a decade ago [Novell] claimed to have 85 percent of the server market*". See Microsoft's submission dated 17 October 2003, on page 64.

[710] NERA notes that Active Directory was "*added to Windows in 2000, long after Novell first offered its Novell Directory Services in 1993. Other major directory service offerings also have longer histories. (SunOne Directory Server, which is included as part of Solaris, is descended from Netscape's Directory Service, first offered in 1996.)*" See NERA *Survey Evidence in the Commission's investigation on Interoperability*, at paragraph 32, in Microsoft's submission of 31 October 2003.

[711] As outlined above, customers are inclined not to rely on technology that does not have an "*established record as proven technology*". See above, at recital (523).

(588) Once Microsoft's work group server operating system gained acceptance in the market, however, Microsoft's incentives changed and holding back access to information relating to interoperability with the Windows environment started to make sense. With Windows 2000, Microsoft then engaged in a strategy of diminishing previous levels of supply of interoperability information. This disruption of previous levels of supply concerns elements that pertain to the core tasks that are expected from work group server operating systems, and in particular to the provision of group and user administration services.

(589) In the following recitals (recitals (590) to (692)), it will be established that Microsoft's refusal puts Microsoft's competitors at a strong competitive disadvantage in the work group server operating system market, to an extent where there is a risk of elimination of competition.[712]

5.3.1.2.1 Market evolution

5.3.1.2.1.1 Market shares

(590) Microsoft's work group server operating system products have enjoyed a rapid rise to dominance in the market. Its position is reinforced by the nature of the barriers to entry that have been highlighted, as well as the associative links between the work group server operating system market and the client PC operating system market.[713] Microsoft's share of the market has grown since it entered the market, and continues to grow to such an extent that its main competitor in the market, Novell, has gone from a leading position to being a relatively minor player in the space of just a few years (and this in a market where companies make changes to their work group server networks once every few years, and even then only incrementally).

(591) By 1996, the share of Windows among servers costing under USD 100,000[714] was 22.5% when measured by unit shipments (15.6% by revenues). By 2002, this figure had grown to 63.0% (48.9% by revenues).[715] For servers costing under USD 25,000, the equivalent figures were a growth from 25.4% in 1996 (24.5% by revenues) to 64.9% in 2002 (61.0% by revenues).[716]

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[712] The present Decision does not purport to establish that competition is *already* eliminated in the market for work group server operating systems, or that it would be impossible to achieve even some partial interoperability with Windows client PC and work group server operating system (some partial interoperability *is* possible, not least due to previous disclosures made by Microsoft and due to the fact that Microsoft's products are backward-compatible). However, it will be demonstrated that the degree of interoperability that can be achieved on the basis of Microsoft's disclosures is insufficient to enable competitors to viably stay in the market.

[713] See above, at recitals (526) *et seq*.

[714] At the time of the issuing of the first two Statements of Objections (2000 and 2001), the Commission considered USD 100,000 to be the relevant price band proxy by which to measure market shares for work group server operating systems. See footnote 599.

[715] Source: IDC Worldwide Quarterly Server Tracker.

[716] Source: IDC Worldwide Quarterly Server Tracker.

(592)   Microsoft's market share has experienced a strong growth following the launch of Microsoft's Windows 2000 generation of products, for which Microsoft had disclosed less interoperability information than for previous generations.   The workload-based figures by IDC show a quick growth following the launch of Windows 2000, at the expense of competitors' offerings, which cannot achieve the same degree of interoperability as they could do with Windows NT 4.0.   For instance, when considering the "*file/print sharing*" workload, the unit shipment-based share of Windows calculated on the basis of IDC figures for servers below USD 25,000 has grown from 55.6% in 2000 to 66.4% in 2002 (from 54.7% to 65.7% when measured by revenues over the same period).[717]

(593)   Microsoft's continued growth in the market is mirrored by the decline of its most natural rival, Novell.   Based on IDC's "*file/print sharing*" workload figures for servers costing under USD 25,000, NetWare's market share measured in unit shipments fell from 33.3% in 2000 to 23.6% in 2002 (from 31.5% to 22.4% when measured by revenues over the same period).[718]

(594)   The Commission's 2003 market enquiry also shows a clear trend of replacement of NetWare by Windows.   A significant number of entities within the sample (29 out of the 101 that answered the relevant question) have recently migrated from a non-Windows operating system to Windows 2000 to perform work group server tasks such as file and print.   Out of these 29 entities, 22 provided information on what operating system they previously ran, and of those, 16 (72.7%) ran NetWare.   Moreover, no firm in the survey has plans to migrate from Windows to NetWare.   These figures, demonstrating NetWare's rapid decline, are consistent with the IDC data.

(595)   This trend was already present in the 46 Microsoft customer statements.[719] 4 organisations had migrated or were migrating from NetWare to Windows 2000 Server.[720]

(596)   NetWare's decline is observed both by industry analysts ("*Novell [continued] a downward trend that has been consistent since 1999*"),[721] and by Microsoft itself

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717   Source: Microsoft - IDC Server Workloads 2003 Model.
718   Source: Microsoft - IDC Server Workloads 2003 Model.
719   There is a bias in the selection of the sample, which is that the organisations in question are Microsoft customers, and, as such, may be more likely to use Windows than companies selected at random. Only 9 out of the 46 entities which provided statements were using NetWare at all (19.1%). At least one of those companies [Confidential]) was also using a significant (and larger) number of Windows servers for the same tasks.
720   See statements by [Confidential], [Confidential], [Confidential] and [Confidential].
721   IDC, *Worldwide Client and Server Operating Environments Forecast and Analysis, 2002-2006* (IDC #27969)

("*Novell's been bleeding for years*").[722] In the same vein, based on its Survey III, Mercer acknowledges that "*when asked about their usage of each of the server operating systems for workgroup server functions over the last five years, organizations that have reduced their usage of NetWare outnumber those that have increased their usage of NetWare by a nearly 7:1 ratio*".[723]

(597) Moreover, new entrants in the market have been unsuccessful. In spite of its efforts to achieve interoperability with Windows by developing *inter alia* PC NetLink,[724] Sun, as the other UNIX vendors, has a marginal presence in the market.[725]

(598) Microsoft mentions the "*extraordinarily rapid growth*"[726] of Linux in the server realm as indicative of the fact that it is facing significant competition. However, a close examination of the IDC figures, the results of the Commission's 2003 market enquiry, and the 46 Microsoft customer statements show that Linux has not experienced a rapid growth *in the work group server operating system market.* These sources of information demonstrate that Linux is generally used for tasks that are outside the relevant market retained by the Commission, such as Web serving, firewall serving, and for mission critical applications. In contrast, Linux (in combination with Samba[727]) has a very limited presence in the work group server operating system market.

(599) IDC calculates that for the file and print task for servers costing under USD 25,000, Linux's market share measured by shipments *fell* from 5.1% in 2000 to 4.8% in 2002, and was level at 3.9% in both these years when measured by revenues.[728] The Commission's 2003 market enquiry also found that Linux had a very limited presence in customers' installed base of work group servers – as outlined above at recital (506), out of a total of more than 1,200,000 PCs, less than 70,000 (less than 5.8%) were served by Linux/Samba servers for file and print tasks.

(600) The Commission's 2003 market enquiry also confirms that those entities that do use Linux do so overwhelmingly for non-work group server operating system tasks. Among the tasks for which the Commission's requests for information asked the

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[722] Microsoft's then head of its Server Platform Division, Paul Flessner, June 4, 2003 at http://crn.channelsupersearch.com/news/crn/42398.asp, printed on 18 November 2003.
[723] Mercer Report 2003 attached to Microsoft's submission of 17 October 2003, on page 25.
[724] See above, at recitals (212) *et seq.*
[725] See above, at recitals (508) *et seq.*
[726] See for example Microsoft's response to the Commission's second Statement of Objections, NERA Submission, Appendix D, at paragraph 68.
[727] For details of Samba, see above, at recitals (293) *et seq.*
[728] Source: Microsoft - IDC Server Workloads 2003 Model . These figures also show that over the same period, Linux's market share in the "*networking*" task has increased (from 10.1% in 2000 to 13.4% in 2002 measured by units, and from 8.0% in 2000 to 10.8% in 2002 measured by revenues). However, as outlined at recital (486) above, this definition also includes non-work group server operating system tasks.

respondents to identify the repartition of the server workload according to the operating system used,[729] the only ones where Linux had significant workload shares in several entities were: "firewall",[730] "Internet-facing Web servers"[731], "intranet facing Web servers"[732] and, to a much lesser extent, "support for non-mission-critical applications" and "support for mission-critical applications".[733]

(601) Similarly, the main tasks specified by the respondents for which Linux is used[734] are related to the Web and/or located at the edge of the intranet[735], or to application serving and database hosting (including backup for critical systems), in particular in relation to mission-critical applications.[736] Some answers to the survey hint at a use of Linux for research and development activities.[737]

(602) This picture is echoed by an examination of the Microsoft customer statements, where Linux is mainly used to run (Apache) Web servers[738], as gateways[739], as a

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[729] Question 5 of the questionnaire attached to the Commission's Article 11 letters sent on 16 April 2003.

[730] See, for example, responses by Entity I46-6 (from Entity I46, response dated 12 May 2003), Entity I15 (dated 28 April 2003), Entity I49 (dated 16 May 2003), Entity I71 (dated 8 May 2003), Entity I54 (dated 24 April 2003), Entity I4 (dated 12 May 2003), Entity I22-1 (from Entity I22, response dated 27 May 2003), Entity I36 (dated 12 May 2003), Entity I77 (dated 14 May 2003), Entity I25 (dated 22 May 2003), Entity I62 (dated 14 May 2003), Entity I9-7, Entity I9-4 (both from Entity I9, dated 18 May 2003).

[731] See, for example, responses by Entity I46-1 (from Entity I46, response dated 12 May 2003), Entity I66 (dated 7 May 2003), Entity I54 (dated 24 April 2003), Entity I22-1 (from Entity I22, response dated 27 May 2003), Entity I72 (dated 5 May 2003), Entity I36 (dated 12 May 2003), Entity I77 (dated 14 May 2003), Entity I01 (response dated 6 June 2003), Entity I33 (dated 6 May 2003), Entity I62 (dated 14 May 2003), Entity I23 (dated 28 April 2003), Entity I63 (dated 4 June 2003), Entity I45 (dated 7 May 2003).

[732] See, for example, responses by Entity I66 (dated 7 May 2003), Entity I21 (dated 12 June 2003), Entity I22-3 (from Entity I22, response dated 27 May 2003), Entity I01 (response dated 6 June 2003), Entity I51 (response dated 19 May 2003), Entity I62 (dated 14 May 2003), Entity I63 (dated 4 June 2003), Entity I45 (dated 7 May 2003), Entity I40 (dated 14 May 2003), Entity I48 (response dated 7 May 2003).

[733] See, for example, responses by Entity I15 (dated 28 April 2003), Entity I66 (dated 7 May 2003), Entity I22-1 (from Entity I22, response dated 27 May 2003), Entity I72 (dated 5 May 2003), Entity I36 (dated 12 May 2003).

[734] See responses to Question 6 of the questionnaire attached to the Commission's Article 11 letters sent on 16 April 2003.

[735] See, for example, responses by Entity I11 (dated 22 April 2003), Entity I18 (dated 7 May 2003), Entity I66 (dated 7 May 2003), Entity I34 (dated 7 May 2003), Entity I36 (dated 12 May 2003), Entity I5 (dated 15 May 2003), Entity I23 (dated 28 April 2003), Entity I42 (dated 8 May 2003), Entity I62 (dated 14 May 2003), Entity I70 (dated 9 May 2003), Entity I45 (dated 7 May 2003), Entity I67 (dated 14 May 2003), Entity I9-7 (dated 12 May 2003), Entity I57 (dated 15 May 2003), Entity I13 (dated 14 May 2003), Entity I52 (dated 9 May 2003).

[736] See, for example, responses by Entity I11 (dated 22 April 2003), Entity I08 (dated 13 May 2003), Entity I21 (dated 12 June 2003), Entity I22-1 (from Entity I22, response dated 27 May 2003), Entity I34 (dated 7 May 2003), Entity I36 (dated 12 May 2003), Entity I17 (dated 12 May 2003), Entity I13 (dated 14 May 2003).

[737] See, for example, responses by Entity I03 (dated 12 May 2003), Entity I34 (dated 7 May 2003), Entity I13 (dated 14 May 2003).

[738] See statements by the [Confidential], [Confidential], Entity 19 in Annex K to Microsoft's submission dated 16 November 2001, [Confidential].

[739] See statement by [Confidential].

short-term platform for messaging[740], to support tailor-made applications[741], to develop and test software[742] and to support mission-critical applications[743].

(603)   It can therefore be seen that Linux has a very limited presence in the work group server operating system market, and has not experienced any growth in that market in recent years. As such, it does not represent a significant threat to Microsoft in this market. This was the situation in 2000-2001, when Microsoft submitted its customer statements to the Commission, and is the situation now, as demonstrated by the market figures and the results of the Commission's 2003 market enquiry.   In this regard, it is interesting to note that research sponsored by Microsoft recognises that "*Linux servers are usually one or two processors systems that perform relatively simple tasks on the edge of networks.*"[744]

(604)   Microsoft nevertheless mentions two other sources of information to buttress its argument that Linux operating systems are gaining traction not only in the server industry in general, but also in the work group server operating system market.

(605)   First, Microsoft relies on the responses by IT executives surveyed by Mercer.[745] In its Survey III, Mercer asked IT executives whether their organisation had Linux work group servers and, if so, whether they expected their use of Linux to increase in the next five years. 53 of the 70 entities concerned (out of a sample of 296 entities) said that this was the case. However, Mercer did not ask these IT executives to quantify this increase, or to say whether this would be at the expense of Windows.

(606)   Similarly, Mercer did not ask the 226 remaining executives whether they had taken a decision to adopt Linux for the provision of core work group server services, but only about their expectation about their future use of Linux. More specifically, Mercer asked these respondents whether they expected Linux to become *viable* for work group server tasks in the next five years. 168 answered positively, which *a contrario* suggests that 58 of them (20% of the sample) do not even expect Linux to become viable for these tasks in the foreseeable future. Whilst Mercer makes much of the fact that a 60% to 40% majority of respondents said that they intend to add Linux work group servers to their infrastructure in the future, it must be highlighted that Mercer did not ask respondents to quantify this increase or to say whether this would be at the expense of Windows.

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[740]   See statement by [Confidential].
[741]   See statements by the [Confidential] and [Confidential].
[742]   See statement by [Confidential].
[743]   See statement by [Confidential].
[744]   *Windows 2000 versus Linux in Enterprise Computing, an IDC White Paper sponsored by Microsoft*, printed from http://www.microsoft.com/windows2000/migrate/unix/tco.asp on 20 July 2003, on page 6.
[745]   Questions 16 to 19 in Mercer's Survey III.

(607)   In fact, the only data mentioned by Microsoft that relate to the actual expected use of Linux as a work group server operating system in the future relates to projections made by IDC under its Server Workloads model, for the period 2003-2007. Microsoft (NERA) explains that "*by 2007 sales of Linux servers used for [...] 'workgroup' functions will have increased substantially, reaching over 15 percent of the total.*"

(608)   In this regard, it should first be mentioned that the IDC "*file/print sharing*" and "*networking*" workloads are only imperfect proxies to determine market shares in the work group server operating system market.[746]

(609)   This notwithstanding, looking at the file and print workload for servers below USD 25,000, it is clear that IDC does *not* expect Linux to grow at the expense of Windows, but rather at the expense of NetWare.[747] In addition, it is striking that IDC forecasts the gap in terms of market share between Microsoft and its competitors to widen. In 2000, Windows represented 1.74 times more shipments than NetWare in the entry-level category, when focussing only on the "*file/print sharing*" workload. In 2003, this ratio is forecast to be 3.7 to 1. In 2007, IDC expects that the Linux operating systems together will break even with NetWare in terms of shipments, and that the ratio between Windows shipments and Linux or NetWare shipments will be over 6.5 to 1.

(610)   Microsoft has been arguing throughout this procedure that Linux is growing rapidly in the work group server operating system market and therefore represents a significant competitive constraint.[748] The very fact that over this timeframe, Linux has not shown any growth and remains a very marginal presence casts significant doubt on Microsoft's repeated assertions concerning Linux. As such, there is no reason to alter the Commission's conclusion that there is a risk of elimination of competition on the work group server operating system market.

(611)   Microsoft's success in the market is also reflected in its own financial results. Microsoft's annual report for the fiscal year ended 30 June 2003 shows that Microsoft's Server and Tools category revenue grew 16% to USD 7,140 million and its profits grew 20% to USD 2,457 million over the 2002 fiscal year. This represents a profit margin of 49.1%.[749] A significant portion of these sales comes from the

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[746]   See above at recital (487) and (488).
[747]   As outlined above, Novell has announced in April 2003 that it will provide its work group server services on top of the Linux kernel in the near future. See above, at recital (95).
[748]   See, for example, Microsoft's submission of 17 November 2000, at paragraph 16 and NERA Report in that submission, at paragraph 27.
[749]   Microsoft Form 10-K, filed 5 September 2003, printed on 18 November 2003 from http://www.sec.gov/Archives/edgar/data/789019/000119312503045632/d10k.htm.

standard version of its Windows server operating system product, that is to say, the work group server operating system product.

(612)   Moreover, Microsoft's success in the market and expectations of future success in the market are reflected in the statements of its senior executives, not least its Chief Financial Officer, John Connors. On 15 April 2003 Mr. Connors was quoted as saying: "*Our server products have been gaining momentum despite the tough business environment [...]. These are key assets in driving the company growth for the 2004 fiscal year and beyond*".[750] In December 2002, Connors stated with respect to server platform sales: "*We are now at a point where we think we have a pretty good darn position, and a very good sales proposition going forward*".[751]

5.3.1.2.1.2 Uptake of Windows 2000 technologies

(613)   Besides the evolution of Microsoft's market share, the Commission has considered the uptake of the new features of the Windows domain that were introduced with Windows 2000, and in particular of Active Directory. Indeed, this uptake reflects the increasing use of Microsoft's newest versions of its work group server operating system product. Furthermore, due to Microsoft's disruption of interoperability-related disclosures, interoperability with these Windows 2000 features is significantly more difficult for non-Microsoft work group servers than used to be the case with the analogous technologies in Windows NT.[752] This means that the uptake of these features contributes to the lock-in of the customers that embrace them in a homogeneous Windows solution for work group networks.

(614)   IDC stated as early as in 2001 that "*[f]or the vast majority of users, the question is not if, but when, they will implement directory services to support Windows 2000 Server and future Windows server operating systems. Further, for Windows 2000 users, the directory of choice is overwhelmingly going to be Active Directory*".[753]

(615)   The Burton Group's *Directory Landscape 2003* report discusses the initial delay in the adoption of Active Directory and concludes that its impact has not fully unfolded

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[750]   http://www.nwfusion.com/news/2003/0415microearn.html, printed on 18 November 2003.
[751]   http://www.microsoft.com/msft/speech/Connors12_4CSFB.htm, printed on 2 May 2003.
[752]   As outlined above, the "backward compatibility" provided in Windows 2000 domains running in "mixed mode" is insufficient in this respect, since Microsoft has mapped a natural migration path to "native mode". See above, at recitals (168) *et seq.*
[753]   See IDC Bulletin # 26000, *Active Directory Goes Hand in Hand with Windows 2000 Server*, November 2001 (emphasis added). Also in 2001 (December), Giga Information Group summarised the results of a survey that it had conducted two months before on 1,000 IT Professionals in the following terms: "*Giga believes that 2002, particularly the second half of the year, will be a watershed in Active Directory deployment cycles. In fact, an acceleration of Active Directory planning, testing and deployments is already underway. Interest in third-party Active Directory domain migration, client-enabled directory management and policy-based enterprise management tools is similarly waxing.*" See Giga Information Group, *Active Directory Adoption Rate Will Ramp Up During 2002*.

yet: *"While it continues to have an air of inevitability, Active Directory hasn't yet lived up to its potential"*.[754]

(616) In its June 2002 *Enterprise Development Management Issues*, Evans Data Corporation ("Evans") tracks the usage of directory services by in-house developers. When asked what directory services their applications target most, a majority (50.3%) of enterprise development managers and development makers surveyed by Evans mention Active Directory. The second directory mentioned is OpenLDAP, an open source LDAP-compliant directory service, mentioned by 10.4% of the respondents. Novell's eDirectory comes third (mentioned by 5.9% of the respondents).[755]

(617) The results of the Commission's 2003 market enquiry are in line with the conclusions of these various market studies. 61 of the 102 entities had already moved or decided to move the majority of the Windows domains of their organisation to Active Directory.[756] Out of the 41 entities that had decided not to do so, 21 (20%) intended to go on relying on alternative products – mostly Novell's eDirectory – and 9 (8%) were postponing the migration for the time being but confirmed that they believed it would be unavoidable in the longer run. The remaining entities either had too limited a number of Active Directory enabled PCs to undertake the migration or were not interested in the type of services provided by Active Directory (most of them were still using the NT technology).[757] Out of the 61 that implemented Active Directory, 56 (92%) implemented Kerberos authentication, group nesting, IntelliMirror desktop management, delegated administration or universal groups.[758]

(618) The responses to Mercer's Survey II also confirm the impressive uptake of Active Directory. Question 17 of the survey asked respondents to indicate *"the major directory service or services that [their organisation] has implemented or decided to implement"*. Of all the directory services put forward by Mercer in terms of adoption, Active Directory stands out: 111 out of the 223 respondents said that their organisation implement Active Directory.[759] Altogether the respondents recognising "Microsoft NT Domain Service" or "Active Directory" as a "major directory

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[754] See The Burton Group, *Directory Landscape 2003*, on page 18.

[755] See Evans Data Corporation, *Enterprise Development Management Issues*, Volume 1, 2002, on page 174.

[756] See responses to Question 15 of the questionnaire attached to the Commission's Article 11 letters sent on 16 April 2003.

[757] See responses to Question 17 of the questionnaire attached to the Commission's Article 11 letters sent on 16 April 2003.

[758] See responses to Question 15 of the questionnaire attached to the Commission's Article 11 letters sent on 16 April 2003.

[759] The corresponding figure becomes 60% if one excludes the entities that do not use any general-purpose directory service.

service" of their organisation represent 70% of the sample.[760]   By contrast, the second most popular solution is NDS/eDirectory, which altogether accounts for 22% of the entities of the sample.[761]

(619)   Despite the market share evolution in the market for work group server operating systems and the uptake of Windows 2000 technologies, Microsoft contends that there is no risk of elimination of competition in this case.   It bases this assertion on statements by its competitors, on the fact that computer networks are heterogeneous, and on the allegedly widespread usage of alternatives to Windows. These arguments will be addressed in the following recitals.

5.3.1.2.1.3 Statements by Microsoft's competitors

(620)   Microsoft argues that the overall financial health of the companies that compete with it in the work group server operating system market, and in particular of Sun,[762] contradicts the Commission's analysis that such companies are being foreclosed from the market.[763]

(621)   In this respect, it must first be stated that the overall financial health of Microsoft's competitors, in particular Sun, is only remotely connected to the competitive situation in the market for work group server operating systems, as the activities of these companies in that market account only for a limited proportion of their overall revenues.

(622)   In any case, as regards the impact on competition, the relevant criterion for establishing a refusal to supply is whether there is a *risk* of elimination of competition. Immediate elimination of competition is not required. This approach is all the more appropriate in a market that exhibits strong network effects and where therefore elimination of competition would be difficult to reverse.

(623)   Microsoft points to public statements by Sun and other work group server operating system vendors which would use the interoperability achieved with Microsoft's products as a marketing argument.[764]

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[760]   The corresponding figure becomes 84% if one excludes the entities that do not use any general-purpose directory service.

[761]   The same respondent may indicate that both Active Directory and eDirectory are used as "major directory services" in his organisation, since Mercer's respondents were answering questions for the whole organisation that they belonged to, including, for example, subsidiaries.

[762]   In fact, as was highlighted in paragraph (2), Sun made a loss of USD 2,378 million in US fiscal year July 2002-June 2003.

[763]   See for example NERA Report attached to Microsoft's submission of 17 November 2000, at paragraphs 124-131.

[764]   See, for example, Microsoft's submission dated 17 November 2000, at paragraph 98 (quoting commercial material by Sun).

(624)   Such statements by their very existence are evidence of the commercial importance for work group server operating system vendors to be able to tell their customers that integration of their products with the Windows environment is smooth. They must nevertheless be read in their promotional context. It would be unlikely that competitors draw the customers' attention to interoperability-related shortcomings of the products advertised.

(625)   The language and the message become less optimistic when competitors report to the US Securities and Exchange Commission (where they can be sanctioned for misrepresenting their business situation). For instance, Novell stated in its filing before the US Securities and Exchange Commission for fiscal year 2001 the following:

> "One pervasive factor facing all companies doing business in our industry is the presence and dominance of Microsoft. […] We are concerned […] that Microsoft may continue to engage in business practices that unfairly inhibit the growth of its competitors, including Novell. In the past, Microsoft has employed tactics that limit or block effective and efficient interoperability between its products and Novell's. We will ensure, to the best of our ability, that our products will interoperate with those of Microsoft as they enhance new operating systems and applications."[765]

5.3.1.2.1.4 Heterogeneity of computer networks

(626)   Basing itself on its customer statements as well as on Mercer's Survey I, Microsoft emphasises that the IT networks of typical organisations are "heterogeneous", that is to say, products of different server operating system vendors are used. This heterogeneity would disprove the Commission's theory that Microsoft's conduct risks eliminating competition. Microsoft also draws attention to a number of "interoperability solutions" and how to manage interoperability in heterogeneous environments.

(627)   Microsoft's conclusion, according to which showing that IT environments are heterogeneous would be sufficient to disprove the Commission's line of reasoning, is

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[765]   Novell's SEC Form 10-K filing for the fiscal year ended 31 October 2002, dated 28 January 2003, printed from http://www.novell.com/company/ir/filings/2002/10K.pdf. Similarly, in its SEC filings for the fiscal year ended 31 October 2002, Novell stated: "*One pervasive factor underlying all of the Company's business endeavours is the presence of Microsoft in all sectors of the software business, and Microsoft's dominance in many of those sectors. [...] The Company believes that Microsoft is exploiting its desktop operating system monopoly in a way that is designed to extend its market power into the market for server operating systems. Microsoft in the past has also employed tactics that limit or block effective and efficient interoperability with Novell's products. [...] As Microsoft creates new operating systems and applications, there can be no assurance that Novell will be able to ensure that its products will be compatible with those of Microsoft*." See Novell's SEC Form 10-K filing for the fiscal year ended 31 October, 2001 (page 9), dated 28 January 2002, printed from http://www.novell.com/company/ir/filings/2001/10K.PDF.

a direct consequence of Microsoft's inadequate premise that there is *one* single server operating system market.

(628) As regards the Microsoft customer statements, a careful reading of the description of their computing environments provides strong arguments in favour of the Commission's definition of a relevant market for work group server operating systems. The "heterogeneity" of the customers' computing environments in fact reflects the heterogeneity of the "server industry" in general. The work group "tier" of the network is homogeneous and dominated by Windows.[766]

(629) Mercer draws from its surveys the conclusion that "*most organisations use multiple server operating systems*"[767] and views this as being in contradiction with the Commission's analysis.[768] However, a hypothetical organisation that had only Windows client PCs and work group servers, ran certain mission-critical applications on UNIX, had an IBM mainframe running a legacy application and several Linux-based firewall or Web servers, would indicate the use of "*multiple server operating systems*". In the same vein, Mercer points out that most respondents to its Survey II and Survey III reported that their organisation used more than one operating system to perform work group server tasks.[769] But a hypothetical organisation that had 90% of its work group server services provided by Windows servers, 5% of the work group services provided by Linux servers and 5% of these services provided by NetWare servers would be using more than one operating system for work group server tasks.

5.3.1.2.1.5 Uptake of alternatives to Windows

(630) Microsoft further argues that "*a number of enterprise customers responding to the Commission's recent Article 11 requests stated that they are in the process of migrating away from Windows server operating systems to […] alternative solutions, particularly NetWare, SAMBA running on Linux and network attached storage devices*".[770]

(631) It is true that *some* of the organisations that responded to the Commission's 2003 market enquiry use non-Microsoft solutions for work group server operating systems. This, however, is simply an indication that Microsoft's competitors may not yet have

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[766] Following an Article 11 request sent in February 2002, the Commission obtained further information on the work group server products used by such customers. Out of 28 customers that provided an answer to that question, 19 used exclusively Windows servers for File & Print. The corresponding figures for groupware were: 23 out of 27. 21 of the 46 customers were migrating to Active Directory.
[767] Mercer Report 2003, on page 30, in Microsoft's submission of 31 October 2003.
[768] This is all the more surprising given that, as outlined above, Mercer's own data in fact point to a market reality where Windows commands a dominant share of the installed base for *work group server operating systems*. See above, at recitals (497)-(498).
[769] Mercer Report 2003, on page 31, in Microsoft's submission of 31 October 2003.
[770] Microsoft's submission of 17 October 2003, on pages 47-48.

been eliminated from the market.[771] However, the relevant question is not whether all competitors have already been eliminated but whether there is a risk of elimination of competition. It is therefore more appropriate to look not only at whether there are customers that rely on alternatives to Windows, but also to quantify this use and its evolution.

(632)   As regards NetWare and Samba/Linux, the relevant evolution has been described above.[772] It is worth recalling that, out of more than 100 responses, Microsoft was only able to refer to one instance of migration from Windows to NetWare[773] and two instances of migration from Windows to Linux for work group server tasks[774].

(633)   As regards network attached storage (NAS), the migrations that Microsoft refers to are limited.[775] More fundamentally, however, operating systems used on NAS are outside the market definition.

(634)   More specifically, a NAS is defined by IDC as an external disk storage system that attaches to a LAN, communicates at file level, and contains an internal operating system optimised for file serving.[776] A NAS device is therefore an appliance that is used to optimise file storage, because if files are stored on normal work group servers, it may be costly (in terms of runtime lost) to expand the storage capacity on a given work group server or by purchasing a server dedicated to storage.[777] A NAS device does not, therefore, provide group and user administration. In addition, as indicated by their name, NAS devices are attached to networks but do not provide services directly to the client PCs. Rather they provide services to work group servers, and *via* these work group servers to client PCs.

(635)   Both these elements are confirmed by Microsoft's own product literature which shows that its NAS offering cannot fulfil any other task than file serving and that it price discriminates its NAS offering compared to its other server operating systems. According to Microsoft: *"Windows Storage Server 2003 is a network attached storage (NAS) operating system, built upon the Windows Server 2003 operating system. Windows Storage Server 2003 lets original equipment manufacturers*

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[771]   The mere existence of *one* customer that chooses not to use Microsoft's product would in any case not disprove a finding that all effective competition has been eliminated.

[772]   See above at recitals (593) *et seq.*

[773]   Entity I22-10 indicates that it will migrate 5 servers away from Windows to Novell's NetWare for file and print in 2004.

[774]   These are entities I 09-07 and I46-23. It is worth noting that a large majority of the Linux servers used by entity I09-07, that is 25 out of 28, are used for non work group server tasks, and that 100% of the print and group and user administration services are performed on Windows work group server operating systems. Entity I46-23 will acquire 3 Samba Linux servers.

[775]   Microsoft mentions four entities (I04, I08, I21 and I44) using NAS out of a sample of 102 entities, that is less than 4% of the respondents.

[776]   See *Worldwide Disk Storage Systems Forecast and Analysis*, 2002-2006, IDC, 2002.

[777]   See *ZDNet UK - Reviews - Network attached storage*, Manek Dusbash, 7 May 2003.

(OEMs) build appliances optimized for file serving, since applications unnecessary to the file serving and storage tasks are not activated. Storage Server NAS devices are headless (without monitor, keyboard or mouse) and can be managed through a Web-based user interface".[778] In addition, Microsoft adds that "*like Windows 2003, Web Edition (but unlike other Windows 2003 products), Windows Storage Server is available only when purchased with new NAS devices from [OEMs]*" and that "*unlike most Windows 2003 products, Windows Storage Server doesn't require you to purchase Client Access Licenses (CALs)*".[779]

(636)   In conclusion, Microsoft's various arguments to the effect that the market evolution described by the Commission does not point to a risk of elimination of competition in the relevant market for work group server operating systems must be rejected.

5.3.1.2.2 Interoperability is the key factor driving the uptake of Microsoft's work group server operating systems

(637)   Various sources of evidentiary material such as Microsoft's own marketing documents, reports by industry analysts and customer evidence show that interoperability with the Windows environment has played a key role in driving the uptake of Microsoft's work group server operating systems.

5.3.1.2.2.1 Microsoft's commercial behaviour

(638)   In its commercial behaviour, Microsoft has consistently used the integration with Windows client PCs as a key marketing argument for selling its work group server operating system product.[780]

(639)   For instance, Microsoft's *Product Guide for Windows 2000* presented the Windows 2000 Server and Windows 2000 Professional in the following terms:

"Individually, the Windows 2000 Server and Professional operating systems offer significant benefits. When used together, they create a platform that lets you take full advantage of all the innovations in Windows 2000."[781]

(640)   In the same vein, Sun pointed at the Oral Hearing to Microsoft's marketing documentation comparing Windows 2000 Server with Sun's PC Netlink / Solaris

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[778]   See *Microsoft Windows Server 2003 and Microsoft Windows Storage Server 2003: Meeting the Storage Challenges of Today's Businesses*, Microsoft Corporation, Published: July 20030

[779]   See *What You Need to Know About Windows Storage Server 2003*, Paul Thurrot, Windows & .NET Magazine, December 2003.

[780]   This is consistent with the fact that Microsoft's competitors feel the need to argue that the interoperability that their products achieve with the Windows Environment is good enough.

[781]   See Windows 2000 Home Page, *Windows 2000 Product Guide*, printed from http://web.archive.org/web/20000816032454/microsoft.com/windows2000/guide.

offering.[782] Due to Microsoft's decision to cease its disclosures to AT&T, the degree of interoperability that PC Netlink can achieve with the newest features of the Windows domain architecture is lower than the degree of interoperability that Windows work group server operating systems achieve with these new features.[783] Microsoft uses precisely these interoperability limitations of PC Netlink / Solaris as a marketing argument to discourage customers from purchasing Sun's work group server operating system products.[784]

(641)   Similarly, a study conducted by Andersen Consulting in 1999 echoes Microsoft's statement concerning the additional value that Windows 2000 Professional provides when it is used with Windows 2000 Server:

> "Many of the benefits of migration to Windows 2000 Professional relate to the way in which the client works with the server. These benefits will not be seen if the organization is not planning to migrate to Windows 2000 Server as well as to Windows 2000 Professional."[785]

5.3.1.2.2.2 Customer evidence

5.3.1.2.2.2.1 Role of interoperability-related considerations

(642)   In its 2003 market enquiry, the Commission asked customers about the role of interoperability with the Windows environment in their purchasing decisions concerning work group server operating systems.

(643)   Before turning to the responses, it must be highlighted that interoperability influences other factors examined by organisations when deciding on which work group server and work group server operating system to purchase.[786] As a consequence, purchasing decisions that will ultimately derive from lack of disclosure

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[782]   Sun's presentation at the Oral Hearing, at slide 40.
[783]   See above, at recitals (211) to (217).
[784]   See Microsoft, *Solaris PC Netlink (formerly Project Cascade)*, printed from http://www.microsoft.com/ntserver/ProductInfo/Comparisons/Solaris/PCNetlink.asp on 14 January 2004.
[785]   Arthur Andersen Business Consulting, 25 August 1999, *Microsoft Windows 2000 Professional: ROI Impacts for Corporate Customers*, printed on 27 January 2003 from Microsoft's Web site, http://www.microsoft.com/windows2000/professional/evaluation/news/roi.asp, emphasis added.
[786]   For instance, a customer may decide not to buy a Solaris-based work group server because Solaris using AS/U only implements the NTLM security protocol and not the Microsoft Kerberos security protocol, and the customer has chosen to fully "kerberise" his Windows domain (as outlined above, at recital (152), Kerberos provides better security than NTLM). It is however dubious whether such a customer will state that his choice not to buy the Solaris-based server was due to interoperability or whether he will rather relate it to security considerations. Similarly, during the "MUP" incident, which is described below at recitals (680) *et seq.*, a non-disclosure of interface information by Microsoft had the effect that NetWare servers appeared slower than Windows servers. Many customers perceived it as a speed issue and were probably not aware that is was related to interoperability with the Windows client PC.

of interoperability information by Microsoft may not be perceived by customers as being related to interoperability: customers will thus have a tendency to underestimate the importance of interoperability in their purchasing decisions.

(644) Out of the 61 entities that had already migrated or decided to migrate the majority of their Windows domains to Active Directory, 52 (85%) confirmed that the factor "*Active Directory offers a better integration with the Windows workstations – including applications running on the workstations or integrated into the workstations (e.g. Outlook, Office) than competing directory services*" or the factor "*Active Directory is required by applications used in your organisation*" had been important in their decision to migrate to Active Directory.[787]

(645) The Commission also asked the 77 respondents who relied primarily on Windows for file and print services about the importance of a number of interoperability-related factors in their decision to do so.[788] Out of the 77 entities that provided an answer to that question, 58 (75%) mentioned at least one of the proposed interoperability-related factors as important.[789] In its Survey II, Mercer asked exactly the same question to its sample of respondents and asked them to quantify this importance using a scale from 1 to 5.[790] Out of the 134 respondents that relied primarily on Windows for file and print services, 99 (74%) confirmed that at least one of the factors had played a role in their decision to use Windows. 91 (68%) gave a score of 4 or 5 to at least one of these factors.[791]

(646) Similar responses have been provided as regards support for groupware packages, which constitute, at least for a non-insignificant minority of customers an important competitive parameter in the work group server operating system. The Commission's market enquiry asked companies that were using Windows as an

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[787] See Question 16 of the questionnaire attached to the Commission's Article 11 letters sent on 16 April 2003. In contrast, only 17 respondents (28%) mentioned one of the following factors as important: "*Active Directory offers a better integration with Web services than competing directory services*", "*Active Directory is a more mature product than competing directory services*", "*Active Directory offers a better compliance and quality of implementation of directory standards than competing directory services*".

[788] See Question 13 of the questionnaire attached to the Commission's Article 11 letters sent on 16 April 2003.

[789] The proposed interoperability-related factors were: "*Windows servers provide full file and print interoperability with Windows client PCs and non-Windows servers do not*"; "*Windows servers provide full interoperability with Active Directory and non-Windows servers do not*"; "*Windows servers provide full interoperability with the security system designed into the Windows client PCs and non-Windows servers do not*", "*Windows servers fully support group policy administration and roaming profiles for Windows workstation users and non-Windows servers do not*".

[790] Questions 11 and 12 in Mercer's Survey II. Question 12 indicates that: "*1= Low importance; 3 = Moderate importance and 5 = High importance*".

[791] Referring to these questions, Mercer argues that "*fewer than 50% of respondents indicated that any of the Commission's factors rated a 4 or 5 on importance*" (Mercer Report *The role of interoperability and other attributes in the choice of server operating systems*, attached to Microsoft's submission of 31 October 2003, on page 14).

operating system for their groupware servers about the relevance of a number of interoperability-related factors in their decision to do so. Out of the 85 entities that provided an answer to that question, 57 (67%) mentioned at least one of the proposed interoperability-related factors as relevant.[792]

5.3.1.2.2.2.2 Relative importance of other factors

(647) Microsoft disagrees that the data collected by the Commission establish a sufficient link between its refusal to supply interoperability-related information and progressive elimination of competition in the market.[793] Microsoft's arguments in this respect are twofold.

(648) First, Microsoft puts forward alternative explanations for its success in the market place. According to such reasoning, Microsoft's success would simply be due to competition on the merits. In particular, Microsoft argues that "*the declining fortunes of Novell's NetWare are not the result of any refusal by Microsoft to supply*",[794] but are the consequence of a lower quality of Novell's products:

> "Unlike UNIX and Windows, NetWare cannot provide the sort of stability and reliability that many enterprise customers demand."[795]

> "The basic problem with NetWare is that it is an old operating system ill-suited to running applications and lacking the reliability, availability and scalability now demanded by most enterprise customers."[796]

(649) This argument is inconsistent with the data collected by Mercer and submitted by Microsoft to the Commission.

(650) Mercer asked IT executives to rate, for a number of purchasing attributes, the *performance* of Linux, NetWare, UNIX. On "reliability/availability", Windows gets

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[792] See Question 19 of the questionnaire attached to the Commission's Article 11 letters sent on 16 April 2003. The proposed interoperability-related factors were: "*Using a Microsoft platform enables better integration with the Windows workstations (including client-side applications, such as Office), compared to the other possibilities envisaged*"; "*Using a Microsoft groupware platform enables better integration with the features of the Windows domain, such as Active Directory*"; "*Using a Microsoft groupware platform enables our organisation to use applications programmed on top of the Microsoft platform*". Question 23 asked the organisations surveyed whether they had developed server-side applications that need to interact with Windows-based client-side applications and investigated whether the necessity to interface with the Windows-based client-side application had been a factor in the choice of the development platform. 49 respondents provided an answer to that question. 25 of them (51%) confirmed the relevance of the need to interface with the Windows environment as a factor driving the uptake of Windows at server-side.

[793] Microsoft in any case contests both the market definition and the conclusion that there is elimination of competition on that market.

[794] Microsoft's submission of 17 October 2003, on page 64.

[795] Microsoft's submission of 17 October 2003, on page 41.

[796] Microsoft's submission of 17 October 2003, on page 64.

the lowest rate in terms of average score calculated by Mercer, below all three other operating system families.[797]

(651)   Furthermore, Mercer's Survey III has "*explored why NetWare is being used less*". Mercer finds that "*those that have maintained or increased their usage of NetWare over the last five years overwhelmingly cited 'Reliability/availability of server operating system' as the driving attribute, with 'Directory service included with server operating system' and 'Performance / functionality of server operating system for workgroup server functions' also receiving a number of mentions*".[798]   By contrast, Mercer explains that "*those that have reduced their NetWare usage, or have not adopted it at all, most often cite two reasons: Expected long-term vendor support and development of platform (investment protection) and Available skill-sets and cost/availability of support (in-house or external)*".[799]

(652)   Mercer considers that, in any case, these results of its surveys prove that "*NetWare's market decline has not been driven by interoperability problems with Windows*".[800]

(653)   The fact that customers are worried about NetWare's "*long term vendor support and development and platform*" is, however, not inconsistent with the Commission's conclusion that there is a risk of elimination of competition in the work group server operating system market due to interoperability issues; in fact it is a logical consequence of these interoperability issues. The elimination of competition, in turn, informs the choices of network administrators, who devote less time in getting trained on NetWare's products. In other words, the "*available skill-sets and cost/availability of support (in-house or external)*" are diminishing for NetWare.

(654)   Another argument put forward by Microsoft is that interoperability is *only one* of the factors that influence customers' purchasing decisions and that it cannot as such "drive" these purchasing decisions in one direction.[801]

(655)   In this respect, Microsoft's economic consultants, Mercer and NERA, criticise the Commission's 2003 market enquiry because it asked customers about the importance

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[797]   Mercer Report 2003 attached to Microsoft's submission of 17 October 2003, on page 25 (Chart 15).
[798]   Mercer Report 2003 attached to Microsoft's submission of 17 October 2003, on page 26 (Chart 17).
[799]   Mercer Report 2003 attached to Microsoft's submission of 17 October 2003, on page 4.
[800]   Mercer Report 2003 attached to Microsoft's submission of 17 October 2003, on page 4. Mercer does not indicate the third most frequently mentioned factor for moving away from NetWare, which, as outlined elsewhere in its report, is "*interoperability with Windows workstations*". See Mercer Report 2003 attached to Microsoft's submission of 17 October 2003, on page 26 (Chart 17).
[801]   "*Evidence from [the] surveys conducted by Mercer [...] shows that the interoperability factors the Commission claims 'drive' choices of server operating systems are only a few of the many attributes that IT professionals consider in choosing server operating systems*" NERA's report *Survey Evidence in the Commission's investigation of interoperability*, in Microsoft's submission of 17 October 2003, on page2.

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of interoperability-related factors and did not enquire about the importance of other factors.

(656)   Mercer explains that:

"Survey II is an improvement on the Commission's questionnaire because it asked customers about the importance of a variety of relevant attributes, therefore putting interoperability in context. […]

Survey III addressed a wider range of issues related to the third SO but not addressed in the Commission's own inquiries. Specifically, Survey III examined the relative importance of interoperability within the context of the many factors that IT professionals consider in making their choices, identified how IT professionals evaluate the major server operating systems on those attributes."[802]

(657)   The responses to these surveys confirm that interoperability with the client PC is important to customers, and that barriers to entry exist in the relevant market for work group server operating systems.[803]

(658)   As regards Mercer's attempt to assess the importance of interoperability relative to "other" factors, however, a number of issues are of relevance.

(659)   First, as already mentioned at recital (643), the non-disclosure by Microsoft of interoperability information may translate into a perception by the customer that the products of Microsoft's competitors raise issues with respect to "other" attributes.[804]

(660)   Second, Mercer's comparison of purchasing "factors" or "attributes" is to a large extent not comparing like with like. For instance, in the two sets of questions of Survey II where Mercer asks the survey respondents to rate the importance and influence of purchasing factors, one of the items in the list is "Total Cost of Ownership", which, by definition, is intended to encompass some if not all of the other factors.

(661)   Against this backdrop, it is neither surprising nor conclusive that "other" factors account, according to Mercer's calculations, for more than 90% of the relative influence on the purchasing decision.[805]

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[802]   Mercer Report 2003 attached to Microsoft's submission of 31 October 2003, on page 7.
[803]   See above, in Sections 5.1.1.2.1.4 and 5.2.2.3.
[804]   At the Oral Hearing, Mercer argued that, if interoperability with the Windows Environment had an impact on the other factors, there should be a correlation between these factors. This argument is misdirected. Indeed, the problem is precisely that the upshot of a refusal by Microsoft to provide interoperability information to its competitors on the work group server operating system market may be that the customer perceives a security, functionality, or TCO issue with the competing work group server operating system product, *instead of* an interoperability issue.
[805]   Mercer Report 2003 attached to Microsoft's submission of 31 October 2003, on page 24 (Chart 14).

(662)   There is a more fundamental issue with Microsoft's attempt to qualify the importance of interoperability when compared to "other" factors. One would expect the operating systems families that enjoy the highest ratings for those purchasing attributes that are deemed to influence customers' purchasing decisions to enjoy the best sales. This is, however, not the case according to Mercer's own data. By way of illustration, if one calculates, on the basis of these data and for Windows, NetWare, UNIX and Linux, the average performance rating of each of these products for the various purchasing attributes considered by Mercer, *weighted* according to each attribute's "relative influence" as reflected in the answers to Mercer's surveys, UNIX gets the highest rating as a work group server operating system, Windows the second highest, close to UNIX, whilst Linux and NetWare products obtain ratings that are close to one another and not substantially lower than Windows / UNIX.[806] This does not explain the clear and expanding lead that Microsoft enjoys on the market.[807]

(663)   Mercer stresses that, both for NetWare and Linux, Windows client interoperability is also cited as a driver by those respondents who have maintained or increased their NetWare usage. It views this result as inconsistent with the Commission's analysis of the market.[808]

(664)   This argument might have some resonance if Windows client interoperability was cited by the surveyed IT executives as a reason to choose Linux or NetWare *over Windows*. This is not the case. Among the various attributes tested in Survey III, "*interoperability with Windows workstations*" is the one where Windows has the most clear-cut lead over the three other operating system families. NetWare ranks second, with a slight lead over Linux and UNIX, which is consistent with the fact that interoperability with the Windows client PCs may be a reason to choose NetWare over other products. This lead is rather limited, though, and there is virtually no difference between Linux and UNIX for this attribute.[809] As such, the fact that "*the Linux plans of IT professionals are being driven by non-interoperability attributes*" is consistent with the conclusion that Linux is in fact not really competing with Windows but rather replacing to a certain extent NetWare and UNIX.

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[806]   More precisely, the results are, on a scale from 1 to 5, UNIX: 4.0, Windows: 4.0, Linux: 3.7, NetWare: 3.7.

[807]   Microsoft argues that, in the responses to Mercer's survey, "*Windows server operating systems are ranked higher than Linux and NetWare on more than three times as many attributes, and beat UNIX server operating systems on twice as many attributes*" and views that as confirmation that "*increasing uptake of Windows server operating systems is based on the merits*". See, Microsoft's submission of 7 February 2004, on pages 12-13. This approach, which does not distinguish between important purchasing attributes and less important purchasing attributes is inconsistent with Microsoft's emphasis on the need to study the relative influence of the various factors.

[808]   See Mercer Report 2003, attached to Microsoft's submission of 31 October 2003, on page 4.

[809]   Mercer Report 2003 attached to Microsoft's submission of 17 October 2003, on page 25 (Chart 15).

(665)   In conclusion, not only do Mercer's arguments fail to rebut the Commission's analysis, but the very data collected by Mercer are in fact in direct contradiction with Microsoft's argument. They confirm that Microsoft's withholding of inter-operability information results in customers directing their purchasing decisions to Microsoft's work group server operating system products.

5.3.1.2.3   There are no substitutes for Microsoft providing interoperability information

(666)   Microsoft explains that interoperability disclosures are not indispensable for its competitors in the work group server operating system market and argues that it has "*outlined in detail a number of different ways to achieve client/server interoperability, all of which are commercially viable*".[810]

(667)   Microsoft puts forward three broad categories of "substitutes" for disclosure by Microsoft. These are: the use of open industry standards supported in Windows; the distribution of client-side software on the client PC; and the reverse-engineering of Microsoft's products in order to gain access to the necessary interoperability information.

(668)   As a matter of preliminary observation, the alleged existence of suitable alternatives to disclosure of the requested information is not consistent with the fact that the difficulties put forward by Sun affect the business of virtually all work group server operating system vendors. In spite of the fact that they rate some of the other vendors' products higher than Windows for characteristics that are important to them, customers are migrating away from these products in a significant way, and acknowledge that interoperability is an important factor in them doing so. This is already circumstantial evidence that the alternatives to which these other vendors have recourse are not sufficient to offset Microsoft's interoperability advantage.[811]

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[810]   Microsoft's submission of 16 November 2001, at paragraph 174. This wording suggests that Microsoft acknowledges that when evaluating the indispensability criterion there is no reason to discard *a priori* obstacles of an economic nature. However, it must be mentioned that, in the same submission, at paragraph 172, Microsoft quotes the *Bronner* ruling as saying that "*it is not enough to argue [that alternatives are] not economically viable*". This, however is an incomplete quote of the relevant excerpt, which discusses whether Bronner could set up an alternative distribution scheme to the one it is seeking access to, and reads: "*in order to demonstrate that the creation of such a system is not a realistic potential alternative and that access to the existing system is therefore indispensable, it is not enough to argue that it is not economically viable <u>by reason of the small circulation of the daily newspaper or newspapers to be distributed</u>*". In this respect, the Court refers to paragraph 68 of the opinion of the Advocate General, which reads: "*It may well be uneconomic, as Bronner suggests, to establish a nation-wide system for a newspaper with a low circulation. In the short term, therefore, losses might be anticipated, requiring a certain level of investment. But the purpose of establishing a competing nation-wide network would be to allow it to compete on equal terms with Mediaprint's newspapers and substantially to increase geographical coverage and circulation*". See Judgement in *Bronner*, at paragraph 46. Contrary to what Microsoft's statement suggests, this shows that the Court in *Bronner* in fact did consider that economic obstacles could constitute a relevant factor in establishing the indispensability of an input.

[811]   Hence there is no *actual* substitute to disclosures by Microsoft of interoperability information. The Commission will therefore more particularly focus on potential substitutes.

5.3.1.2.3.1 Open industry standards

(669) As regards the use of open industry standards implemented in Windows, interoperability within a Windows work group network largely depends on specifications that are proprietary or are extended versions of standard protocols.[812] Therefore, open industry standards fall short of enabling competitors to achieve the same degree of interoperability with the Windows domain architecture as Windows work group server operating systems do. Since all major work group server operating system vendors already support most of the open industry standards supported in Windows, it can be concluded that this degree of interoperability proves to be insufficient for them to viably compete in the market. Therefore, reliance on open industry standards cannot be considered to be *at present* a realistic substitute to disclosures by Microsoft.

(670) Whether it could *become* so in the future depends entirely on Microsoft's discretion to continue relying on non-standard protocols to govern interoperability within Windows work group networks, or on the contrary, to rely on protocols already adopted by standard-setting bodies or to contribute its protocols to such standard setting bodies (which would be a manner of disclosing them).

5.3.1.2.3.2 The distribution of client-side software on the client PC

(671) As regards the distribution of client-side software to run on top of the client PCs of the network, Microsoft's argument is that such client-side software provides the networking capability on the client PC for the work group server to connect.[813] The fact that the Windows PC operating system includes native support for the Windows domain architecture would thus be irrelevant.

(672) Microsoft's argument that native support for a technology in the Windows client PC is irrelevant to the uptake of that technology at the server side is inconsistent with the way reputable industry analysts and Microsoft itself view market reality. The following quote from IDC confirms that the uptake of new technologies at the work group server side (here directory services) depends on the pervasiveness of support for such technologies at the client PC side:

> "While over one-third of the participants in a survey conducted by IDC said they currently have directory services operational, directory-enabled client operating environments are in relatively short supply, preventing users from leveraging some of the best benefits that directory-based management can provide. That problem, however, will alleviate itself over

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[812] See above, at recitals (194) *et seq.* and at recitals (236) *et seq.* In fact, most of the open industry standards put forward by Microsoft are not typically used in core work group server services.

[813] See Microsoft's submission of 17 November 2000, at paragraph 59.

time as more companies roll out Windows 2000 and XP to client workstations and laptops."[814]

(673)   Microsoft makes reference to a number of client-side add-ons implementing various network file system technologies, and in particular NFS.[815] However, a closer examination of those products reveals that they are not intended to facilitate the purchase of non-Microsoft work group server operating system products and their subsequent integration into a Windows environment. For many of them, this is confirmed by the price at which they are sold. A case in point is Hummingbird's NFS Maestro client, which is advertised at USD 245 per client.[816] Assuming a hypothetical network with a ratio between client PCs and work group servers of one work group server per 10 client PCs, with all the client PCs running Windows 2000, one may consider a situation where the organisation owning this network wants to buy a new operating system for all its work group servers. Microsoft's Windows 2000 Server offering can be purchased, with 10 Client Access Licences, for USD 1,199. To install Hummingbird's NFS Maestro client on every PC means a total cost of USD 2,450. This constitutes more than twice the cost of the Windows 2000 Server solution, and this is before any direct licensing cost for the non-Microsoft work group server operating system itself is even considered.

(674)   Moreover, the direct price of client-side add-ons is only one component of the cost to customers of installing and managing such system software in addition to the Windows operating system on the client PCs of their network. The "rule of thumb" in the industry is that the direct installation of such a software add-on is from USD 100 to USD 200 per PC.[817] Compatibility problems may occur, as upgrades to

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[814]   IDC Bulletin # 26000, *Active Directory Goes Hand in Hand with Windows 2000 Server*, November 2001, "IDC Opinion" (cover page of the bulletin). Commenting on this quote, Microsoft stated to the Commission that it "*agrees that the ability to access directory services from Windows client operating system bears on the success of directory services provided by non-Microsoft server operating systems*". See Microsoft's submission of 7 February 2004 in response to the Commission's letter of 16 January 2004, Annex, on page 26.

[815]   See, for example, Microsoft's submission of 17 November 2000, Annex D.

[816]   See Hummingbird's Web page, printed on 20 May 2003.

[817]   See, for example, Novell's submission of 19 February 2001, in response to a Commission request for information: "*In order for Novell to distribute its client, each user must download the client form the Novell Web site and install it. It takes a great deal of time. Time is money. We estimate that it costs over USD200 per machine to do this. Microsoft does it at no cost.*" (Case COMP/C-3/37.792, on page 6798) See also GartnerGroup Research Note of 14 June 1999, Note 3 Software Distribution Costs, "*We estimate that the per-occurrence cost of performing an software upgrade of LAN-attached users is at least $ 150 per desktop. Performing the same upgrade for mobile or remote users can be as much as 50 percent more, or $ 225 per desktop.*" It must be emphasised that the relative cost disadvantage will be still higher where a customer does not consider migrating *all* the work group servers but adding *one* work group server to the network. Microsoft argues that work group servers can provide automatic distribution of software. This however, causes a "chicken-and-egg" problem for Microsoft's competitors. Although it is in theory possible to a network administrator to first distribute non-Microsoft client-side add-ons to the client PCs by using a Windows work group server and then to abandon the Windows work group server and use the client-side add-ons to migrate the administration

the operating system will have to be matched against upgrades to the client-side add-on. For instance, it has been pointed out that when customers install a new Microsoft Service Pack, they will have to load an update to the client-side add-on[818].

(675)   Microsoft's argument on the possibility to use client-side add-ons to compete against Windows is essentially based on the example of Novell.[819] Microsoft states:

> "With regard to software installed on clients, Novell has achieved great success with its NetWare server operating system using exactly the approach the [first Statement of Objections] rejects as impractical. Because Novell does not offer a client operating system, it must install additional software in client operating systems like Macintosh, OS/2 and Windows so they can interoperate with NetWare servers."[820]

(676)   In its *NetWare to Windows 2000 Server Migration Planning Guide*, however, Microsoft explicitly mentions that "*Windows 2000 Server is a better platform from which to manage a Windows-centric desktop environment*" and presents it as a reason why the migration from NetWare to Windows 2000 Server provides benefits to the user.[821]

(677)   In the course of the Commission's investigation Novell stated explicitly that the solution of shipping a client-side add-on was partly dependent on Microsoft's acceptance to ship the Novell client with Windows 2000 Professional and it has complained about difficulties in doing so.[822] Novell concludes that "*Microsoft's*

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of the network from the Windows work group server to the non-Microsoft alternative, this does not make much sense in practice, since it introduces an unnecessary migration in the process.

[818]   See Novell's submission of 19 February 2001 in response to a Commission's request for information (Case COMP/C-3/37.792 on page 6798).

[819]   Microsoft also mentions Sun, Tivoli, Computer Associates, Lotus, Hummingbird, Attachmate, DataFocus, Eircom Software and Esker, see Microsoft's exhibits of 8 June 1999 at Tab. 11 to 16 (Case IV/C-3/37.345 on pages 1588 to 1682).

[820]   Microsoft's submission of 17 November 2000, at paragraph 67.

[821]   See Microsoft, *NetWare to Windows 2000 Server Migration Planning Guide*, printed from http://www.microsoft.com/windows2000/techinfo/planning/incremental/netmigrate.asp, on page 1. It is noteworthy that requiring customers to install client-side add-ons to use its products is a commercial handicap for Novell only *vis-à-vis* Microsoft, which does not operate under the same constraint and can provide native interoperability with the Windows client PC operating system. Before Microsoft entered the work group server operating system market, Novell was very successful in that market. Furthermore, it is less of a handicap *vis-à-vis* customers that already have invested in NetWare than *vis-à-vis* new customers or *vis-à-vis* customers that have embraced the Windows Environment. Consistent with this, Novell has been experiencing a *gradual* exclusion from the market.

[822]   See Novell's response to a request for information, of 28 July 2000: "*Some of [Novell's] code has been shipped on the [Windows 2000 Professional] CD to ensure that our customers who migrate from NT 4 to Windows 2000 will have a smooth migration. To accomplish this task, we had to ship portions of our client code on the [Windows 2000 Professional] CD. We wanted to include the full client, but [Microsoft] refused, stating that they didn't have enough space on the CD to meet Microsoft's needs.*" (Case COMP/C-3/37.792 on page 1666). See also Novell's response to a request for information, of 19 February 2001: "*Not being able to ship Novell's full client puts Novell at a significant disadvantage. Microsoft's client installs simultaneously with the installation of Windows 2000 Professional. [...] In order for Novell to distribute its client, each user must download the client from the Novell web site and*

advantage is that they own [Windows 2000 Professional] and can distribute client-side features that enable that workstation to use a [Windows 2000 Server]".[823]

(678)   Novell's commercial behaviour exemplifies the difficulties of client-side dependent software.   NDS for NT, an interoperability product developed by Novell using reverse-engineering[824] did not imply the installation and management of client-side software. Novell used precisely this point as a marketing argument. For instance, a document produced by Novell for IT Technicians describes NDS for NT in the following terms: "*NDS for NT is installed on NT servers that are designated as Primary Domain Controllers (PDC) or Backup Domain Controllers (BDC). <u>No workstation components or workstation configuration is required</u>*."[825]

(679)   Also, Novell's NetWare 6 server, released in September 2001, is "clientless", which Novell uses as a marketing argument: A white paper by Novell, published in October 2001, states as one of the benefits that a consumer can expect from NetWare 6 the fact that, "*as a clientless [Network Operating System], [it] has removed the need to roll out and configure a NetWare client to every desktop*".[826] This means that Novell has tried to avoid the solution that Microsoft is putting forward as a viable alternative and, by doing so, hopes that it will be easier to convince people to buy its product. However, it must be emphasised that due to Microsoft's above-described refusal to disclose interoperability information, Novell's "clientless" work group server operating system cannot use the full capabilities of the Windows client PCs and work group servers in the same way that Microsoft's work group server operating system can.

(680)   Finally, the development of client-side add-ons raises the issue of interoperability between the client-side add-on and the Windows operating system. By way of example, Novell has pointed out the difficulty it experienced with respect to the so-called "Multiple UNC Provider" ("MUP"). The MUP is a piece of software located on the Windows client which transmits calls for a file to a relevant client-side add-on, the "redirector", which implements all that is needed to handle communication with a given work group server operating system.   Novell complained about

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install it. It takes a great deal of time. We estimate that it costs over USD 200 per machine to do this."
(Case COMP/C-3/37.792 on page 6798).

[823]   See Novell's submission of 13 April 1999 (Case IV/C-3/37.345, p. 2236 – 2238).

[824]   See above, at recitals (298) *et seq*.

[825]   See Novell Research January 1999, *An Introduction to NDS for NT v 2.0*, printed from http://developer.novell.com/research/appnotes/1999/january/03/a990103_.pdf on 23 January 2003, on page 43 (emphasis added).

[826]   See *NetWare 6, Network Operating Systems Beyond the LAN – NetWare's Solutions to Today's Networking Challenges and How they Compare to Solutions in Windows 2000 Server*, 30 October 2001, printed from http://www.novell.com/products/netware/nw6vswin2000.pdf on the 27 January 2003.

"problems with Microsoft software which make NetWare appear as a much slower system than Windows NT".[827]

(681) The problem is described in detail in the direct testimony of Dr Carl Ledbetter in the US Court Hearings on remedies in the anti-trust case against Microsoft.[828] Dr Ledbetter, at the time of these Hearings Chief Technology Officer and senior vice president of Novell in charge of engineering, research and development, experienced of the problem as a customer, while he worked at Hybrid Networks. According to Dr. Ledbetter, *"Microsoft revised the MUP code for its release of Windows NT 4.0 on August 9, 1996. Once customers upgraded to Windows NT 4.0, Novell servers in those networks began to take far longer than usual to execute requests, and longer than Microsoft servers took to execute corresponding requests."*[829] Dr. Ledbetter outlines the suddenness of the impact for customers and the delay with which Microsoft addressed the issue: *"Requests that just a few days earlier had taken only a few seconds to execute were now catastrophically slow. And this happened within hours of the installation on the affected networks of Windows NT 4.0 with the MUP. [...] Microsoft did not [provide] any way to correct the MUP problem – until May 30, 1997, more than nine months after it had conceded responsibility. [...] Novell lost many customers during the nine months it took Microsoft to acknowledge the problem with the MUP and to post a complicated fix."*[830]

(682) In conclusion, Microsoft's argument that other work group server operating system vendors could distribute client-side add-ons and thereby avoid any dependency on Microsoft's client PC operating system is invalid.

5.3.1.2.3.3 Reverse-engineering

(683) Microsoft mentions reverse-engineering as a means of accessing information necessary for interoperability with the Windows domain architecture,[831] and lists examples of companies or organisations that have recourse to it, in particular the Samba group.

(684) These examples do not represent an effective competitive constraint on Microsoft in the work group server operating system market. This is for a number of reasons, which apply *mutatis mutandis* to other interoperability solutions in this field that would be based on reverse-engineering.

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[827] See Novell's submission of 13 April 1999 (Case IV/C-3/37.345, p. 2238).

[828] See Carl S Ledbetter's direct testimony to the US District Court in the States' antitrust action against Microsoft (Remedies 1, 4, 5, 16, 18), 22 March 2002, printed from the National Association of Attorney General's Web page, from http://209.190.248.167/issues/microsoft/pdf/exhibits/PX1684.pdf on 27 January 2003. See paragraphs 121 to 141 for a detailed technical explanation.

[829] *Ibid*, at paragraph 127.

[830] *Ibid*, at paragraph 127 to 141.

[831] See, for example, Microsoft's submission of 17 November 2000, at paragraph 164.

(685)   First, reverse-engineering of the interfaces of a program as voluminous as Windows requires considerable efforts with uncertain chances of success. As outlined above at recitals (454) *et seq.*, reverse-engineering the Win32 API has proven not to be a commercially viable means of challenging Microsoft's client PC operating system monopoly.[832] Even reverse-engineering a less comprehensive set of interfaces will encounter the difficulty of locating the adequate points of connections, which are buried somewhere in the over 30 million lines of code of Windows. As a result of these technical obstacles, there is a significant time lag involved in the process, which is critical in the fast-moving markets for software. A case in point is Samba. As outlined at recitals (293) to (297) above, Samba is more than one generation late in terms of interoperability with the Windows domain architecture, since certain of the relevant interfaces for the Windows 2000 generation of Microsoft's client PC and work group server products have not yet been reverse-engineered after the release of Windows XP Professional and Windows 2003 Server Standard Edition.[833]

(686)   Second, the viability of products developed using reverse-engineering depends on Microsoft not breaking the compatibility. This could easily be done, for instance through legitimate actions such as upgrading the operating system. Reverse engineering is therefore an inherently unstable basis for a business model. For instance, as outlined above,[834] the NDS for NT solution was broken by Microsoft with the introduction of Windows 2000. Microsoft uses precisely this point as a way to discourage customers from using NDS for NT:

> "The specific 'redirection' technique that Novell used within NDS for NT 2.0 will not continue to work when servers are upgraded to run the Windows 2000 Server operating system. To date, Novell has made no public statements about its plans to resolve this issue. Microsoft believes that it is important for customers to know how upcoming versions of NDS for NT will operate so that they can plan for any differences in functionality that may result if Novell uses architectural alternatives to redirection in the future.
>
> NDS for NT presents significant planning risks to companies that expect to use applications – such as the next release of Microsoft Exchange Server – that are designed to take advantage of features unique to the Active Directory service of Windows 2000 Server"[835]

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[832]   See above, at recitals (455) *et seq*.

[833]   In the Oral Hearing, Samba stated that interoperability with Windows NT 4.0 was in fact still very limited.

[834]   See above, at recitals (298) *et seq*.

[835]   See Microsoft, *Understanding Novell's NDS for NT 2.0,* posted April 12, 1999, printed from http://www.microsoft.com/windows2000/server/evaluation/news/bulletins/nds2.asp on 21 January 2003.

(687)   In conclusion, reverse engineering – as opposed to disclosures from Microsoft – does not constitute a viable solution for companies willing to compete with Microsoft on the work group server operating system market.

5.3.1.2.4   Communications Protocols Licensing Program

(688)   Microsoft argues that the Commission's "*allegations about interoperability with Windows client operating system have been overtaken by the passage of time*": according to Microsoft, this is so because "*the communications protocol licensing program that Microsoft created pursuant to the U.S. Final Judgment allows any vendor of server operating systems to license any or all of the communications protocols that Windows server operating systems use to communicate with Windows client operating systems*". Microsoft concludes from this that "*there is no client-to-server interoperability issue, to the extent there ever was one*".[836]

(689)   Microsoft's argument is based on an inadequate distinction between "client-to-server interoperability" and "server-to-server interoperability". As outlined above, in Windows work group networks, client-to-server and server-to-server interoperability are tightly linked to one another.[837]

(690)   The Communications Protocol Licensing Program only provides for the disclosure of protocols used for communication between a Windows client PC and a Windows work group server. As such, it does not address the broader issue that is at stake in this case. In particular, it does not cover protocols that are "pure" (that is to say, not implemented in the client PC) server-to-server protocols but that are functionally related to the client PC (such as replication protocols or Global Catalogue exchange of data). What is more, the Communications Protocols Licensing Program contractually excludes use of the disclosure for any server-to-server communication.[838] This provision renders integration of a non-Microsoft work group server in the Windows domain architecture impossible.

(691)   In summary, the Communications Protocols Licensing Program does not resolve the problem of insufficient disclosure of interoperability information by Microsoft. By the same token, the Communications Protocols Licensing Program does not adequately address the risk of elimination of competition.

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[836]   Microsoft's submission of 17 October 2003, on page 6.
[837]   See above, at recitals (177) to (182).
[838]   See above at recitals (277) to (279).

5.3.1.2.5 Conclusion

(692) It follows from the foregoing considerations that Microsoft's behaviour risks eliminating competition in the work group server operating system market, due to the indispensability of the input that it refuses to supply to its competitors.

5.3.1.3 Impact on technical development and consumer welfare

5.3.1.3.1 Microsoft's refusal to supply limits technical development to the prejudice of consumers

(693) Article 82 (b) of the Treaty provides that abuse as prohibited by that Article may consist in limiting technical development to the prejudice of consumers.

(694) Due to the lack of interoperability that competing work group server operating system products can achieve with the Windows domain architecture, an increasing number of consumers are locked into a homogeneous Windows solution at the level of work group server operating systems. This impairs the ability of such customers to benefit from innovative work group server operating system features brought to the market by Microsoft's competitors. In addition, this limits the prospect for such competitors to successfully market their innovation and thereby discourages them from developing new products.

(695) If Microsoft's competitors had access to the interoperability information that Microsoft refuses to supply, they could use the disclosures to make the advanced features of their own products available in the framework of the web of interoperability relationships that underpin the Windows domain architecture.

(696) In fact, this is the course of conduct that they have adopted in the past, when they had access to certain portions of that information, by using limited disclosures made by Microsoft. The products that they thus developed were advertised for the innovative features and additional value that they brought to Windows work group networks. product (based on the licence of AS/U from AT&T[839]).[840] Similarly, Novell points out the new features that NDS for NT brings to the Windows domain architecture.[841]

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[839] See above, at recital (213).

[840] "*Solaris PC NetLink Software: Solaris Reliability and Scalability for Windows NT Environments PC NetLink software delivers native Windows NT network services – which includes directory, authentication, and file and print services – on Solaris servers. As a result, users get familiar network services on a more reliable and scalable platform. How do users know their desktops are now being served with Solaris? They don't. Everything works exactly as before. But system administrators can easily see the difference: - The network is suddenly more reliable - The server doesn't need to be rebooted frequently - There's more space in the server room, because the company can consolidate multiple Windows NT servers onto fewer Sun servers.*" See *Sun Adds Value to Windows NT Environments*, a printout from Sun's Web page of 25 May 1999, attached to Microsoft's submission of 8 June 1999, at tab. 1 (Case IV/C-3/37.345, on page 1466).

[841] "*NDS for NT 2.0 is software you can use to administer mixed Windows NT and NetWare networks. With NDS for NT 2.0 you can deploy NT applications, increase network reliability and productivity,*

At the Oral Hearing, Novell pointed out that NDS for NT was a commercial success, which shows that there was consumer demand for such a product. As described above, with Windows 2000, other work group server operating system vendors can no longer offer such follow-on innovation to consumers.[842]

(697) Microsoft argues that, if it had to disclose to its competitors the interface specifications that underlie the Windows domain architecture, this would hinder the beneficial competition between different specifications for interoperability in work group networks.[843] However, this argument overlooks the specific competitive conditions in which Microsoft's behaviour unfolds. In words used by Microsoft's executives, "*Microsoft holds tremendous sway*" over the client PC operating system market.[844] In that setting, Microsoft is able to *impose* the Windows domain architecture as the *de facto* standard for work group computing of which PCs are a key component. Once Microsoft establishes privileged support for a given work group service technology in its dominant PC operating system, alternative solutions cannot compete.

(698) Furthermore, it is important to note that there is ample scope for differentiation and innovation beyond the design of interface specifications. In his report submitted by Sun, Professor Wirsing states:

> "A specification does not define all aspects of a software system, therefore many different distinct implementations of a specification are possible. These implementations may differentiate themselves by factors like ease of use, performance or scalability. Therefore specifications leave room for variation and feature enhancements in implementations."[845]

(699) As a consequence of Microsoft's behaviour, various product characteristics that are important to consumers and on which competition on the merits could unfold are currently artificially relegated to a secondary position. As evidenced by the ranking computed by Mercer, consumers value other features of work group servers than "*interoperability with Windows workstations*", such as for example

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and manage your NT branch office. Because NDS for NT 2.0 does not change the domain architecture, it is completely compatible with existing Windows NT applications, and you can still use familiar Windows NT tools to manage your NT domains. [...] NDS for NT 2.0 also eliminates the need to establish and maintain complicated trust relationships. You can add users to one or more domains without deleting and recreating them, and manage your entire mixed network using the NetWare Administrator (NWAdmin) utility." See *NDS for NT 2.0*, a printout from Novell's Web page of 25 May 1999, attached to Microsoft's submission of 8 June 1999, at tab.9 (Case IV/C-3/37.345 on page 1518).

[842] See above, at recitals (215) to (217) and recitals (298) to (301).

[843] See, for example, Microsoft's submission of 1 December 2003, on page 22.

[844] Internal Microsoft memo drafted for Bill Gates by C++ General Manger Aaron Contorer dated 21 February 97 - see Sun's submission on evidentiary material dated 11 August 1999 at Tab. 2 (case IV/C-3/37.345 page 3703).

[845] See Martin Wirsing *et al.*, *Specification and Implementation of Interoperable Systems*, on page 1, in Sun's submission of 31 October 2003.

"*reliability/availability of the server operating system*" and "*security included with the server operating system*".[846] These are factors that critically depend on the quality of the implementation, i.e. on the source code. In addition, it must be highlighted that, in both of these areas, the IT executives surveyed by Mercer identify Windows as lagging behind UNIX, Linux and NetWare.[847] .

(700) In a longer-term perspective, if Microsoft's strategy is successful, new products other than Microsoft's work group server operating systems will be confined to niche existences or not be viable at all. There will be little scope for innovation – except possibly for innovation coming from Microsoft.[848]

(701) In summary, Microsoft's refusal to supply limits technical development to the prejudice of consumers.

5.3.1.3.2 Alleged lack of evidence of harm to consumers

(702) Microsoft states that there is a "*lack of evidence that Microsoft's actions have harmed consumers*".[849] In contrast, the evidence submitted by Microsoft (Microsoft customer statements, Mercer's surveys) would conclusively prove that customers are satisfied with the degree of interoperability that they are able to achieve.

(703) By way of preliminary observation, Microsoft's denial of any negative impact on consumer welfare through non-disclosure of interoperability information stands ill against its own statement as regards the impact of the disclosures under the US Settlement. Microsoft states in view of these disclosures that "*[w]ith access to this technology, licensees will have new ways to achieve interoperability between their servers and covered Windows desktops. And customers may see more choice in the marketplace through products that use this technology to achieve such interoperability in heterogeneous computing environments*".[850] It would seem that a positive impact on consumer welfare is indicated if, according to Microsoft, "*more choice in the marketplace*" was the result of the disclosures it had undertaken. *A contrario*, the previous situation of non-disclosure must have provided for less choice in the market place to achieve interoperability in heterogeneous computing environments.

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[846] Mercer Report 2003 attached to Microsoft's submission of 31 October 2003, on page 23 (Chart 13).
[847] As regards "*security included with the server operating system*", this is all the more striking since, as outlined above, Microsoft's refusal of interoperability information also puts its competitors at a disadvantage as regards security.
[848] The negative impact of such an evolution on Microsoft's own incentives to innovate will be analysed below at recital (725).
[849] Microsoft's submission dated 17 October 2000, on page 1.
[850] See *Microsoft's Settlement Program Milestones*, printed on 3 December 2002 from http://www.microsoft.com/presspass/legal/aug02/08-05settlementmilestones.asp.

(704)   Furthermore, it is established case-law that Article 82 of the Treaty "*covers not only abuse which may directly prejudice consumers but also abuse which indirectly prejudices them by impairing the effective competitive structure as envisaged by Article 3 (f) of the Treaty*".[851] In this respect, it is noteworthy that Microsoft's refusal to supply has already enabled it to gain a dominant position in the market for work group server operating systems. As such, Microsoft's behaviour is impairing the effective competitive structure in the market.

(705)   Microsoft's apparent assumption is that the only results compatible with the Commission's objections would be that customers report on interoperability-related *problems* in the daily management of their IT networks. Such an assumption is inappropriate. It is the developers of complementary software which has to interoperate with Microsoft's software who depend on the interface information. Customers will not always exactly know what is disclosed by Microsoft to other work group operating system vendors and what is not. It is only indirectly that customers factor into their purchase decisions the results of Microsoft rivals' best-efforts to achieve interoperability with Microsoft's dominant products.[852] It is at this moment that the exclusionary effect of Microsoft's refusal to supply sets in, in that these products appear, in the eyes of customers, less attractive than Microsoft's software.[853]

(706)   When confronted with a "choice" between putting up with interoperability problems that render their business processes cumbersome, inefficient and costly, and embracing a homogeneous Windows solution for their work group network, customers will tend to opt for the latter proposition. Once they have standardised on Windows, they are unlikely to report interoperability problems between their client PCs and the work group servers. While this shows that there is interoperability between *Windows* client PCs and *Windows* work group servers, it does not prove the absence of abusive conduct or harm to customers. In fact, it screens out the antecedent conduct which had anti-competitively undermined customer choice in the first place and had made the standardisation on Windows a preferred option.

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[851]   Judgment in <u>Hoffmann-La Roche</u>, at paragraph 125.

[852]   In particular, Mercer's statement that "*applications-level, not operating system-level interoperability tops the list of key interoperability issues*" for IT executives must be read against the fact that the in-house development work carried out by a typical IT department is as a rule focused on application-level, not operating system-level software. As such, it is more in conjunction with application-level interoperability than in conjunction with operating system-interoperability that IT executives are likely to be confronted with technical issues that their IT department needs to solve.

[853]   A case in point is Trustmark, which reduces the TCO of its desktop by leveraging features of Windows XP Professional such as Group Policy. "*Trustmark Insurance Company chose the Microsoft Windows XP Professional operating system to take advantage of next generation Microsoft .NET technologies it expects after a complete migration from Novell servers to Windows 2000 Server and Microsoft .NET server.*" See Microsoft's case study *Microsoft Windows XP Professional Plays Key Role in Migration from Novell*, printed on 19 November 2002 from http://www.microsoft.com/windowsxp/pro/evaluation/casestudies/casestudy.asp?CaseStudyID=11087.

(707)   The sample of customers from which Microsoft has submitted statements constitutes a good example of organisations that are embracing a Windows solution at work group level.[854] Microsoft's argument to the effect that its customer statements show that "*interoperability problems can be, and are, typically overcome by a variety of solutions*"[855] is therefore misplaced, since it relates either to Windows-to-Windows interoperability or interoperability between Windows computers and servers that are outside the scope of this case.

(708)   The inadequate focus on "interoperability problems" similarly invalidates Mercer's analysis in this respect. Mercer states that its "finding" that "*'Full' client-server interoperability for 'work group' tasks is not a problem for IT professionals that needs to be solved*", stands "*in contrast to the Commission's market inquiry conclusions and assertions presented in [the supplementary Statement of Objections]*".[856] But one would not expect the IT executives surveyed by Mercer to characterise the fact that only Windows work group servers achieve full interoperability with Windows PCs as an "interoperability problem" for them. But, as outlined above in Section 5.3.1.2.2, the evidence in this case shows that it is a reason for them to opt for a homogeneous Windows solution at the work group network level – and this raises concerns as regards the competition structure in the work group server operating system market.[857]

5.3.1.4   Justification put forward by Microsoft

5.3.1.4.1   Protection of Microsoft's incentives to innovate

(709)   Microsoft argues that its refusal is objectively justified due to the intellectual property rights that it holds over the information requested by Sun. In this respect, Microsoft states:

> "The objective justification for Microsoft's refusal to disclose its intellectual property rights is self-evident: those rights are meant to protect the outcome of billions of dollars of R&D investments in software features, functions and technologies. This is the essence of intellectual property

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[854]   See above, at recital (628).
[855]   NERA Report, dated 17 April 2002, at paragraph 16.
[856]   Mercer's report of 31 October 2003, on page 3.
[857]   The same applies to Mercer's conclusion in its Survey I that "*IT executives [would] view Windows 2000 as an improvement over previous versions of Windows, for both server-client and server-server interoperability*" (see Mercer's report of December 2001, on page 36). Indeed, this statement derived from a question asking IT executives whether Windows 2000 "*differ[ed] from previous versions of Windows in terms of the level of interoperability it provides with other Windows or non-Windows operating systems*", without differentiating between interoperability with Windows products and with non-Windows products.

right protection. Disclosure would negate that protection and eliminate future incentives to invest in the creation of more intellectual property."[858]

(710)   However, the fact that Sun's request may constitute a request that Microsoft license certain intellectual property rights to Sun cannot as such constitute a "self evident" objective justification for Microsoft's refusal to supply.

(711)   The central function of intellectual property rights is to protect the moral rights in a right-holder's work and ensure a reward for the creative effort. But it is also an essential objective of intellectual property law that creativity should be stimulated for the general public good. A refusal by an undertaking to grant a licence may, under exceptional circumstances, be contrary to the general public good by constituting an abuse of a dominant position with harmful effects on innovation and on consumers.

(712)   It has been established above in Section 5.3.1.2 that Microsoft's refusal to supply risks eliminating competition in the relevant market for work group server operating systems, that this is due to the fact that the refused input is indispensable to carry on business in that market and that Microsoft's refusal has a negative impact on technical development to the prejudice of consumers. In view of these exceptional circumstances, Microsoft's refusal cannot be objectively justified merely by the fact that it constitutes a refusal to license intellectual property. It is therefore necessary to assess whether Microsoft's arguments regarding its incentives to innovate outweigh these exceptional circumstances.

5.3.1.4.1.1 Microsoft's concerns about cloning

(713)   Microsoft expresses a general concern that, if it were to answer positively to Sun's request, this "*would make it relatively easy for competitors to clone new features in the Windows family of operating systems*".[859]

(714)   This argument may partly derive from Microsoft's misguided assertion that the Commission's order relates to allowing access to, or copying of, Microsoft's source code. For instance, in its response to the supplementary Statement of Objections, Microsoft states that "*requiring Microsoft to provide access to key source code in Windows will facilitate the cloning of its innovations*".[860] It bears repetition that the Commission does not envisage ordering compulsory licensing of Microsoft's source code.

[858]   NERA Report attached to Microsoft's submission of 17 October 2003, at paragraph 53.
[859]   See NERA's report attached to Microsoft's submission dated 16 November 2001, at paragraph 391.
[860]   NERA submission of 17 October 2003: "*The Commission's Refusal to Supply Case: A Review of the Economic Evidence*", at paragraph 66.

(715)   However, at other points, Microsoft establishes a distinction between "copying" of source code and "cloning". In this regard, Microsoft (NERA) defines a "clone" as "*software that duplicates the precise functionality of an existing piece of software without necessarily using the same computer code*".[861]   Microsoft explains that "*requiring Microsoft to create specifications for Windows client and server operating systems that do not exist, and then to license those specifications to competitors, would [...] facilitate the cloning of Microsoft's operating systems*".[862]

(716)   In another submission to the Commission, Microsoft provides an example of what it considers to be cloning. In that submission, Microsoft takes issue with the fact that Sun requests, from Microsoft, sufficient disclosures such that "*a non-Microsoft workgroup server operating system vendor could engineer an API layer that would allow a software application written to the Win32 APIs to be fully interoperable on platforms other than just Windows*".[863]   Commenting on this part of Sun's request, Microsoft states: "*Why? So consumers, according to Sun, could choose a server operating system based on 'head-to-head competition rather than simply which vendor can run Windows applications as expected'. This is cloning [...]*"[864]

(717)   In the same vein, in its written comments submitted after the Oral Hearing, reacting to Sun's assertion that building from a specification is not cloning, Microsoft explains that "*the specification for a software product is a detailed blueprint that tells competitors how to replicate the product's functionality. Such replication is cloning as that term is used in the software industry, even if it does not involve the verbatim copying of the source code for Microsoft's operating systems.*"[865]

(718)   It is noteworthy that such a definition of "cloning" is very broad and, contrary to Microsoft's contention, is not self-evident. It seems that Microsoft would label "clones" all the implementations that are compliant with a given specification. For instance, IBM's and BEA's implementations of the Java specifications[866] are clones under Microsoft's definition.

(719)   If by "*to clone new features in the Windows family of operating systems*" Microsoft in fact means to implement in a non-Microsoft operating system support for the protocols underlying the Windows domain architecture, on the basis of a

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[861]   See Microsoft's submission of 17 October 2003, on page 10: "*if what the Third SO seeks [...] is that Microsoft provides its intellectual property to other server operating system vendors, to enable them to copy or clone the interfaces exposed by Windows*".
[862]   Microsoft's submission of 30 November 2003 commenting on the Oral Hearing, on page 21.
[863]   Sun's submission of 7 January 2002, *DoJ Brief*, quoted by Microsoft in its submission of 22 March 2002, on page 15.
[864]   Microsoft's submission of 22 March 2002, on page 15. As outlined above at recitals (188) and (189), this request by Sun goes further than the request at stake in the present case.
[865]   Microsoft's submission of 30 November 2003 commenting on the Oral Hearing, on page 21.
[866]   See above, at footnote 45.

specification disclosed by Microsoft, Microsoft's statement that this would be "relatively easy" grossly understates the time and effort that such an implementation process would involve.

(720)   By way of illustration, when evoking what it calls the *"failed attempt by Cisco[867] [...] to port Active Directory to UNIX"*,[868] Microsoft itself recognises that implementing on top of UNIX specifications designed for Windows is a difficult task, even when access to the Windows source code is granted:

> "As noted previously, Windows 2000 and UNIX are quite different operating systems, and it proved more difficult than Cisco expected to port Active Directory to UNIX. As a result, Cisco enlisted the aid of Mainsoft Corp. ("Mainsoft"), which has substantial experience porting Windows services to UNIX [...]. Microsoft entered into a separate Windows 2000 source code license with Mainsoft to enable Mainsoft to assist Cisco with its efforts to port Active Directory to UNIX. Thus far, those efforts have not been successful, and it is not clear whether they ever will be. This is yet another indication of the difficulty of porting Windows 2000 services to non-Windows operating systems."[869]

(721)   The example of Cisco's attempt to port Active Directory to UNIX shows that the amount of time and investment that is involved in the implementation of even a detailed and accurate specification for the protocols at stake in this Decision would be significant.[870] In order to write, optimise and debug their implementations of the specifications disclosed by Microsoft, Microsoft's competitors would in fact have to make efforts comparable to those made by Microsoft itself as regards its own implementation work. In reality, due to the fact that Microsoft controls these specifications, Microsoft's competitors would unavoidably be at a disadvantage as regards the quality of their implementation of the disclosed specifications, compared to Microsoft's own product. There would also be an unavoidable time lag between Microsoft and its competitors, since Microsoft would only have to release the specifications when it already had a working implementation.

(722)   As a consequence, Microsoft's competitors will *have* to provide additional value to the customer, beyond mere interoperability of their products with the Windows

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[867]   Cisco Systems, Inc. Describes itself as *"the worldwide leader in networking for the Internet"*. See http://www.cisco.com/en/US/about/index.html, printed on 24 January 2003.

[868]   Microsoft's submission of 17 November 2000, Annex T, on page 3.

[869]   Microsoft's submission of 17 November 2000, Annex T, on pages 4-5 (emphasis added).

[870]   This finding is underlined by the length of time that Compaq needed to successfully implement the limited client-side interfaces licensed by Microsoft under the 1999 agreement (for a description of the agreement, see above, at recital (231) *et seq*. Microsoft states in its submission of 17 November 2000 that, at that time, *"Compaq [had] not yet been able to port the Windows 2000 components specified in the license to Tru64 UNIX."* See Microsoft's submission of 17 November 2000, Annex T on page 4.

domain architecture, if such products are to be commercially viable. Microsoft's concerns about cloning are therefore misplaced.

(723)   Against this background, Microsoft's argument relating to its incentives to innovate in fact comes down to an argument concerning Microsoft's incentives to innovate with respect to the specifications underlying certain interfaces of its products.

(724)   This approach is inappropriate. When analysing how an obligation to disclose the interface information requested by Sun would impact on Microsoft's incentives to innovate, account must be taken of Microsoft's incentives to innovate its products as a whole, not only in the design of its products' interfaces. Furthermore, such an assessment must be conducted *in comparison to* the alternative situation where Microsoft's anti-competitive behaviour remains unfettered.

(725)   In the latter situation, there is a serious risk that Microsoft will succeed in eliminating all effective competition in the work group server operating system market.[871] This would have a significant negative effect on its incentives to innovate as regards its client PC and work group server operating system products. Microsoft's research and development efforts are indeed spurred by the innovative steps its competitors take in the work group server operating system market. Were such competitors to disappear, this would diminish Microsoft's incentives to innovate. By contrast, were Microsoft to supply Sun and other work group server operating systems with the interoperability information at stake in this case, the competitive landscape would liven up as Microsoft's work group server operating system products would have to compete with implementations interoperable with the Windows domain architecture. Microsoft would no longer benefit from a lock-in effect that drives consumers towards a homogeneous Microsoft solution, and such competitive pressure would increase Microsoft's own incentives to innovate.

(726)   Even if one focuses exclusively on Microsoft's incentives to improve the protocols a specification of which Microsoft refuses to supply, Microsoft's reasoning proves inadequate. For instance, Microsoft argues:

> "Assume that years ago Microsoft had anticipated a decision of the Commission along the lines of [the Commission's first Statement of Objections]. Would it have tried, as it did, to offer Windows client software that worked as well as possible with Windows server software? Would it have considered close co-ordination of those complementary products for its customers a good business proposition for Microsoft? […] [T]he answer must be no."[872]

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[871]   See above, Section 5.3.1.2.
[872]   Microsoft's submission dated 17 November 2000, Christian von Weizsäcker, *Comments on the Commission's Statement of Objections Filed against Microsoft*, at paragraph 53.

(727)   There are good reasons to believe that the answer is in fact yes. Microsoft has an interest in "*[offering] Windows client software that work[s] as well as possible with Windows server software*", simply because Microsoft sells client PC and work group server operating systems and such products need to interoperate with one another. In general, the value of Microsoft's client PC operating system in the eyes of customers (and their willingness to pay) increases through the availability of complementary interoperable work group server operating systems.[873]

(728)   Finally, it is noteworthy that Microsoft has agreed, in the framework of the Communications Protocols Licensing Program, to disclose part of the interface specifications necessary for establishing interoperability with the Windows domain architecture. The limitations imposed by Microsoft, in particular as regards server-to-server communications, relate to an (inadequate) technical distinction and do not relate to a qualitative difference from an innovation perspective. In fact, the server-to-server communications in the Windows domain architecture involve the same type of protocols – sometimes the very same protocols – as client-to-server communication. At the Oral Hearing, in response to a question asked by the Commission services, Microsoft (Mr. Holley) acknowledged that it had not noticed any negative impact of the Communications Protocols Licensing Program on its incentives to innovate.

(729)   In conclusion, it is dubious whether an order to supply in this case would have any negative impact on Microsoft's incentives to innovate.[874] Microsoft's justification based on its incentives to innovate must therefore be rejected.

5.3.1.4.1.2 Industry practice

(730)   Microsoft's line of argument is further undermined by the fact that disclosure of interoperability information is not exceptional.

(731)   Referring to the Commission's Decision in *British Midland*, Microsoft emphasises that a key element of the Commission's finding in that case was that Aer Lingus had deviated from an accepted industry practice (which was to allow interlining between air carriers).[875] Microsoft contends that, by contrast, the withholding of interface information would be common practice in the software industry. Microsoft further argues that the disclosures sought by the Commission, or in fact the disclosures that

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[873] Microsoft submits this argument, *mutatis mutandis*, when discussing the alleged lack of its economic rationale for foreclosure. See Microsoft's submission of 17 November 2000, NERA Report, at paragraphs 174-176.

[874] This is a further difference to the situation in *Bronner*. Indeed, the possibility to give to its newspaper offering a competitive advantage over other products by ensuring that they are delivered earlier to consumers may have been the key factor underlying Mediaprint's decision to invest in the establishment of a home-delivery system in the first place.

[875] Microsoft's submission of 16 November 2001, at paragraph 185.

it made under the US Communications Protocols Licensing Program are in fact exceptional under this standard:

> "[In the framework of the US settlement,] Microsoft has essentially given up its ability to retain for its own use the benefit of the substantial investment it made in creating the communications protocols that its client and server operating systems use in communicating with one another. No other commercial software company operates under such strictures, and the significance of this provision ought not to be overlooked."[876]

(732)   However, the economic characteristics of software markets actually suggest that industry practice is often interoperability oriented.[877] Non-dominant players in the work group server operating system market have incentives to provide their competitors with interoperability information, since the existence of interoperable and complementary software products enhances the value of their own products in the eyes of users. Such companies may thus find it to their competitive advantage to have their technology adopted by others as an industry standard.

(733)   Furthermore, the possibility to determine and be the first to implement a standard constitutes a significant competitive advantage. Companies that get a standard-setting body to accept specifications that they have written as a standard benefit from the advantage of being seen as the reference of such a standard. They often keep a substantial advance even long after the specifications have been implemented by their competitors. LDAP and the Netscape Directory Service – now Sun ONE Directory Server – are cases in point. Netscape has long been the driving force behind LDAP. This was still recognised as a competitive advantage of the Sun ONE Directory Server, more than three years after LDAP version 2 was submitted to the IETF.[878]

(734)   Evidence in the marketplace is consistent with this line of reasoning. Several examples of interoperability standards, of which various competing implementations

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[876]   Microsoft's submission of 16 November 2001, at paragraph 101.

[877]   In any case, there are no grounds under Article 82 of the Treaty according to which instances of behaviour by a dominant company which accord with industry practice should be screened out. Even if it were therefore the case that other vendors did not disclose similar interface information this would not mechanically exculpate Microsoft. *"It follows from the nature of the obligations imposed by Article 86 of the Treaty that, in specific circumstances, undertakings in a dominant position may be deprived of the right to adopt a course of conduct or take measures which are not in themselves abuses and which would even be unobjectionable if adopted or taken by non-dominant undertakings* (see, to that effect, Case 322/81 Michelin v Commission [1983] ECR 3461, paragraph 57)." Judgement of the Court of First Instance of 17 July 1998 in Case T-111/96, ITT Promedia v Commission [1998] ECR II-2937, at paragraph 139. See also, for example, Judgment in Irish Sugar, at paragraph 112.

[878]   In its *Directory Landscape 2003* Report, the Burton Group mentions as one of "*Sun ONE Directory Server Strengths*" the fact that Sun "*is considered by many as the reference LDAP directory service for building, testing and deploying LDAP-based solutions*".

exist, have been described above.[879] It must also be pointed out that Microsoft itself acted in accordance with this logic when its position in the work group server operating system market was still marginal. Microsoft even disclosed source code in order to promote its programming models and communication standards.[880]

(735) Incidentally, it is noteworthy that Mercer's "finding" as a result of its Survey I that "*IT executives generally [...] do not see significant differences among leading vendors [regarding interoperability]*"[881] only seemingly supports Microsoft's thesis that it does not behave differently to other players in the relevant markets. For one, this statement relates to an assessment per vendor, and is not focussed at all on disclosure of interface specifications for interoperability in work group networks. What is more, it focuses on the interoperability between products *already purchased* − as opposed to the role of interoperability in choosing Windows rather than an alternative product *at the time of purchase*. Finally, the "rating" in terms of interoperability achieved by the different vendors does not equate to a rating in terms of disclosures of interoperability information. A case in point is SuSE: which scores rather badly compared to other vendors in terms of interoperability achieved, whereas its products are distributed under the GNU GPL and hence competitors have the complete information necessary to achieve interoperability with them.[882]

5.3.1.4.1.3 IBM Undertaking

(736) Microsoft refers to the undertaking made by IBM to the Commission in 1984 ("the IBM Undertaking"),[883] as providing "*useful guidance for determining what information ought to be disclosed for purposes of interoperability*".[884] Microsoft acknowledges that the IBM undertaking reflects "*a careful and balanced judgment with regard to disclosure obligations*".[885] According to Microsoft however, the Commission's approach in the current case contrasts with its approach with regard to the IBM undertaking.[886]

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[879] See above, in footnote 693.

[880] See, for example, AS/U, above at recital (211). As outlined above at recitals (211) *et seq.*, and recitals (578) *et seq.*, Microsoft progressively disrupted previous levels of disclosures after it managed to get sufficient presence in the work group server operating system market.

[881] See Mercer Report attached to Microsoft's submission of 18 December 2001, on page 6.

[882] Among the vendors rated by the respondents to Mercer's Survey I, SuSE has the second lowest "interoperability rating". *Ibid.*, Chart 17, on page 24.

[883] Commission Case IV/29.479. The Commission suspended its investigation, which had started in the 1970s, following that undertaking by IBM.

[884] Microsoft's submission of 16 November 2001, on page 77.

[885] Microsoft's submission of 16 November 2001, footnote 162.

[886] Microsoft's submission of 16 November 2001, at paragraph 164. In particular, Microsoft argues that while the IBM undertaking required IBM to disclose interface information to its competitors, it did not require IBM to disclose source code or any information about the design or internal operation of its products.

(737)   In the case that led to the IBM Undertaking, IBM was alleged to hold a dominant position for the supply of two key products, the central processing unit and the operating system, for its most powerful range of computers, the IBM System/370. The Commission objected, *inter alia*, to IBM's practice of failing to supply so-called "plug-compatible manufacturers" in sufficient time with the technical information needed to permit their products – which competed with IBM's own products – to be used with System/370.[887]

(738)   As part of that undertaking, IBM agreed to disclose, in a timely manner, sufficient interface information to enable competing companies in the Community to attach both hardware and software products of their design to System/370. Furthermore, IBM agreed to disclose adequate and timely information to competitors to enable them to interconnect their systems or networks with IBM's System/370 using a set of network protocols which IBM had developed, its "Systems Network Architecture" ("SNA").[888]

(739)   In the light of the above, it is difficult to see how the IBM case supports Microsoft's line of argumentation. Rather, this case reflects several of the key considerations underlying the line taken in the IBM case.

(740)   First, in the IBM Undertaking as in this case, it has been recognised that active disclosure of intellectual property-protected information and licensing of intellectual property could be necessary to allow for interoperability. In this respect, Microsoft itself points out the fact that IBM reserved the right to charge a reasonable and non-discriminatory royalty for the supply of proprietary information protected by intellectual property law.[889] Second, the distinction between interface information and *internal* product design (in this case, the source code of Windows) also informs the Commission's approach in this case. Third, there was an understanding that delayed access to interface specifications would have a negative effect on competition in the market.[890]

(741)   In conclusion, as in the IBM case, the Commission's approach in this case constitutes a careful and balanced judgment with regard to the disclosure obligation and takes into account Microsoft's and its competitors' incentives to innovate.

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[887]   See *XIVth Report on competition policy* - 1984, on page 78.
[888]   *Ibid.*, on page 79. Microsoft's *Computer Dictionary* describes SNA in the following way. "***SNA** Acronym for **S**ystems **N**etwork **A**rchitecture. A network model devised by IBM to enable IBM products, including mainframes, terminal, and peripherals, to communicate and exchange data.*" Microsoft, *Computer Dictionary*, on page 486.
[889]   See Microsoft's submission of 17 November 2000, at paragraph 171, copied *verbatim* in Microsoft's submission of 16 November 2001, at paragraph 165.
[890]   As regards the interfaces between or to System/370 software products, IBM undertook to supply interface information as soon as such interfaces had become reasonably stable. See *XIVth Competition Report EC*, 1984, on page 79.

(742)   Besides the IBM case, the requirement to offer interoperability in order to enable competition on the merits to unfold played a role in *Tetra Pak II*. In that case, the Commission not only considered the contractual tying in which Tetra Pak had engaged to be abusive and required its termination but also decided that Tetra Pak "*shall inform any customer purchasing or leasing a machine of the specifications which packaging cartons must meet in order to be used on its machines*".[891] The Court of First Instance and the Court of Justice upheld the Commission's Decision.

5.3.1.4.1.4 Consistency with the Software Directive

(743)   Microsoft expresses the concern that a finding by the Commission that its refusal to supply interoperability information was abusive would upset the "*careful balance between copyright and competition policies*" struck by the Software Directive.[892]

(744)   It is important to first note that the law applied in this case is Article 82 of the Treaty and not the Software Directive. The Software Directive, being secondary Community legislation, could, in any event, not supersede Article 82.

(745)   This notwithstanding, the Software Directive proves a notable point of reference for the Commission's assessment of Microsoft's behaviour under Article 82, as it stresses the importance of balancing intellectual property considerations and interoperability considerations in the software industry, even with respect to non-dominant products.

(746)   Indeed, while the Directive is primarily concerned with the harmonisation of copyright protection of computer programs in the Member States, Article 6 thereof stipulates that the authorisation of the holder of a copyright over a computer program may not be required for the de-compilation of parts of that program, where this is "*indispensable to obtain the information necessary to achieve the interoperability of an independently created computer program with other programs*".[893] This is subject to certain conditions, in particular that the independently created program shall not be "*substantially similar in its expression*" to the de-compiled program.[894]

(747)   Article 6 of the Software Directive thus limits a copyright-holder's rights in favour of interoperability, whether the copyright-holder is dominant or not. In view of Microsoft's extraordinary market strength as well as the other exceptional

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[891]   See Commission Decision 92/163/EEC, Article 3(5), and Judgment of the Court of First Instance in <u>Tetra Pak II</u> , at paragraph 139.
[892]   Microsoft's submission of 17 November 2000, Annex Y on page 1.
[893]   Furthermore, it is clarified that ideas and principles that underlie any element of a program, including those underlying its interfaces, are not protected by copyright law. See Recitals 13, 14 and Article 1 (2) of the Software Directive.
[894]   As outlined above at recitals (569) *et seq.*, the refusal at stake in the present case is not a refusal to authorise copying of source code, but to provide interface interface information.

circumstances in this case, this Decision establishes that Microsoft has an obligation to *actively* supply interface information to other work group server operating system vendors. While thus being consistent with the Software Directive as regards the balancing of intellectual property rights and interoperability, this Decision establishes a disclosure obligation for Microsoft under Article 82 of the Treaty which goes beyond mere passivity in the face of de-compilation of its software code for interoperability purposes.

(748)   If Microsoft were to view this as an conflict between the Decision with the Directive, it should be stressed that recital 27 of the Directive states that the provisions of the Directive are "*[...] without prejudice to the application of the competition rules under Articles 85 [now 81] and 86 [now 82] of the Treaty if a dominant supplier refuses to make information available which is necessary for interoperability as defined in [the] Directive*".[895]

(749)   Microsoft argues that this case is not one where a dominant supplier refuses to make information available which is necessary for interoperability as defined in this Directive.[896]

(750)   The point made by Microsoft is apparently that Sun requires a *degree* of interoperability that is too high and goes beyond the "full interoperability" that would be contemplated by the Software Directive.[897] Microsoft seems to interpret the Software Directive as meaning that a competition law issue could potentially arise if competitors were unable to achieve "*full* interoperability".[898] But, according to Microsoft, under the Software Directive's "*concept of interoperability*", Microsoft already provides for such "full interoperability".[899]

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[895]   As already outlined above in footnote 877, pursuant to Article 82 undertakings in a dominant position may have to adopt a course of conduct the non-adoption of which would be unobjectionable in the instance of non-dominant undertakings. Microsoft acknowledges that "*Recital 27 makes clear that competitors may be relieved of the burdens associated with the Software Directive's decompilation remedy if the copyright holds a dominant position*". Microsoft's submission of 17 November 2000, Annex Y, on page 12.

[896]   See for example Microsoft's submission of 17 November 2000, Annex Y.

[897]   As outlined above, it is factually incorrect on the part of Microsoft to state that it does not refuse interoperability information. See above, at recitals (199) *et seq.*

[898]   See Microsoft's submission of 17 October 2003, on page 63: "*Microsoft has agreed with the Commission from the outset that a competition law issue could potentially arise if competitors were unable to develop server operating systems whose functionality is fully accessible from Windows client operating systems*". In this respect, it must be highlighted that to interpret "*necessary to achieve interoperability*" as meaning necessary to achieve *some* (or *partial*) interoperability would render recital 27 meaningless, because a dominant company could always escape the corresponding responsibility by providing only for competitively unimportant or insufficient connectivity. It would also void the provision of Article 6, which uses the same expression "*necessary to achieve interoperability*" of all it substance.

[899]   See Microsoft's submission of 17 November 2000, at paragraphs 140 to 143.

(751)   This is because, in Microsoft's view, the definition of interoperability laid down by the Directive would "*mean [...] that full interoperability is available to a developer of server operating systems when all of the functionality of his program can be accessed from a Windows client operating system*".[900]   Microsoft argues that this definition is supported by the recitals of the Software Directive.

(752)   The tenth, eleventh and twelfth recitals in the preamble to the Software Directive read:[901]

> "Whereas the function of a computer program is to communicate and work together with other components of a computer system and with users and, for this purpose a logical and, where appropriate, physical interconnection and interaction is required to permit all elements of software and hardware to work with other software and hardware and with users in all the ways in which they are intended to function;

> Whereas the parts of the program which provide for such interconnection and interaction between elements of software and hardware are generally known as 'interfaces';

> Whereas this functional interconnection and interaction is generally known as 'interoperability'; whereas such interoperability can be defined as the ability to exchange information and mutually to use the information which has been exchanged."

(753)   Microsoft interprets the word "*they*" in the tenth recital as referring to "*software and hardware of vendors seeking to achieve interoperability*",[902] which, in Microsoft's view, would support Microsoft's definition of "*full interoperability*".

(754)   It is unlikely that the word "they" at recital 10 of the Software Directive should be read in the way that Microsoft suggests. As a third party puts it: "*If the Council had intended to limit interoperability to the 'one-way' concept promoted by Microsoft, the tenth recital would necessarily have been very different. It would have been similar to the following: 'the function of a computer program is to communicate and work together with other components of a computer system and with users and, for this purpose, a logical and, where appropriate, physical connection, is required to permit <u>that computer program</u> to work with other software and hardware and with users in all the ways in which <u>it is</u> intended to function'.*"[903]

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900   Microsoft's submission of 17 November 2000 at paragraph 143.
901   See above, at recital (32).
902   Microsoft's submission of 17 November 2000 at paragraph 143.
903   See Novell's submission of 10 January 2002 at p.9 (emphasis added).

(755)   In any event, Microsoft's definition of "*full interoperability*", which relies critically on the ambiguous concept of "*access to functionality*",[904] must be rejected.

(756)   By way of example, this definition could be interpreted as suggesting that *any kind* of access from the "*Windows client operating system*" to the server operating system vendor's program, however limited and cumbersome, is sufficient to ensure "full interoperability". If this were to be the case, then it is difficult to understand what difference Microsoft would draw between "full interoperability" and "partial interoperability".

(757)   Another possible interpretation would lead to the conclusion that, if a server operating system vendor's program supports a protocol that Windows 2000 Professional in its default version does not support, there is no full interoperability until Microsoft has implemented this protocol in its product. A requirement that Microsoft provides full interoperability under that interpretation would in fact go far beyond what the Commission requires Microsoft to do in this case.

(758)   At a more fundamental level, Microsoft's approach must be rejected because the word *inter*-operability, by its very nature, relates to a two-way relationship. Microsoft's "one-way" definition is difficult to reconcile with the wording of the definition of interoperability: "*the ability to exchange information and <u>mutually</u> to use the information which has been exchanged*", or with the concept that "*the function of a computer program is to communicate and <u>work together</u> with other components of a <u>computer system</u>*".[905]

(759)   Microsoft argues that the French version of the Directive supports its interpretation of the word "*they*" in the English version and the conclusions that it draws from it:

"considérant qu'un programme d'ordinateur est appelé à communiquer et à opérer avec d'autres éléments d'un système informatique et avec des utilisateurs; que, à cet effet, un lien logique et, le cas échéant, physique d'interconnexion et d'interaction est nécessaire dans le but de *permettre le plein fonctionnement de tous les éléments du logiciel et du matériel avec d'autres logiciels et matériels ainsi qu'avec les utilisateurs*"

(760)   However, Microsoft's interpretation is no more convincing in relation to the French version than in relation to the English version. Even assuming that "*tous les éléments du logiciel et du matériel*" relates to elements of the "*programme d'ordinateur*", Microsoft's interpretation disregards the fact that there is no reference to "*intended to function*" in the French version. The term "<u>*plein fonctionnement de tous les éléments*</u>

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[904]   It is noteworthy that the Software Directive uses neither of these words.
[905]   See above, at recital (752).

du logiciel et du matériel <u>avec</u> d'autres logiciels et matériels ainsi qu'avec les utilisateurs" refers to a situation where all the elements of the system work smoothly together – which is precisely the interpretation that Microsoft rejects.

(761)   Microsoft argues that, when used in conjunction with Article 6, the recitals of the Software Directive support its definition of "full interoperability".[906]   Microsoft's argument in this respect is based on the fact that Article 6 focuses on the need to achieve the "*interoperability of an independently created program*", which Microsoft interprets as meaning that: "*Article 6 [...] concerns itself solely with access to interface information necessary to make the features of the <u>second</u> program [, i.e. the program developed and not the reverse-engineered one,] work properly*".[907]   In the same vein, Microsoft argues that "*[t]he interoperability derogation permits access to information to enable the second independently created program to deliver all of its functionality, not to use all the functionality of the first program*".[908]

(762)   Notwithstanding the imprecise nature of the phrase "*use all the functionality*", it must be held that information necessary to ensure that the decompiled program works as intended in interoperating with the independently created program is information covered by the derogation provided by Article 6. Far from qualifying the definition of interoperability put forward in the recitals of the Directive, Article 6 simply uses that definition. Article 6 relates to "*interoperability of the independently created program <u>with other programs</u>*", as paragraph 1 of the said article makes clear. As such, the proper functioning of the original program – or of other programs – *with* which the independently created program will interoperate is very relevant to the issue at stake. This is confirmed by recital 23 of the Directive, which states: "*Whereas an objective of this [Article 6] exception is to make it possible to connect all components of a computer system, including those of different manufacturers, so that they can work together*".

(763)   In conclusion, contrary to Microsoft's contention, this case does relate to a situation "*where a dominant supplier refuses to make information available which is necessary for interoperability as defined in [the Software Directive]*". This does not mean that Microsoft's behaviour is automatically abusive. However, the fact that the Software Directive explicitly mentions the possibility that a refusal to supply information necessary for interoperability may constitute an abuse of a dominant position is not inconsequential for this analysis pursuant to Article 82.

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[906]   Microsoft's submission of 17 November 2000, Annex Y, on pages 12-13.
[907]   Microsoft's submission of 17 November 2000, Annex Y, on page 4.
[908]   Microsoft's submission of 17 November 2000, Annex Y, on page 13.

5.3.1.4.2 Alleged absence of incentives to foreclose

(764)   As a way apparently to support its claim that its refusal is objectively justified, Microsoft contends that "*it is highly implausible that Microsoft had [...] the incentive to foreclose competitors through leveraging in the ways suggested by [the Commission's Statements of Objections]*".[909]

(765)   Microsoft's argument in this respect essentially relies on the "one monopoly profit" theory. According to this theory, under certain conditions (product A and product B are perfect complements with fixed ratios), it is not possible for a firm that is a monopolist in a product market A to increase its profits by securing a monopoly in the related product market B. The monopolist can in fact extract all the monopoly rent through pricing of the monopoly good on market A. "*This theorem [...] does not say that monopolists will not enter adjacent markets, merely that when they do it is likely to enhance efficiency*".[910] Indeed, the more competitive market B is, the lower the price for the complementary good B, and the higher the price that consumers will be willing to pay for good A.

(766)   However, Microsoft's line of argumentation is flawed insofar as it postulates that no added profit can be gained from attaining a dominant position in the complementary (work group server) operating system market. The inadequacy of the premise invalidates, in turn, the allegation that Microsoft has no economic incentive to use any anti-competitive means to expedite such a result.

(767)   First, the "one monopoly profit" theory relies on strong assumptions, which do not hold in this case. In particular, the two products at stake must be perfectly complementary with fixed ratios. This is not the case for client PC and work group server operating systems. Microsoft itself concedes that "*the assumptions of perfect complementarity with fixed ratios do not apply exactly to client and server operating systems*".[911] For instance, a decision to invest in work group server operating system products may derive from a need to have a given number of users exchange and share more information, rather than from a need to accommodate more users and may thus not be coupled with a decision to buy more client PC operating system products.

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[909]   See Microsoft's submission of 16 November 2001, NERA Report, Executive Summary, at paragraph E12.
[910]   See Microsoft's submission of 17 November 2000, NERA Report, at paragraphs 174-176.
[911]   See NERA report, attached to Microsoft's submission of 17 November 2000, in footnote 227 (paragraph 175). NERA further states that "*home computers generally do not connect to servers (except via the Internet); and computers hosting Web sites generally do not connect to clients (except via the Internet). To a great extent, the customers buying the client operating systems are not the same customers buying the server operating systems.*" (*ibid.*)

(768)   Second, even when product A and product B are perfectly complementary with fixed ratios, the "one monopoly profit" theory does not hold when keeping a firm in market B in check reinforces the dominant undertaking's dominant position in market A, erecting barriers against an actual or potential competitive threat in that market.

(769)   In this case, it cannot be excluded that in the future there will be companies challenging Microsoft's dominant position in the client PC operating system market. By having achieved a dominant position in the work group server operating system market, Microsoft secures a strategic "input" important for undertakings wanting to compete in the client PC operating system market, namely interoperability with the Windows work group servers. Indeed, a future competitor in the client PC operating system market will need to provide products interoperable with Microsoft's dominant work group server operating system.   As such, by strengthening its dominant position in the work group server operating system market, Microsoft effectively reinforces the barriers to entry in the client PC operating system market.

(770)   There is yet another aspect that invalidates Microsoft's argument that it has no incentives to achieve dominance in the work group server operating system market. As Microsoft itself acknowledges, software markets are subject to "shifts of paradigms", of which the evolution from the original centralised computing approach to the modern approach of distributed computing, where processing power is distributed between servers and "fat clients", constitutes a good example.[912]   An evolution that would lead the IT industry back to a more server-centric (and "thin client") approach could in the long term threaten to strip Microsoft's overwhelming dominance on the client PC operating system market of its competitive importance.

(771)   Microsoft's internal communication bears witness to anxiety about this possibility: "*Sun, Oracle and Netscape are all pushing a new model of [almost] centralised computing. They all acknowledge that Microsoft holds tremendous sway over the desktop platform, so they all want to quickly strip as much value and spending as possible off the desktop and onto the server where they can charge premium prices and push their own platform offerings*".[913]   In view of the close links between the

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[912]   See above at recitals (44) *et seq.*

[913]   Internal Microsoft memo drafted for Bill Gates by C++ General Manger Aaron Contorer of 21 February 1997 - see Sun's submission on evidentiary material of 11 August 1999 at Tab. 2 (Case IV/C-3/37.345 page 3703). In the same document, Aaron Contorer further recognises that this long term threat does not constitute a present competitive constraint to Microsoft: "*At the same time, [Microsoft's competitors] know [their model of centralised computing] is fundamentally wrong. There are good reasons why a big company in the 1990s uses thousands of small and midsize CPUs instead of one giant Cray supercomputer to do all the work. Centralized machines have poor price/performance when they get too large: they have high latency for ordinary interactive tasks like typing [...]; and they fail to take advantage of the principle of colocation – putting the processor close to the inputs and outputs it needs to work with*".

client PC operating system market and the work group server operating system market, Microsoft has an incentive to prevent entry by these identified rivals in the latter.

(772)   From the above it can be concluded that, contrary to Microsoft's contention, Microsoft has incentives to leverage its market power from the client PC operating system market into the work group server operating system market.

(773)   In fact, Microsoft's internal communication confirms not only the incentives of the company to attempt to eliminate competition on the work group server operating system market, but the fact that the strategy it intends to use is along the lines of the Commission's analysis of Microsoft's behaviour.

(774)   By way of illustration, the following communication between Microsoft executives underlines an awareness that Microsoft's client-side dominance would allow it to leverage into certain areas of the server operating system market: "*[Microsoft] has a huge advantage in the enterprise computing market by leveraging the dominance of the Windows desktop*".[914]

(775)   The following quote from the same e-mail thread demonstrates the rationale for capturing the work group server operating system market in order to use it as a bridgehead from which to take the leveraging strategy into the Internet: "*Dominance on the server infrastructure on the Internet is a tougher nut to crack [but] we just might be able to do it from the enterprise out if we could own the enterprise (which I think we can)*".[915]

(776)   More generally, were Microsoft to succeed in monopolising the work group network space, it could then replicate its leveraging strategy by denying interoperability to products that need to interoperate with the work group network as a whole. This could be the case for different servers that until now have mostly standard interfaces to the work group tier – for example database servers, Web servers – but on which Microsoft may further its strategy of imposing its own proprietary technology as the *de facto* standard.

(777)   A good example of elements on which such a strategy could rely is Active Directory. Once an organisation has, for instance, chosen to use Active Directory to manage the profiles of all its employees, it may become key for a number of software products,

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[914]   E-mail by Doug Bayer (Senior Director Desktop and Business Systems Division) to Senior Director Steve Madigan, cc. C++ General Manager Aaron Contorer and Senior Technical Evangelist Mark Ryland. 29 May 1996, Sun's submission of evidentiary material of 11 August 1999, at Tab. 2 (Case IV/C-3/37.345, on pages 5793-5794).

[915]   Sun's submission of evidentiary material of 11 August 1999, at Tab. 2 (Case IV/C-3/37.345, on pages 5793-5794).

possibly outside the work group network realm, to interoperate (for example. to establish secure communication) with Active Directory.

(778)   Finally, Microsoft's internal communication confirms that Microsoft's executives view interoperability as a tool in this leveraging strategy: "*What we are trying to do is use our server control to do new protocols and lock out Sun and Oracle specifically [...]. Now, I don't know if we'll get to that or not, but that's what we are trying to do*".[916]

5.3.1.5   Conclusion on refusal to supply

(779)   Microsoft has been enjoying a dominant (quasi-monopoly) position on the client PC operating system market for many years. This position of market strength enables Microsoft to determine to a large extent and independently of its competitors the set of coherent communications rules that will govern the *de facto* standard for interoperability in work group networks. As such, interoperability with the Windows domain architecture is necessary for a work group server operating system vendor in order to viably stay on the market.

(780)   Microsoft has diminished the level of disclosures that it makes concerning information necessary to achieve such interoperability. Microsoft has turned down a formal request by Sun concerning such interoperability information.

(781)   The data collected by the Commission show that there is a risk of elimination of competition in the work group server operating system market. Microsoft's market share has increased swiftly. The company has reached a dominant position in the relevant market. This position continues to be reinforced. Technologies that will lead to a further lock-in into Microsoft's products at the work group server and client PC level are quickly gaining traction in the market. The Commission's investigation has also produced evidence that establishes a causal link between the market evolution and the interoperability advantage enjoyed by Microsoft. Furthermore, there is no actual or potential substitute to disclosures by Microsoft of interoperability information.

(782)   Microsoft's refusal to supply has the consequence of stifling innovation in the impacted market and of diminishing consumers' choices by locking them into a homogeneous Microsoft solution. As such, it is in particular inconsistent with the provisions of Article 82 (b) of the Treaty.

(783)   The major objective justification put forward by Microsoft relates to Microsoft's intellectual property over Windows. However, a detailed examination of the scope

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[916]   Transcript of a February 1997 speech by Bill Gates to Microsoft's sales force, in Sun's submission of 14 October 1999, at Tab. 5, on page MSS 505490 (Case IV/C-3/37.345 on page 5823).

of the disclosure at stake leads to the conclusion that, on balance, the possible negative impact of an order to supply on Microsoft's incentives to innovate is outweighed by its positive impact on the level of innovation of the whole industry (including Microsoft). As such, the need to protect Microsoft's incentives to innovate cannot constitute an objective justification that would offset the exceptional circumstances identified. Microsoft's other objective justification, which is that it has no incentive to engage in anti-competitive conduct with respect to interoperability, is not supported – and in fact is largely contradicted – by the evidence in this case.

(784)   In conclusion, Microsoft's refusal to supply interoperability information violates Article 82 of the Treaty.

5.3.1.5.1   Duration of the abuse

(785)   The abuse can only be established for the period where all its constitutive elements were in place.

(786)   Microsoft's refusal to supply can be established as of 6 October 1998. On that date, Microsoft refused in writing[917] the request by Sun, dated 15 September 1998.[918] It is also clear that Microsoft continues to refuse to supply such information – and that Microsoft's refusal to Sun is one instance in a general pattern of conduct.

(787)   The special responsibility that Microsoft did not sufficiently take into account when answering Sun's request derives from Microsoft's quasi-monopoly on the client PC operating system market. Indeed, Microsoft's refusal to supply relates to interface specifications that organise a network of Windows work group servers and client PCs and that, as such, are not attributable to one of the two products at stake (client PCs or work group servers), but rather represent a rule of compatibility between those two products. This means that the competitive significance of Microsoft's refusal – and hence, the ensuing infringement of Article 82 of the Treaty – derives from Microsoft's quasi-monopoly position in the client PC operating system market. Microsoft already enjoyed such a position of market strength when Sun made its request.

(788)   It is noteworthy that the fact that Microsoft has since achieved a dominant position on the work group server operating system market does of course bring additional strength to Microsoft's leveraging strategy and is a step towards the elimination of competition on this market. But it is not a constituent element of Microsoft's

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[917]   See letter from Paul Maritz, Microsoft, to Richard Green, Sunsoft, Inc., dated 6 October 1998 (Case IV/C-3/37.345 pages 4788, 4789

[918]   See letter from Richard Green, Sunsoft, Inc. to Paul Maritz, Microsoft, dated 15 September 1998 (Case IV/C-3/37.345 page 4787).

behaviour and therefore does not need to be taken into account when determining the duration of Microsoft's abuse.

(789)   Sun's request was focussed on technologies that are natively supported only by the Windows 2000 generation of Microsoft's products – in particular Active Directory technologies. Therefore the question may arise whether Sun was entitled to disclosures relating to Windows 2000 at the time it made its request.

(790)   The first beta version of Windows 2000 was released by Microsoft in September 1997.[919] This means that, at the time when Sun made its request, Microsoft already had a working implementation of at least some of the requested specifications and was already actively promoting its product among software developers and potential customers. Therefore, the Commission takes the view that Sun's request was not premature.

(791)   In conclusion, Microsoft's behaviour amounts to an abuse of a dominant position under Article 82 of the Treaty from 6 October 1998 onward.

5.3.2   Tying of Windows Media Player with Windows

(792)   In the following recitals (recitals (793) to (993)), it will be established that Microsoft infringes Article 82 of the Treaty, in particular paragraph (d) thereof, by tying Windows Media Player ("WMP") with the Windows PC operating system. Article 82 (d) provides that abuse as prohibited by that Article may consist in making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts.

(793)   The Commission considers that Microsoft started to tie its streaming media player with Windows 98 Second Edition in May 1999. Whatever bundling Microsoft may have engaged in previously, with Windows 98 Second Edition, Microsoft tied for the first time the product that it offered in the relevant market for streaming media players.[920] It will further be shown that since May 1999, Microsoft has persisted in the abusive behaviour by tying WMP with subsequent versions of Windows.

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[919]   See Microsoft's press release, *Windows NT 5.0 Beta delivered to over 200,000 developers*, printed from http://www.microsoft.com/presspass/press/1997/Sept97/WinNT5Pr.asp on 9 May 2003. It is worth noting that the deadline for disclosures under Section III.D of the US Settlement is "*the time Microsoft first releases a beta test version of a Windows Operating System Product [i.e. Windows for Client PC product] that is made available via an MSDN subscription offering or of which more than 150,000 copies are distributed*".

[920]   See Microsoft's submission of 17 October 2003, NERA, at paragraph 53, implying that Microsoft's matched RealNetworks' innovative features. Microsoft concludes that this was the reason for the increase in WMP's usage share.

5.3.2.1 Microsoft's conduct fulfils the constituent elements of a tying abuse under Article 82 of the Treaty

(794)   Tying prohibited under Article 82 of the Treaty requires the presence of the following elements: (i) the tying and tied goods are two separate products; (ii) the undertaking concerned is dominant in the tying product market; (iii) the undertaking concerned does not give customers a choice to obtain the tying product without the tied product; and (iv) tying forecloses competition.

(795)   It will be established at recitals (799) to (954) that Microsoft's conduct fulfils the constituent elements of tying. Furthermore, it will be shown at recitals (956) to (970) that Microsoft's arguments to justify the tying of WMP do not prevail over the anti-competitive effects of tying.

(796)   In discussing the individual elements of tying, the impact of the US Judgment and Microsoft's implementation of it will be examined. This is all the more important as Microsoft argues that the US Settlement (and the US Judgment) has had the practical effect of "unbundling" WMP and Windows.[921] Microsoft states that it started implementing the US Settlement on 16 December 2001. Accordingly, OEMs would be free to install and promote other non-Microsoft media players. They could ship client PCs free from visible means of access to WMP and hence with RealPlayer or another media player pre-installed as the default player.[922] Microsoft argues that any additional antitrust remedy on the Commission's part would therefore be unnecessary.

(797)   As outlined above,[923] the US proceedings focused on Microsoft's anti-competitive conduct of protecting its dominant client PC operating system from competitive threats posed by Netscape's Navigator and Sun's Java. Furthermore, the plaintiffs dropped their tying charge after the Court of Appeals ruled that tying in the case at issue should have been considered under a rule of reason approach and not under the *per se* approach proposed by the plaintiffs and adopted by the District Court in its Conclusions of Law. As a consequence, after the Court of Appeals' ruling, the

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[921]   Cf. Microsoft's submission of 16 November 2001, at paragraph 208. Microsoft's submission of 19 November 2001 (NERA), at paragraph 387. Microsoft's submission of 7 February 2004, on page 34.

[922]   See Microsoft's submission of 16 November 2001, at paragraphs 15, 137, 213. The default player for a particular file format is the player launched by the operating system when a user tries to access a file in that format. If a user has copied a CD to his or her hard drive using the popular MP3 format, and the RealOne Player is set as the default player for MP3 files, then the operating system will launch the RealOne Player when a user 'double clicks' on that MP3 file. Similarly, if the end user clicks on an MP3 file on a Website while browsing the Internet, the browser will launch the appropriate player that was assigned as the default player for MP3 files.

[923]   See above, at recital (14) *et seq.*

District Court had no opportunity to consider whether Microsoft's conduct violated the prohibition of tying under § 1 of the Sherman Act.

(798)   Consequently, the US Judgment does not purport to include a remedy for tying. In particular, the US Judgment does not provide for removal of WMP code from the PC operating system (and neither does Microsoft's altered business conduct). Under the US Judgment, Microsoft need only provide a means enabling OEMs and end-users to hide the icon and entries representing the WMP application on the computer screen. The WMP code is still present on top of each Windows operating system Microsoft ships. In her memorandum opinion on the US Judgment, Judge Kollar-Kotelly stated that any order to provide for the removal of software code from Windows "*would likely be reflected in the imposition of liability for illegal tying, rather than liability for illegal for [sic] monopoly maintenance*".[924]

5.3.2.1.1   Microsoft is dominant in the client PC operating system market

(799)   Microsoft's dominance in the market for client PC operating systems has been established above in Section 5.2.1. Microsoft uses its dominance in that market insofar as it ties WMP with Windows, that is, distributes Windows (the "tying" product) only together with WMP (the "tied" product). Microsoft does not provide for means of removing WMP.

5.3.2.1.2   A streaming media player and an operating system are two separate products

(800)   The existence of distinct products is the second precondition for tying. Products that are not distinct cannot be tied in a way that is contrary to Article 82. Microsoft argues that WMP is an integral part of Windows and not a product distinct from Windows.

(801)   Microsoft's proposition as to the existence of one integrated product does not correspond to the reality of the marketplace. Dominant companies often contest that two products are distinct, particularly when these products are used in conjunction with each other – thereby implying that a necessary condition for establishing tying according to competition law is not present. In *Tetra Pak II*[925], Tetra Pak claimed that there was a natural link between the products it sold to its customers in combination (machines and cartons). The consequence in Tetra Pak's view was that it could lawfully combine the two products through contract. In *Hilti*, the producer

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[924]   Memorandum Opinion of 1 November 2002, United States District Court for the District of Columbia, *United States of America v. Microsoft Corporation*, Civil Action No.98-1232 (CKK), at footnote 23. See also: "*Likewise, the definition of "Windows Operating System Product in the SRPFJ cannot curtail the ability of a court to determine that Microsoft has illegally tied two products which are separate under the antitrust laws.*" (Memorandum Opinion with Findings of Fact and Final Judgment of 1 November 2002, United States District Court for the District of Columbia, *State of New York v. Microsoft Corporation*, Civil Action No. 98-1233 (CKK) on page 30)

[925]   Judgment of the Court of Justice in <u>Tetra Pak II.</u>

of nail guns argued that the guns, cartridge strips and nails had to be regarded as belonging to one and the same relevant market

(802)   The Courts rejected these "integrative" approaches. In both cases, it pointed out that there existed independent manufacturers who specialised in the manufacture of the tied product, a fact which indicated that there was separate consumer demand and hence a distinct market for the tied product.[926] Consequently, the Court held that the defendants had engaged in unlawful tying pursuant to Article 82.

(803)   The distinctness of products for the purposes of an analysis under Article 82 therefore has to be assessed with a view to consumer demand. If there is no independent demand for an allegedly "tied" product, then the products at issue are not distinct and a tying charge will be to no avail.

(804)   The fact that the market provides media players separately is evidence for separate consumer demand for media players, distinguishable from the demand for client PC operating systems.[927] There is, therefore, a separate market for these products. There are vendors who develop and supply media players on a stand-alone basis, separate from PC operating systems. Media players are often offered for download from the respective vendors' Web-sites. Microsoft itself states that "*there are a dozen of media players, of which RealNetworks' RealPlayer and Apple's QuickTime are only two of the most prominent.*"[928]

(805)   Microsoft's own practice to develop and distribute versions of WMP for Apple's Mac operating systems and Sun's Solaris client operating system[929] further indicates that operating systems and media players are not just parts of the same product.[930]

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[926]   Judgment of the Court of Justice in *T*etra Pak II, at paragraph 36 and Judgment of the Court of First Instance of 12 December 1991, Hilti, Case T-30/89, [1991] ECR p. II-1439, at paragraphs 66 and 67.

[927]   "*If a court finds either that there is no noticeable separate demand for the tied product or, there being no convincing direct evidence of separate demand, that the entire 'competitive fringe' engages in the same behavior as the defendant, [...] then the tying and tied products should be declared one product and per se liability should be rejected*" Judgment of 28 June 2001, United States Court of Appeals for the District of Columbia Circuit, *United States v. Microsoft*, No. 00-5212, on page 74, at http://caselaw.lp.findlaw.com/scripts/getcase.pl?navby=search&case=/data2/circs/DC/005212a.html.

[928]   Microsoft's submission of 9 May 2003, on page 2 and Microsoft's submission (NERA) of 8 May 2003, on page 10.

[929]   See http://www.microsoft.com/windows/windowsmedia/download/default.asp, printed 16 September 2002 (WMP 6.3 for Solaris, WMP 7.1 for Mac OS 8.1 to 9.x, WMP for Mac OS X).
In the meantime WMP 9 is available for the Macintosh. See http://www.microsoft.com/windows/windowsmedia/software/Macintosh/osx/default.aspx.

[930]   In Microsoft *Computer Dictionary* it is written that Windows Media Player "*can run as a stand-alone client executable program. Windows Media Player can also be embedded in a Web page [...].*" (Microsoft *Computer Dictionary*, Fifth Edition 2002, on page 570) Microsoft describes WMP as a "stand-alone technology" and as having a "modular architecture" (MSDN Homepage, Howard D., *Introducing the Windows Media Player SDK*, September 2002 http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnwmt/html/wmplayer_9_sdk_intro.asp, printed 25 November 2002.) See also Microsoft's

Also, Microsoft releases upgrades of WMP, distinct from Windows operating system releases or upgrades, as was the case with Microsoft's current WMP 9 (available as of 7 January 2003, while the latest operating system upgrade - Windows XP - was released on 25 October 2001).[931]

(806)   While Microsoft's tying and desktop ubiquity give it a substantial distribution advantage in this market, the fact that a not insignificant number of consumers choose to obtain media players separately from their operating system shows that informed consumers recognise them as separate products.[932] Microsoft continuously stresses the number of consumers who use RealPlayer,[933] a media player that clearly is separate from any operating system. RealNetworks does not develop and sell operating systems.[934]

(807)   Some operating system users will not need or want a streaming media player at all.[935] There are companies, for example, which do not want their employees to use media players for instance because they could be used for non-work related purposes.[936]

(808)   It may be true that the direct consumer demand test under a *per se* rule (as normally applied in US tying cases) "*focuses on historic consumer behaviour, likely before integration*" and therefore risks ignoring efficiency benefits deriving from new product integration.[937] In the case of WMP, however, there is non-insignificant consumer demand for alternative players some four years after Microsoft started tying its streaming media player with Windows.[938]

(809)   Microsoft's argument to the effect that there is "*no material demand for operating systems without media player technologies*" and that "*few consumer [sic] would take Windows without WMP when offered a choice of Windows with and without*

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submission of 7 February 2004, on page 60: "*Such modularity allows software developers to use as much or as little of the media playback functionality in Windows as they choose.*"

[931]   Microsoft's submission of 17 October 2003, NERA, at paragraph 50.

[932]   Since 1995 RealNetworks has registered 245 million unique installations of its media players. See RealNetworks' submission of 11 January 2002, at paragraph 49.

[933]   See, for example, Microsoft's submission of 29 August 2001 at paragraphs 223 and 224 and Microsoft's submission of 3 June 2001, on page 15.

[934]   Microsoft itself states that there are users who prefer RealPlayer to WMP. (Microsoft's submission of 7 February 2004, on page 44)

[935]   On http://www.litepc.com/xplite.html, a program is sold which allows users to reduce the footprint of Windows 98 by removing IE and WMP. ("*XPlite and 2000lite are powerful configuration utilities for Windows creating a modular Windows operating system where YOU are in control.*") The existence of such vendors would appear to be an indication that there is demand for a smaller "footprint" of the Microsoft software.

[936]   Organisations routinely choose the applications they want installed on their desktops. (Microsoft's submission of 17 October 2003, NERA, at paragraph 43)

[937]   Judgment of 28 June 2001, United States Court of Appeals for the District of Columbia Circuit, *United States v. Microsoft*, No. 00-5212, on page 77.

[938]   See Microsoft's submission of 17 October 2003 (NERA), at paragraph 61. Compare to a mouse-driven user interface for Microsoft operating systems as an add-on to DOS, mentioned by Microsoft in its submission of 21 October 2003 (M. Iansiti), at p. 8.

WMP"[939] as they would obtain "*operating systems that could not play music CDs or play music files downloaded from the Web*"[940] disregards the alternatives that would be available to customers if Microsoft did not bundle WMP and is for this reason invalid. If OEMs and consumers had the possibility to obtain Windows without WMP that would not mean that they would choose to obtain Windows without a media player. OEMs are likely to follow consumer demand for a pre-installed media player and offer a package which would include a media player on top of Windows, the difference being that it would not automatically be - although it could be - WMP.

(810) Microsoft also engages in promotion specifically dedicated to WMP, independent of the operating system. It refers, for example, to WMP as an "application"[941] and cites a study it commissioned wherein "competing media players" are compared.[942] At another place it calls WMP a stand-alone technology.[943]

(811) Client PC operating systems and streaming media players are also different insofar as their functionality is concerned (see the description of the products in sections 5.1.1.1 and 5.1.1.3). And while it is correct that many consumers expect their PCs to be able to render streaming media content – and media players do need to access an operating system to function – that does not make the two an integrated product any more than a nail gun and nails of the same brand are a single product.[944]

(812) Streaming media players and client PC operating systems involve different industry structures as can be seen from the fact that in the media player market, there still remain some competitors to Microsoft (RealNetworks and Apple), while in the client PC operating system market, Microsoft's competitors are insignificant. The price points of the two products are different too, in so far as media players are often distributed for less than USD 30 or for free[945], while client PC operating systems are generally not.

(813) Last but not least, Microsoft applies different SDK licensing agreements to Windows ("Platform SDK License Agreement") and Windows Media Technologies (for

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[939] Microsoft's submission of 17 October 2003 (NERA), on page 20.
[940] Microsoft's submission of 17 October 2003 (NERA), at paragraph 40.
[941] See Stinson C. and Siechert C., *Running Windows 2000 Professional* at 765 (Microsoft Press 2000), attached as Exhibit 46 to RealNetworks' submission of 11 January 2002.
[942] See Microsoft Press Release, *eTesting Labs Study Shows Windows Media Player for Windows XP Is Nearly Twice as Fast as Real Jukebox or RealOne For Common Digital Media Tasks; Fastest Full-Featured Player Also Uses Fewer Memory Resources*, attached as Exhibit 47 to RealNetworks' submission of 11 January 2002.
[943] MSDN Homepage, D. Howard, *Introducing the Windows Media Player SDK*, September 2002 http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnwmt/html/wmplayer_9_sdk_intro.asp, printed 25 November 2002.
[944] Judgment of the Court of First Instance of 12 December 1991, Hilti, Case T-30/89, [1991] ECR p. II-1439, at paragraph 66.
[945] WMP's "price" could arguably be deemed to be "hidden" in the overall price for the bundle of Windows and WMP.

example "Windows Media Player SDK" and "Windows Media Format SDK").[946] SDK stands for Software Developer's Kit and is a set of programs used by a computer programmer to write applications compatible with a particular product. Compared to the Platform SDK, Microsoft applies more restrictive licensing conditions to the Windows Media Technologies SDKs. For example, the standard term of the Windows Media Format SDK is one year.[947]

5.3.2.1.2.1 Microsoft argues it bundled media playback software before 1999

(814)   Microsoft's argument to the effect that it had bundled media playing technology with Windows since 1992 (Windows 3.1) cannot invalidate the Commission's findings that two distinct products exist.

(815)   Even if Microsoft's argument that it has been tying media playing technology since 1992 was factually correct, it is in itself legally immaterial for a tying abuse. To the extent that Microsoft argues that the Commission is precluded from pursuing bundling from 1999 onwards as it does not pursue bundling from 1992 onwards, there is no authority to be found for such a theory in Community competition law. The practice of prior bundling cannot comprise its own defence nor exculpate Microsoft's conduct.[948] If it were otherwise, any dominant company could distort competition in adjacent markets simply by not becoming the target of enforcement action for long enough to establish a track record. In fact, in Microsoft's logic the Commission's approach in this Decision shortens the duration of the abuse (a finding of tying since 1992 would lengthen the duration of the abuse) which is advantageous to Microsoft.

(816)   Neither is there any authority to Microsoft's argument that the Commission, in its supplementary Statement of Objections, considered "*that integration of local playback functionality in Windows was permissible, but that integration of streaming media capability was not.*"[949] This misrepresents the Commission's case which takes issue with Microsoft's conduct at a juncture where tying became more harmful than it had previously been. The reasons for this change in the competitive importance of tying have to do with the fact that in 1999, Microsoft tied a product (WMP 6) which matched other vendors' products in the essential functionality that many customers came to expect from a media player (media streaming over the Internet) and with which Microsoft had entered the market for streaming media players in 1998. It does not, therefore, constitute a valid conclusion to state that the Commission considers

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[946]   See RealNetworks' submission of 11 January 2002, on pages 87-93.
[947]   MusicMatch's submission of 8 July 2003, on page 4.
[948]   The Commission takes the duration of an abuse into account when calculating the fine to be imposed. See Article 15 (2) of Regulation No 17.
[949]   Microsoft' submission of 17 October 2003 (response to supplementary Statement of Objections), on page 105.

the bundling of previous media players lawful under Article 82 of the Treaty.[950] At most, it can be said that in this Decision the Commission does not pursue Microsoft's conduct prior to 1999.

(817) It is worth recalling furthermore that in 1992, Microsoft's Multimedia Extensions supported the open MIDI and .wav file formats and did not lock-in users in Microsoft proprietary file formats. Also in 1995, the first *streaming* media player Microsoft announced to distribute together with Windows (Windows 95) was RealNetworks' (then called "Progressive Networks") RealAudio Player, as Microsoft did not yet have a viable streaming media player (Microsoft's NetShow player did not *stream* over the Internet then).[951] Referring to media streaming, Paul Maritz, Group VP of Platforms at Microsoft, said at the time that "*[w]e consider RealAudio is a great technology for accessing audio on the Internet in real time, which is why we included it with our Internet Explorer*".[952] This form of distribution together with Windows did not - of course - mean that the RealPlayer software code could not be fully uninstalled.

(818) To the extent that Microsoft makes its bundling of RealPlayer in 1995 a defence against a tying charge[953], this argument must be rejected as the Commission cannot be precluded from pursuing a given infringement of competition law (tying of WMP) on the basis that it did not pursue another possible infringement (tying of RealPlayer).[954] In any event, to tie another vendor's product would not appear to foreclose the chances of more efficient products as it is in Microsoft's interest to bundle a product which maximises the attractiveness of the package and Microsoft could not be said to have pursued strategic interests on behalf of, for example, RealNetworks, which offers its own codecs and file formats.[955]

(819) It was only in 1999 that Microsoft bundled a media player capable of media streaming (audio) over the Internet in addition to local playback of content.[956] In fact, as stated in the section dealing with market definition, it is media players capable of both media streaming and local play back that satisfy specific consumer

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[950] Microsoft' submission of 17 October 2003 (response to supplementary Statement of Objections), on page 106.

[951] See http://www.realnetworks.com/company/press/releases/1995/livewin95.html, printed 18 September 2002. See also Microsoft's submission of 7 February 2004, on page 49.

[952] See http://www.realnetworks.com/company/press/releases/1995/livewin95.html, printed on 18 September 2002.

[953] Microsoft's submission of 17 October 2003, on page 106.

[954] See recital (817).

[955] *Time Line of Microsoft and RealNetworks Relationship*, November 1998, http://www.microsoft.com/presspass/features/1998/11-18RNrelationship.asp

[956] NERA's statement that "*Windows Media Player was included in Windows in 1992*" is inaccurate as Microsoft's first product called Windows Media Player was released on 7 July 1998.

demand and therefore constitute the relevant product market.[957] While Microsoft's bundled client-side media software was not capable of quality media streaming there were rival products which had a competitive edge over Microsoft's software. Incidentally, this applies to the quality of Microsoft's media player product in general and not only as regards its streaming capabilities. For illustration, Microsoft itself does not think much of its media player called NetShow stating that "*it was unpopular with customers because it did not work very well. [...] By 1999, Microsoft had developed overall multimedia playback functionality (including Internet streaming capability) that was much better [...]*". [958]

(820)   The negative impact of tying until 1999 could therefore be off-set by media player vendors who provided a product that Microsoft was not able to provide.[959]

5.3.2.1.2.2 Microsoft argues that bundling a streaming media player with the operating system is normal commercial practice

(821)   Microsoft states that other software vendors integrate media playing technology in their client PC operating systems[960] and that this is proof of the absence of separate products.

(822)   This argument fails for several reasons. Firstly, Microsoft's test looks exclusively to the behaviour of other vendors of the "tying" product, that is to say, the operating system and disregards that there are independent suppliers of the "tied" product (see recitals (803) and (804)). Secondly, Sun and the Linux vendors to which Microsoft refers to show commercial custom[961] do not bundle their own media players[962] but

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[957]   Entity T16, an Internet service (and content provider), states that the 1998 introduction by RealNetworks of multi-rate streaming and SMIL marked one of the main streaming history keystones. (Entity T16's submission of 9 June 2003, on page 7, answer 60) In *AOL/Time Warner* (Case COMP/M.1845, 11 October 2000) the Commission left open whether this difference could justify two different relevant markets for on-line music delivery. Paragraph 26: "*[...] For the purpose of the present assessment it is unnecessary to decide whether music downloads and streaming constitute one or two separate product markets as the transaction would in any event lead to the creation of a dominant position.*"

[958]   See Microsoft's submission of 17 October 2003, NERA, at paragraph 53, implying that Microsoft matched RealNetworks' innovative features and that this was the reason for the increase in its usage share. Microsoft states that only when it had dramatically improved Internet Explorer did its usage share increase. Although Internet Explorer was bundled in Windows 95, users had still used Netscape's Navigator. See Microsoft submission (NERA) of 8 May 2003, on page 5. Microsoft makes this argument in the context of showing that distribution together with Windows does not have anti-competitive effects.

[959]   Microsoft' submission of 17 October 2003 (response to supplementary Statement of Objections), on page 104.

[960]   See for example Microsoft's submission of 17 October 2003, NERA, on pages 18-19.

[961]   Microsoft Presentation, 12 November 2003, Hearing in Case No COMP/C-3/37.792, at Slide Q 7 and Microsoft's submission of 17 October 2003, on page 19.

[962]   This is not surprising as Lycoris, SuSe and Red Hat are also distributors and service providers that assemble open source software programmes on the basis of the Linux operating system and package them for customers.

third party players offered by independent suppliers: for example, in Lycoris Linux's case RealPlayer, in SuSe Linux's case AlsaPlayer[963] and XMMS player,[964] and in Linux Red Hat's case XMMS player. To the extent that these operating system vendors bundle third party media players , this is – more than anything else - further evidence for the existence of independent suppliers of media players.

(823)   Third, Microsoft chooses to ignore that none of these operating system vendors links the media player to the operating system in a way which makes it unremoveable. Users are left a choice to remove the media player code from their client PCs.[965]

(824)   If anything, the argument that other operating system vendors offer media players together with the operating system shows that customers predominantly want their client PCs to provide multimedia capabilities. Microsoft's conclusion, however, that the operating system and a media player therefore constitute one single product is not valid. For illustration, if Microsoft provided a third party's media player with Windows, rather than its own – or OEMs provided such a bundle[966] - consumers' demand for multimedia capabilities would be equally met. However, logically, this does not mean that this third party media player would be or would become a part of the Microsoft Windows operating system.

5.3.2.1.2.3 Conclusion

(825)   It follows from the foregoing that client PC operating systems and media players are distinct products for the purposes of Community competition law. As products distinct from client PC operating systems, media players are susceptible to be tied within the meaning of Article 82.

5.3.2.1.3 Microsoft does not give customers a choice to obtain Windows without Windows Media Player

(826)   The third element of illegal tying pursuant to Article 82 of the Treaty is that customers are not given the choice of acquiring the tying product without the tied product. The dominant undertaking renders the availability of the dominant (tying) product conditional on the customer's simultaneous acquisition of the tied product.

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[963]   Open Source player, see http://www.alsaplayer.org/main.php3.
[964]   http://www.xmms.org/

[965]   Also Kplayer, which NERA says is integrated in KDE (Microsoft's submission of 17 October 2003, on page 19, note to Table 5) is a removable open source player (http://kplayer.sourceforge.net/) that comes shipped with KDE. The same holds true for gst-player and gnome-xine. In paragraph 33 and footnote 58 *ibid.,* NERA itself seems - somewhat inconsistently - to state that Kplayer and gst-player are included with KDE and GNOME as "*separate applications*".

[966]   See for example HP and Apple's iTunes. As far as online music stores such as Apple's iTunes are concerned, Microsoft has not yet entered the market with a comparable product.

(827)   Normally, the OEMs that license Windows from Microsoft for pre-installation on their client PCs are the direct "addressees" of this coercion, passing it ultimately on to the end-users.[967] By virtue of Microsoft's licensing model, OEMs must license Windows with WMP pre-installed. Microsoft does not offer a licence which would cover Windows without WMP. OEMs which choose to install an alternative media player on Windows can only do so in addition to WMP. If a user buys Windows in a retail store, the same considerations apply.

(828)   It is important to note that the US Settlement addressing monopoly maintenance does not alter this assessment. Removal of end-user access does not restore the choice of Microsoft's customers as to whether to acquire Windows without WMP.

(829)   There are no ready technical means to un-install WMP.[968] According to Microsoft, that is the case because other parts of the operating system and numerous third party products are built to take advantage of the capabilities that WMP provides. If WMP were removed, other parts of the operating system and third party products that rely on WMP would not function properly, or at all.[969]

(830)   Microsoft rejects the applicability of Article 82 (d) of the Treaty, pointing to the absence of a supplemental obligation as customers need not pay "extra" (WMP is distributed with Windows for free) and stating that customers need not use the functionality; they could use functionality developed by others.[970]

(831)   Besides the observation that the applicable law is Article 82 in general, and Article 82 (d) in particular, it has to be noted that the wording of paragraph (d) of Article 82 does not include a reference to "paying" when introducing the element of a "supplemental obligation". Microsoft's line of argumentation, which would only allow for the application of Article 82 in cases where customers need to buy something extra, seems to suggest the absence of competitive harm if customers do not have to spend money for the "tied" product.[971] As a matter of methodological observation, Microsoft hereby conflates the coercion and foreclosure of competition elements of tying.

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[967]   Where Microsoft sells shrink-wrapped versions of Windows in retail shops, the coercion directly applies in regard to consumers.

[968]   See Microsoft's submission of 15 March 2001, on page 13.

[969]   *Ibid.*

[970]   Oral Hearing, Mr. Bellis, *The SOs' allegations concerning multimedia functionality in Windows: the legal issues*, Slide O5. Microsoft's submission of 17 October 2003 (response to supplementary Statement of Objections, at p.109 *et seq.*) See also Microsoft's submission of 17 October 2003 (NERA), on page 20 *et seq.*

[971]   WMP's "price" could arguably be deemed to be "hidden" in the overall price for the bundle of Windows and WMP.

(832)   Nor is there language in Article 82 which would suggest that, in order to show coercion, customers need to be forced to use the tied product. In *Hilti*, for example, users were not forced to use the Hilti branded nails they obtained with the Hilti branded nail gun. The question whether there is foreclosure of competition because customers or suppliers of complementary software and content are *likely to use* the bundled product at the expense of competing non-bundled products is of course relevant. It will be shown in the following section (recital (835) *et seq.*) that the harmful effects on consumers from tying WMP (also) derive from undermining the structure of competition in media players which is liable to result in deterrence of innovation and eventual reduction in choice of competing media players.

(833)   In particular, it will be shown that inasmuch as tying risks foreclosing competitors, it is immaterial that consumers are not forced to "purchase" or "use" WMP. As long as consumers "automatically" obtain WMP - even if for free - alternative suppliers are at a competitive disadvantage. This is because no other media player vendor can guarantee content and software developers similar platform ubiquity.   Content providers and software developers who know that WMP is present on all Windows client PCs (more than 90% of the market) will provide Microsoft with a competitive advantage by developing content and applications primarily to WMP.   These arguments are developed in greater length and supported by evidence in the following section on foreclosure of competition.

(834)   It follows from the above considerations that Microsoft's does not afford customers a choice as to whether to acquire the tying product without the tied product, which is the third constituent element of tying pursuant to Article 82 of the Treaty.

5.3.2.1.4 Microsoft's tying of Windows Media Player forecloses competition in the market for media players

(835)   The fourth element of tying contrary to Article 82 of the Treaty is that tying has a harmful effect on competition. The Court of Justice has stated that it constitutes an abuse when an undertaking in a dominant position directly or indirectly ties its customer by a supply obligation since this deprives the customer of the ability to choose freely his sources of supply and denies other producers access to the market.[972]

(836)   Microsoft interpretation of Article 82 of the Treaty as comprising an element of "forced use" cannot be followed under a systematic interpretation of that provision, insofar as it concerns its applicability to tying-type conduct. Community law must be interpreted in view of not only its wording but also in view of the context in which

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[972]   Judgment of the Court of 13 February 1979, <u>Hoffmann-La Roche</u>, Case 85/76, [1979] ECR p. 461, at paragraphs 98, 90 and 111.

it occurs and in view of the objectives of the rules of which it is part.[973] Article 82 of the Treaty must thus be read in the light of its underlying objective which is to ensure that competition in the internal market is not distorted (see Article 3 (g) of the Treaty). For this reason, Article 82 also applies to conduct which indirectly ties customers, thereby giving rise to exclusionary effects comparable to the ones stemming from "direct" tying.[974]

(837)   In *Hoffmann-La Roche* the Court of Justice applied Article 82 (d) of the Treaty to a rebate scheme which created an economic incentive for customers to source their products exclusively from the dominant company.[975] The rebate scheme did not make the conclusion of the contract subject to acceptance by the other parties of a supplementary obligation.[976] Although Roche's customers were not contractually forced to purchase anything extra - they "only" lost the benefit of the possible rebates if they decided not to cover their need for additional products from Roche - the Court of Justice found the scheme to be exclusionary and Roche to have abused its dominant position. The Court of Justice and the Court of First Instance also found conduct which tended to prevent customers from obtaining their supplies from competing manufacturers to be in violation of Article 82 of the Treaty in subsequent rulings.[977]

(838)   In three recent judgments, the Court of First Instance had an opportunity to apply Article 82 to cases which involved instances of exclusivity/foreclosure. In *Van den Bergh Foods*, the Court of First Instance held that foreclosure of competition under Article 82 in an exclusivity-type case need not reach the level of complete foreclosure but indicated that it must not be insignificant.[978] In the recent *Michelin* and *British Airways* judgments, which dealt with fidelity rebates, the Court of First Instance stressed that the concrete foreclosure effect of abusive conduct need not be

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[973]   Cf. Judgment of the Court of 18 January 2001, <u>Malpensa</u>, Case C-361/98, [2001] ECR Page I-385, at paragraph 31.

[974]   See Judgment of 13 February 1979, <u>Hoffmann-La Roche</u>, Case 85/76, [1979] ECR p. 461, at paragraph 41.

[975]   See Judgment of 13 February 1979, <u>Hoffmann-La Roche</u>, Case 85/76, [1979] ECR p. 461, at paragraph 111.

[976]   See, for the same approach Commission Decision 2001/463/EC in Case COMP D3/34493 DSD OJ L 166, 21 June 2001, p. 1, at recital 114, section 2.2.2 entitled "Obstructive abuse".

[977]   Judgments in <u>Michelin,</u> at paragraph 71, Case T-65/89 <u>British Plasterboard v Commission</u>, [1993] ECR II-389, at paragraph 120 and <u>Irish Sugar</u>, at paragraph 213. See also Judgment of 23 October 2003 in Case T-65/98 <u>Van den Bergh Foods v Commission</u>, not yet reported, at paragraph 160.

[978]   Van den Bergh supplied freezer cabinets to retailers for storage of impulse ice cream, imposing an exclusivity clause as regards the ice cream stored in these freezer cabinets. Van den Bergh had argued that only 6% of the outlets were foreclosed and that this would be *de minimis*. The Court of First Instance concluded that de facto 40% of the outlets were foreclosed although it recognised that the foreclosure was not absolute as retailers were contractually not prevented from buying a second freezer cabinet or replacing the one supplied by the dominant company. See Judgment of 23 October 2003, in <u>Van den Bergh Foods</u>, at paragraphs 149 and 160.

shown as long as it is shown that the conduct in question is liable to have such an effect.[979]

(839)   According to Microsoft, the Commission has not met the requisite standard to prove harm to competition. A tying abuse under Article 82 can therefore not be established. Microsoft submits that the Commission, in order to prove harm to competition, must do more than merely show that Microsoft distributes Windows only together with WMP.[980]

(840)   Microsoft contends that there are circumstances (for example, other media players are given away for free,[981] there are other ways to reach customers than OEM pre-installation, tying has pro-competitive effects) attendant on the bundling of WMP with Windows which would mean that this practice has no negative effect on competition.

(841)   There are indeed circumstances relating to the tying of WMP which warrant a closer examination of the effects that tying has on competition in this case. While in classical tying cases, the Commission and the Courts considered the foreclosure effect for competing vendors to be demonstrated by the bundling of a separate product with the dominant product, in the case at issue, users can and do to a certain extent obtain third party media players through the Internet, sometimes for free. There are therefore indeed good reasons *not* to assume without further analysis that tying WMP constitutes conduct which by its very nature is liable to foreclose competition.

(842)   In the following sections, it will be explained why tying in this specific case has the potential to foreclose competition so that the maintenance of an effective competition structure is put at risk. In a nutshell, tying WMP with the dominant Windows makes WMP the platform of choice for complementary content and applications which in turn risks foreclosing competition in the market for media players. This has spill-over effects on competition in related products such as media encoding and management software (often server-side), but also in client PC operating systems for which media players compatible with quality content are an important application.

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[979]   "*[...] For the purposes of establishing an infringement of Article 82 EC, it is sufficient to show that the abusive conduct of the undertaking in a dominant position tends to restrict competition or, in other words, that the conduct is capable of having that effect.*" (Judgment of the Court of First Instance of 30 September 2003, in Case T-203/01, Michelin, not yet reported, at paragraph 239) "*[...] In the first place, for the purposes of establishing an infringement of Article 82 EC, it is not necessary to demonstrate that the abuse in question had a concrete effect on the markets concerned. It is sufficient in that respect to demonstrate that the abusive conduct of the undertaking in a dominant position tends to restrict competition, or, in other words, that the conduct is capable of having, or likely to have, such an effect.*" See Judgment of the Court of First Instance, British Airways, T-219/99, 17 December 2003, at paragraph 293.

[980]   Microsoft's submission of 16 November 2001, at paragraph 220 *et seq.*

[981]   See for example Microsoft's submission of 17 October 2003 (NERA), on page 20.

Microsoft's tying practice creates a serious risk of foreclosing competition and stifling innovation.[982]

5.3.2.1.4.1 Tying Windows Media Player affords Microsoft unmatched ubiquity on client PCs worldwide

(843)   In 2002, 121 million client PC operating systems were shipped. 114 million of them had Windows pre-installed. In percentage terms, Microsoft holds a market share of 93.8%.[983] In the period from October 2001 to March 2003, 207 million PCs were shipped worldwide. 196 million had Windows pre-installed.[984]

(844)   Through tying WMP with Windows, Microsoft ensures that WMP is as ubiquitous on PCs worldwide as Windows is. No other distribution mechanism or combination of distribution mechanisms attains this universal distribution.[985] Microsoft obviously controls this mode of distribution and (no longer) affords competing media player vendors access to it.[986]

(845)   Users who find WMP pre-installed on their client PCs are indeed in general less likely to use alternative media players as they already have an application which delivers media streaming and playback functionality.[987]

(846)   Microsoft advertises the advantages of OEM pre-installation of software for PC users asserting that "*home users who know little about computers [...] place a premium on*

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[982]   Judgment in <u>Irish Sugar,</u> at paragraph 232: "*The Court has also held that, by prohibiting the abuse of a dominant position within the market in so far as it may affect trade between Member States, Article 82 covers not only practices that are capable of harming consumers directly but also those which harm them indirectly by undermining effective competition (*<u>Hoffmann-La Roche</u>*, para. 125)*".
   See also Order of the President of the Court of Justice of 11 April 2002, Case C-481/01 P(R), <u>IMS</u>, at paragraph 84 "*The reasoning [of the President of the Court of First Instance, according to which the primary purpose of Article 82 EC is to prevent the distortion of competition, and especially to safeguard the interests of consumers, rather than to protect the position of particular competitors] cannot be accepted without reservation, in so far as it could be understood as excluding protection of the interests of competing undertakings from the aim pursued by Article 82 EC, even though such interests cannot be separated from the maintenance of an effective competition structure.*"
[983]   IDC, *Worldwide Client and Server Operating Environments Forecast, 2002-2007*
[984]   RealNetworks's presentation at the Oral Hearing, slide 20.
[985]   In one of the documents Microsoft submitted in the course of the investigation IDC states: "*The Windows operating system is the platform on which Windows Media is built and distributed, giving Microsoft unprecedented reach in distribution.*" See Microsoft's submission of 17 October 2003 (NERA), Exhibit 44, S. Kevorkian, *Microsoft and Streaming Media: A Profile*, on page 8.
[986]   It has been mentioned before (see above, at recitals (305), (306) and (819)) that when Microsoft's media player product, by Microsoft's own admission, did not yet provide a satisfactory consumer experience, Microsoft entered into an agreement with RealNetworks to carry RealPlayer in Windows (in the Internet Explorer).
[987]   Cf. the possibility to download Netscape's Navigator from the Internet could not halt the reversal of market shares as far as Microsoft's Internet Explorer and Netscape's Navigator are concerned. As regards Web browsers, Microsoft's own studies show that most users have never downloaded a browser. See Government exhibit 204, e-mail from Mr. Mehta to Mr. Foulon of 27.3.1997, in United States District Court for the District of Columbia, *United States v. Microsoft*, Civil Action No. 98-1232 and 1232 (TPJ).

buying systems that can be plugged in and run with a minimum of effort."[988] Discussing Windows Media technologies, Microsoft furthermore declares that "*[t]o the extent Microsoft offers consumers certain functionality in its operating systems, it is quite true that they may choose to use what Microsoft offers instead of licensing third-party software products that deliver similar functionality*".[989]

(847)   Microsoft's statement that integration of new functionalities into the operating system "*reduces the price customers have to pay for costly add-ons from other vendors that may not be needed*"[990] is also noteworthy. Third-party media players offering all the functionality of WMP are often *not* given away for free.[991] Microsoft's argument that "*media player vendors have business models in which they give away most copies of their products*" therefore has to be taken with a degree of caution.[992] It would indeed appear that users feel still less inclined to *buy* a second media player - even though it offers more functionality than a basic free version of the same brand - where they have already obtained a comparable full-fledged media player pre-installed on their PC.

(848)   The Commission does not take issue with Microsoft's contention that home users place a premium on buying systems that can be plugged in and run with a minimum of effort.[993] This applies equally to client PCs including an operating system and a streaming media player. It is for this reason that OEMs make a business out of creating bundles including hardware and software to sell to consumers. However, OEM pre-installation of *a* media player would afford end users that benefit and it should therefore already be noted at this juncture that Microsoft's bundling of WMP is not a prerequisite for that benefit (see recital (956) *et seq.*).

5.3.2.1.4.1.1 Installation agreements with OEMs cannot offset Windows Media Player's ubiquity

(849)   There are several aspects which make the option of entering into agreements with OEMs a less efficient and effective means of obtaining media player distribution in the face of Microsoft's tying. While there are a few big OEMs (Dell, IBM, HP, Gateway) which together account for a significant share of the market, small OEMs are dispersed. According to IDC, in 2002, white box PCs (often sold by small OEMs also called system builders) accounted for more than 30% of the world-wide

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[988]   Microsoft's submission of 17 November 2001 (NERA), on page 25.
[989]   Microsoft's submission of 16 November 2001, at paragraph 132.
[990]   Microsoft's submission of 17 April 2000, on page 18.
[991]   For example, ten-band equalizer, cross-fading, and volume leveling functionalities are functionalities which other vendors offer in their premium versions (See http://www.pcmag.com/article2/0,4149,1356874,00.asp, printed 11 January 2004).
[992]   Microsoft's submission of 19 November 2001 (NERA), on page 208. See also Microsoft's submission of 21 October 2003 (M. Iansiti), *Platform Integration and its Implications for Media Players and Operating Systems*, on page 4.
[993]   Microsoft's submission of 17 November 2001 (NERA), on page 25.

market.[994]   Microsoft's May 2003 settlement with Time Warner also shows the interest for even an important Internet access provider such as Time Warner to have efficient access to small OEMs.[995]   On the basis of the settlement, Microsoft grants Time Warner access to its Authorized Replicators[996] for distribution of AOL Access Software on self-contained CDs.[997]

(850)   Another point to keep in mind is that OEM arrangements for pre-installation usually only cover PCs sold to home users. Microsoft states that *"OEM pre-installation of software is not a relevant form of distribution to reach the larger organizations that account for the preponderance of business users."*[998]   Microsoft states that about 55% of new PC sales are made to "large enterprises."[999]

(851)   In any event, as long as Microsoft ships Windows only together with WMP and does not allow for code removal, OEMs face negative incentives to bundle an additional media player that uses up hard-drive capacity[1000] and offers essentially similar functionality[1001] because users in turn are unlikely to pay a higher price for such a bundle.[1002]   Microsoft quotes an OEM which uses WMP *"because it is part of the Windows operating systems"* and *"[Confidential] need to expend additional effort obtaining and loading separate multimedia playback software."*[1003]   Microsoft states at another place that *"OEMs already forced to carry two third-party media players may demand higher compensation to carry another"*. If Microsoft considered that to be the case it would appear to equally apply to the current situation in which Microsoft forces OEMs to carry its own media player.[1004]

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[994]   See *Dell taps market for 'white box' PCs*, ZDNet, 20 August 2002, at http://zdnet.com.com/2102-1103-954477.html, printed 15 January 2003. See RealNetworks' submission of 18 February 2003, on page 13, giving a 45% share for white-box PC sales worldwide.

[995]   Time Warner's submission (fax) of 2 June 2003. Time Warner had brought a civil law suit for damages against Microsoft following the liability finding under the Sherman Act in the US proceedings.

[996]   Microsoft Authorized Replicators are companies that make operating system CDs for smaller OEMs called System Builders.

[997]   Time Warner will ship its CD(s) to the Replicators and these, on behalf of Microsoft, will distribute it together with the Microsoft Windows CDs to System Builders.

[998]   Microsoft's submission of 17 October 2003, NERA, at paragraph 43.

[999]   Microsoft submission (NERA) of 8 May 2003, on page 4.

[1000]   See also Judgment of 28 June 2001, United States Court of Appeals for the District of Columbia Circuit, *United States v. Microsoft*, No. 00-5212, at pp. 36 - 39.

[1001]   See above at recital (846). See also, for example, MusicMatch's submission of 8 July 2003, on page 4: *"Small differences in rendered quality usually do not significantly impact the market success of codecs. [...] standards and broad adoption have a greater marketplace effect than rendered audio quality. In this regard, Microsoft's proprietary WMA is a widely available and commonly used codec, despite the earlier existence and similar functionality of the MP3 codec."*

[1002]   See RealNetworks' submission of 11 January 2002, at paragraphs 151-152 recounting Compaq's position on installing RealNetworks' software together with Microsoft's.

[1003]   Microsoft's submission of 17 October 2003, on page 90.

[1004]   Microsoft's submission of 17 October 2003, NERA, at paragraph 86.

(852)   Further reasons for reticence to ship two players relate to customer confusion and increased support and testing costs.[1005]   For many OEMs, customer support is a major cost of business and the main incremental cost of selling software.[1006]   The risk of increased support and training costs to be incurred by OEMs will continue to exist even if the Microsoft icon is hidden because WMP can be "reactivated" by media files streamed from the Internet in Microsoft's Internet Explorer, the most widely used Web browser.[1007]   Furthermore, Microsoft's continued ability to override the default setting[1008] for a non-Microsoft media player after the US Final Judgment (where the competing program does not provide a particular functionality) means that the possibility of increased support costs is not entirely eliminated even where an alternative player is set as the default player.[1009]

(853)   Microsoft states that in 2003, NERA staff purchased six new PCs from OEMs, of which five PCs included RealOne.[1010]   Microsoft concludes that "*RealOne is carried on many computers.*"[1011]   In the same context Microsoft makes light of the fact that OEMs accounted for less than 3% of RealPlayer's distribution during the second quarter of 2001, in spite of RealNetworks' efforts in this channel[1012] stating that this "*could mean that RealNetworks (for any number of reasons) achieves little distribution through OEMs (at least in that particular quarter two years ago) or that RealNetworks is extremely successful in distributing its software through other channels.*"[1013]

(854)   It has to be noted first that the six PCs purchased by NERA were purchased from OEMs which account for 33% of worldwide sales in the home and small office segments. So 67% are not covered.[1014]   Second, Microsoft's purchases also show

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[1005]   See Judgment of 28 June 2001, United States Court of Appeals for the District of Columbia Circuit, *United States v. Microsoft*, No. 00-5212, at pp. 36 - 39.

[1006]   Cf. Microsoft's submission of 9 May 2003, on page 6. In the context of discussing and rejecting a "must-carry" remedy Microsoft states that "*[s]ince OEMs generally operate on thin profit margins, imposing new costs upon them to support products that they had no choice but to preinstall would likely cause considerable OEM dissatisfaction.*"

[1007]   See MusicMatch's submission of 14 November 2002, on page 10. MusicMatch states that when an MP3 file is clicked on in an Internet music play list or an MP3 file is downloaded using Microsoft Internet Explorer, the files are not sent to the default media player but a prompt window asks the user if he would like to play this file "embeddedly" i.e. using the WMP within IE. MusicMatch further states that as regards Compact Disc Autoplay Functionality Windows XP Service Pack 1 "*now forces the end user to set up account options prior to automatically playing a music compact disc, despite the OEMs default election.*" (p. 11)

[1008]   A default-set media player is the player which is used automatically whenever multimedia files are played.

[1009]   See US Final Judgment, Civil Action No. 98-1233 (CKK), 1 November 2002, Section III.H.

[1010]   Microsoft's submission of 17 October 2003, NERA, on page 24.

[1011]   Microsoft's submission of 17 October 2003, NERA, at paragraph 46.

[1012]   See RealNetworks' submission of 11 January 2002, at paragraphs 157-173 and its submission of 18 February 2003, on page 11.

[1013]   Microsoft's submission of 17 October 2003, NERA, on page 24, footnote 77.

[1014]   In addition, presumably not all PC lines of the OEMs covered would carry these media players.

that in 2003, Apple's QuickTime Player was not preinstalled on five of the six PCs purchased and MusicMatch was not installed on three of the six PCs.

(855) As regards RealNetworks, during the twelve month period from October 2001 through September 2002 *"RealNetworks' media players were preinstalled pursuant to its distribution deals with OEMs [confidential] on fewer than [confidential] - or substantially less than [1% to 15%]* - of the 134 million PCs shipped worldwide."*[1015] Extending the reference period from the fourth quarter of 2001 through to the first quarter of 2003, RealNetworks confirmed at the Oral Hearing that its OEM pre-installation rate pursuant to deals with OEMs was less than [1% to 15%]* of total PC sales.[1016] From October 2001 to March 2003, the RealOne Player was preinstalled in that way on [confidential] million PCs while WMP was preinstalled on 196 million PCs shipped.[1017]

(856) Moreover, the 2001 distribution agreement between RealNetworks and Compaq for example, which establishes RealPlayer as the default player on a certain line of Compaq PCs[1018] (WMP is invariably present on these Compaq PCs), exemplifies the significant additional cost that tying imposes on Microsoft's rivals.[1019] Microsoft acknowledges that RealNetworks pays OEMs to preinstall its software in order to promote usage of its products on the client side.[1020] RealNetworks' submissions show that it has agreed with Compaq on a revenue sharing model of not insignificant

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*   Parts of this text have been edited to ensure that confidential information is not disclosed.
[1015]   RealNetworks' submission of 18 February 2003, on page 12. In Entity T20's view, RealNetworks is *"rapidly losing presence on user devices, and barring any significant (and unlikely) change of market circumstances, is unlikely to be present in the multimedia player technology business in any significant way within about three years."* (Entity T20's submission of 21 May 2003, at answer 36)
[1016]   *Presentation to European Commission on Behalf of RealNetworks*, Steven Salop, 14 November 2003, at Slide 7. See also presentation of RealNetworks at the Oral Hearing, 14 November 2003, Slide 20. See also RealNetworks' submission of 5 January 2004.
[1017]   Presentation of RealNetworks at the Oral Hearing, 14 November 2003, Slide 20. While direct OEM pre-installation can be conceptually differentiated from deals such as RealNetworks' has with Time Warner (see paragraph (873)) those deals must of course be taken into consideration and account for a significant part of RealPlayer's distribution (see recital (943)).
[1018]   *Compaq PCs to Include RealNetworks Software* Reuters.com, 12 December 2001, "*RealNetworks Inc. said on Wednesday Compaq Computer Corp., the world's No. 2 PC maker, will include its software on new computers, giving the Internet media company an important outlet to consumers as it builds steam behind its online subscription service. [...] The RealOne player will also be the default software for playing CDs and MP3 music files on Compaq PCs. Moreover, an "entertainment" button on the Compaq keyboard will direct users to the RealOne site,[...]"*
[1019]   Findings of Facts of United States District Court for the District of Columbia, *United States v. Microsoft*, Civil Action No. 98-1232 and 1232 (TPJ), at paragraph 240: "*To the extent Netscape is still able to distribute Navigator through the OEM channel, Microsoft has substantially increased the cost of that distribution. Although in January 1999 (in the midst of this trial), Compaq suddenly decided to resume the pre-installation of Navigator on its Presario PCs, Compaq's reversal came only after Netscape agreed to provide Compaq with approximately $700,000 worth of free advertising.*"
[1020]   See Microsoft's submission (NERA) of 17 April 2002, at paragraphs 25 and 45. See also Microsoft's submission of 7 February 2004, on page 42. where Microsoft specifies that such deals can take the form of revenue sharing arrangements. See also *a contrario* Microsoft's submission of 17 October 2003, at Annex B, [confidential] stating that must-carry would "*eliminate a future revenue opportunity*".

relevance.[1021]   Another point to keep in mind is that RealNetworks' deal with Compaq does not cover PCs shipped to enterprises, which account for over half of PC sales.[1022]

(857)   In conclusion, tying WMP creates disincentives for OEMs to ship third party (streaming) media players pre-installed on their PCs.

5.3.2.1.4.1.2 Downloading cannot offset Windows Media Player's ubiquity

(858)   Alternative channels (to OEM pre-installation) of obtaining software such as media players are considered less efficient by consumers. A distribution channel different to pre-installation is the Internet, where vendors can offer their media players for download. Microsoft states that in recent years multimedia playback software has been "*updated much more frequently than most consumers are willing to obtain a new PC or upgrade their entire operating system.*" Microsoft itself "*relies heavily on the Internet to distribute upgraded version of Windows Media Player*".[1023] According to Microsoft, users on average use more than just one media player, which shows the viability of the download channel.[1024]

(859)   There is no doubt that, among the alternative distribution channels to pre-installation of software, downloading is the most important. Microsoft, as well as its competitors, reach a significant number of users through offering their media players for download. However, downloading is not a channel which can be compared in efficiency to (OEM) pre-installation.

(860)   Microsoft refers to Media Metrix[1025] data according to which each media player user in June 2002 employed media players from an average of 1.7 vendors.[1026] However, as downloading a media player enables users to add a second media player to their PC and not to replace WMP, the 1.7 media players used cannot detract from the fact that WMP is always pre-installed on Windows PCs. The other media player used, and therefore installed, may sometimes be QuickTime sometimes RealNetworks' player and sometimes yet another player (cf. recital (920)).

[1021] [0]   See RealNetworks' submission of 11 January 2002, at paragraphs 177 and 178. See also MusicMatch's submission of 14 November 2002, on page 10: "*While Microsoft finances distribution of its Windows Media Player through its operating system, other media players must compete for distribution with marketing programs and revenue sharing partnerships. This imbalance places below-cost price pressure on other media players like MM Jukebox Plus, and threatens their survival.*"

[1022]   See above, at recital (850).

[1023]   Microsoft' submission of 17 October 2003 (response to supplementary Statement of Objections), on page 96. See also Microsoft's submission of 7 February 2004, on page 37.

[1024]   Microsoft's submission of 17 October 2003, NERA, at Annex B-4.

[1025]   Media Metrix, which Microsoft described in 2001 (NERA Report attached to Microsoft's submission of 16 November 2001, at paragraph 350) as the leading market research firm in the area of Web multimedia, is now part of Jupitermedia (Nasdaq: JUPM).
See http://www.jupiterresearch.com/bin/item.pl/home.

[1026]   Microsoft's submission of 17 October 2003, NERA, at Annex B-4.

(861) Microsoft and alternative vendors seek to have content providers and software developers target their content and applications to them. The *guaranteed* distribution and instalment of a given media player on a user's PC assumes particular importance in a situation of limited resources and cost constraints. In other words, what is critical in a market characterised by network effects is not so much whether downloading allows for widespread distribution of competitors' media players, but whether downloading allows for distribution of the competing products which is approximately equal to WMP's. Downloading does not achieve this.

(862) As regards business PCs, Microsoft asserts that "*OEM pre-installation of software is not a relevant form of distribution to reach the larger organizations that account for the preponderance of business users. These organizations routinely either tell OEMs the specific applications they want preinstalled on new PCs or erase everything from the hard disks of all PCs and install their own standard software*".[1027] But Microsoft's dominance in client PC operating systems does not depend on whether the home or business segment of the client PC operating system is looked at. So regardless of whether organisations might indeed "*erase everything from the hard disks of all PCs*" it is an undisputed fact that they predominantly have Windows - which apparently they most often reinstall after having erased everything - and therefore WMP on their desktops. This is different for vendors like RealNetworks. One reason for their lower distribution rate on business PCs has to do with the fact that businesses often prevent their employees from downloading software on their desktops.

(863) Microsoft alone is able to tell developers that the ubiquitous distribution of WMP is assured as it is bundled with Windows while the distribution of other media players remains haphazard. In the light of this, Microsoft's argument to the effect that users use on average more than one media player[1028] does not invalidate the foreclosure as established in the Section entitled "*Effect on content providers and software developers*".[1029] To the extent that alternative distribution channels such as downloading a media player do not enable third party vendors to achieve similar guaranteed "ubiquity" to that enjoyed by Microsoft by bundling WMP, tying will entail foreclosure of competition due the fact that complementary content and

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[1027] Microsoft's submission of 17 October 2003, NERA, at paragraph 43.
[1028] Microsoft's submission of 19 November 2001, NERA, at paragraph 250 and Microsoft's submission of 17 October 2003, NERA, at paragraph 39. In any event, the one media player users are most likely to use is WMP. See Microsoft's submission of 17 October 2003, NERA, on page B-9: "*According to the [Microsoft commissioned] August 2003 survey, of the respondents who used at least one media player, 74 percent (89 of 121) used Windows Media Player, 60 percent (72 of 121) RealPlayer/RealOne, and 31 percent (37 of 121) QuickTime.*"
[1029] See Microsoft's submission of 17 October 2003, on page 81 stating that "*because of Windows, software developers can [be ...] confident that their products will run on any PC on which Windows is installed.*"

applications are liable to be primarily developed for WMP (network effects of ubiquity).

(864) Microsoft states that more than 100 million copies of WMP 9 were downloaded in the ten months the software was available to the general public[1030] and specifies that "*[t]hese copies were downloaded by people who already had a version of Windows Media Player installed on their PCs.*"[1031] Microsoft concludes that these "*statistics rebuts the notion that consumers are unwilling to download a media player from the Internet if they already have one on their PC.*" But Microsoft states that the media player these users "*already [have] on their PC*" was WMP. This is important to note because Microsoft has implemented a mechanism in WMP by which WMP regularly looks for WMP upgrades on Microsoft's Web site (it "phones home"), and in case it finds such an upgrade, prompts the user to download it.[1032] The users Microsoft refers to are thus likely to have been prompted to download WMP 9 (and repeatedly so if they chose not to do so at the first prompt).

(865) Downloading a WMP upgrade in a situation where Microsoft recommends to do so via a recurring screen prompt is different from a situation where third party media player vendors – whose players are *not* automatically present on each newly bought Windows PC – have no possibility to prompt users to download their media player onto the PC *for the first time.* Only once the initial obstacle of the first download has been overcome will they also be able to rely on mechanisms which allow them to use screen prompts to offer the user downloads of upgrades.[1033]

(866) Yet another reason why downloading does not constitute as efficient a distribution channel as OEM pre-installation is that downloading is viewed as complicated by a not insignificant number of users, while using the pre-installed product is not.[1034] In this respect, it is also relevant that a significant number of download attempts are not successfully concluded.[1035] The complexity cost of downloading a media player may

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[1030] Microsoft' submission of 17 October 2003 (response to supplementary Statement of Objections), on page 96.

[1031] Microsoft' submission of 17 October 2003 (response to supplementary Statement of Objections), on page 96.

[1032] This mechanism was discussed and confirmed by Ms. Averett, Microsoft, at the Oral Hearing.

[1033] See Microsoft' submission of 17 October 2003 (response to supplementary Statement of Objections), on page 97.

[1034] See for example Entity T11's submission of 18 July 2003, at answer 17. See also Findings of Facts of 5 November 1999, United States District Court for the District of Columbia, *United States v. Microsoft*, Civil Action No. 98-1232 and 1232 (TPJ), at paragraph 146.

[1035] According to a RealNetworks' test series in 2003, more than 50% of download attempts fail. See Presentation of RealNetworks at the Oral Hearing, *Case COMP/C-3/37.792-Microsoft*, 14 November 2003, slide 19. See also RealNetworks's submission of 5 January 2004. See also question by the Commission in the Oral Hearing answered by Mr. Poole. Mr. Gates states that it is an objective for the future for downloading of software to be error-free: "*We want it to be very clear that downloading new software onto that PC is something that doesn't disrupt the machine, that works 99 percent of the time; and we know we're not there today, but through that monitoring, through these advances, we can make that the case.*" (*Integrated Innovation: Software Magic*, 2003 Financial Analyst Meeting July 24, 2003,

be expected to be less important for sophisticated users who are familiar with configuring their software.[1036]

(867)   Microsoft itself, in the context of explaining the benefits of a pre-installed WMP (as opposed to a downloadable WMP) states that "*requiring users to download more than ten megabytes of software code before they can access multimedia content is extremely inconvenient.*"[1037]   It is probable that Microsoft referred in this quote (from 2001) to downloading via narrowband, yet it rightly points out in a 2003 submission to the Commission that "*the penetration of broadband [in Europe ...] is much lower than in the United States*".[1038]   Therefore, the inconvenience of downloading a media player is in Microsoft's own view a real issue, at least in Europe.

(868)   It is inaccurate to imply that only a broadband connection to the Internet makes media streaming worthwhile (and that these users would then invariably enjoy shorter download times for the player).[1039]   It is precisely media streaming over modem connections to the Internet that has been made possible by media players such as RealPlayer, in 1995, and WMP 6, in 1998.[1040]   Microsoft states that "*[w]ith the introduction of improved streaming media capability, even users with low -speed dial-up connections could begin listening to an audio clip or watching a video clip before it had been fully downloaded from the Internet, creating an impression similar to that of radio or broadcast television.*"[1041]   In 1999, Microsoft advertised Windows Media Technologies 4 including WMP as "*the only streaming media platform to deliver FM-Stereo-Quality audio to modem users*",[1042] and at the beginning of 2003,

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Bill Gates, http://www.microsoft.com/msft/speech/FY03/GatesFAM2003.mspx, printed on 9 January 2004.

[1036]   The existence of more sophisticated users also accounts for the number of consumers who obtain RealPlayer in the presence of Microsoft's bundling.

[1037]   Microsoft's submission of 3 June 2001 in Case IV/C-3/37.345, at pp. 10 and 11 (emphasis added). See also Microsoft's submission of 17 October 2003 (NERA), at footnote 30, "*Strategy Analytics reports that in 2003, only 7.5% of EU households had broadband connections as compared to 27% in the United States.*" Broadband would allow for faster downloading and would consequently diminish complexity costs related to the vagaries of downloading. However, in 2002 in Europe, only one sixth of the households who had Internet access have a broadband connection. Narrowband access over standard telephone lines accounts for 72% of the households who have Internet access. (Flash Eurobarometer 125 "*Internet and the public at large*", May/June 2002, http://europa.eu.int/comm/public_opinion/flash/fl125_en.pdf).

[1038]   Microsoft submission (NERA) of 17 October 2003, on page 9.

[1039]   Microsoft's submission of 17 October 2003, NERA, at paragraph 48.

[1040]   "*Listening to online radio proved to be a relatively popular pastime for survey respondents.*" Microsoft's submission of 17 October 2003 (NERA), Exhibit 44, S. Kevorkian, *Microsoft and Streaming Media: A Profile*, on page 5.

[1041]   Microsoft's submission of 17 October 2003, on page 85.

[1042]   *Microsoft Announces Beta Release of Windows Media Technologies 4.0*, 13 April 1999, http://www.microsoft.com/presspass/press/1999/Apr99/WMT4Betapr.asp

Microsoft says that Windows Media 9 provides quality audio and video streaming for dial-up users.[1043]

(869) Moreover, users may expect a media player provided "out-of-the-box" together with the hardware to yield better results than a product they need to self-install.[1044] Another obstacle to downloading is that Windows generates an error message if a user tries to access content that WMP does not support.[1045] In such circumstances an unsophisticated user may feel insecure about downloading a media player.[1046] Last but not least, it must be recalled that in many corporations, employees are prevented from downloading software as downloads increase complexity for IT administrators who would need to manage disparate desktops.

(870) A supply-side aspect to consider is that, while downloading is in itself a technically inexpensive way of distributing media players, vendors must expend resources to overcome end-users' inertia and persuade them to ignore the pre-installation of WMP.

(871) For the above reasons, downloading is not an adequate alternative to pre-installation, that is to say, it is not an alternative which would off-set the negative impact that tying WMP has on competition. Incidentally, if Microsoft seriously considers that downloading is an equivalent alternative to pre-installation, its insistence on maintaining its current privilege of automatic pre-installation appears inconsistent.

5.3.2.1.4.1.3 Other alternative distribution channels are also second-best

(872) Apart from downloading, another distribution channel Microsoft mentions is to bundle media players with other software or Internet access services.[1047] This, however, is also a second-best solution and does not rival the efficiency and effectiveness of distributing software pre-installed on (Windows) PCs. Normally, media player vendors are forced to exchange something of value with other software vendors in order for their product to become part of the bundle.[1048] Moreover, no

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[1043] See Final Release of Windows Media 9 Series Starts Next Wave of Digital Media, 7 January 2003, http://www.microsoft.com/presspass/press/2003/jan03/01-079SeriesFinalReleasePR.asp. According to Microsoft, WMP 7 offered "*immediate access to over 1,500 Internet radio stations from around the world offering you the superior sound quality of Windows Media Format.*" (*Windows Media Player 7.1 for Windows 98*, http://www.microsoft.com/windows/windowsmedia/software/playerv7.aspx, printed 4 December 2003))

[1044] Microsoft's submission of 17 November 2001 (NERA), on page 25.

[1045] See Microsoft error codes at http://support.microsoft.com/default.aspx?scid=/support/mediaplayer/wmper/wmperrcode_main.asp

[1046] See for example the statement of [confidential] in Microsoft's submission of 17 October 2003, at Annex B.

[1047] See for instance Microsoft's submission of 16 November 2001, on page 60 *et seq.* Microsoft's submission of 17 October 2003, on page 97 *et seq.*

[1048] See below at recital (875).

other software products (or Internet access services) have attained Windows' ubiquity on client PCs.

(873) There are several reasons why even a popular Internet access service such as Time Warner's (previously AOL/Time Warner), which comes pre-bundled on many client PCs, cannot compete with Windows' reach as a carrier for media players.[1049] First, AOL is pre-bundled only on certain branded PCs (such as for example those of IBM and Dell), and not on so-called "white box" (unbranded) PCs sold by smaller OEMs. According to IDC, in 2002, white box PCs accounted for more than 30% of the world-wide market.[1050] Second, AOL is primarily pre-bundled on home, and not corporate computers, which means that a significant share of corporate PCs[1051] have only Microsoft's Windows Media Player installed. Third, many AOL pre-bundles are not automatically active but require the user to install AOL.[1052] This type of AOL preload does not install RealPlayer, it does not enable the playing of content and does not expose its APIs - unless the user chooses to install AOL.[1053] As a result, for the US, this means that in 2002 (only) less than [confidential]% of all PCs shipped with AOL pre-installed, including the PCs where AOL is preloaded but "dormant" - a penetration which is nowhere near that reached by WMP due to pre-installation with Windows.[1054] Outside the US the relevant share of PCs being shipped with AOL pre-installed is [confidential]%.[1055] Moreover, as will be explored below at recital (879) *et seq.*, in the context of the network effects in the media markets on client and server side, wide distribution in itself does not provide for competitive viability against a streaming media player which enjoys "guaranteed" distribution on all Windows PCs.

(874) Last but not least, account must be taken of Time Warner's recent Digital Content Co-operation Agreement with Microsoft which may put Time Warner's relationship with RealNetworks in doubt.[1056] Under the terms of the agreement with Microsoft, Time Warner obtains an assurance, valid for a [confidential]-year period, that its technology will be compatible with Microsoft's digital media solutions,

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[1049] AOL ships with RealOne Player.

[1050] See *Dell taps market for 'white box' PCs*, ZDNet, 20 August 2002, at http://zdnet.com.com/2102-1103-954477.html. See RealNetworks' submission of 18 February 2003, on page 13, giving a 45% share for white-box PC sales worldwide.

[1051] According to RealNetworks, corporate PC sales account for roughly two thirds of OEM sales (RealNetworks' submission of 18 February 2003, on page 12 relying on IDC data). See also Time Warner's submission of 8 January 2002, on page 8 implying a share of [confidential] for OEM sales to business customers. Microsoft states that about 55% of new PC sales are made to "large enterprises". See above, at recital (850).

[1052] Time Warner states that [confidential]% of the "preloads" are of this form in the US and [confidential]% outside the US. See Time Warner's submission of 8 January 2002, on page 9.

[1053] Time Warner's submission of 8 January 2002, on page 8 and 9.

[1054] Time Warner's submission of 8 January 2002, on page 9.

[1055] Time Warner's submission of 8 January 2002, on page 9. On [confidential]% of the PCs shipped in 2002 outside the US, AOL was pre-installed in active state.

[1056] [confidential]

[confidential]. While on the basis of the agreement, Time Warner does not commit itself to the use of Microsoft technologies, the possibility that it may do so remains, and this may have an adverse effect on its relationship with RealNetworks.

(875)   At the Oral Hearing, RealNetworks presented evidence on the inefficiency of distributing CDs including RealPlayer together with Tiscali's Internet Access Service.[1057] The "carpet bombing" in the United Kingdom and France ([confidential] CDs shipped since 2000) led to the installation of about [confidential] copies of RealPlayer, that is to say, a success rate of [confidential]% (whereas the measure cost RealNetworks EUR [confidential]).[1058] Equally, "extra CD" deals with hardware vendors such as [confidential][1059] have proven to not lead to satisfactory uptake.[1060]

(876)   Yet another way to distribute media players is via retail. However, when independent vendors have to turn to retailers to distribute their media players as separately packaged products (another distribution channel for software), they incur higher costs compared to pre-installation on client PCs. At consumer level, end-users who purchase a non-Microsoft media player from retailers incur transaction costs that are absent when users find the media player pre-installed on their computer as part of the operating system.[1061] In addition, retailers generally do not distribute products without charging a price for them.

5.3.2.1.4.1.4 Conclusion

(877)   From the above, it follows that alternative distribution channels do not enable media players competing with WMP to match the ubiquitous and guaranteed presence of the pre-installed WMP code on client PCs worldwide. This situation is not altered by the US Final Judgment as WMP binary code continues to be pre-installed together with Windows on every Windows client PC shipped to customers.

(878)   It will be shown in the following that, in view of the indirect network effects obtaining in the media player market, the ubiquitous presence of the WMP code

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[1057]   See Microsoft's slide U 14 at the Oral Hearing concerning Tiscali.
[1058]   See Presentation of RealNetworks at the Oral Hearing, 14 November 2003, slide 18 and 18 RealNetworks's submission of 26 February 2004, slide.
[1059]   See Microsoft's submission of 17 October 2003, on page 97.
[1060]   Intel distributed RealNetworks' products on CDs that were shipped along with Intel desktop motherboards. According to RealNetworks, such CD distribution, resulted in an actual installation rate of approximately 1.5% in 2003 (149,336 installs on 10 Million CDs shipped). (RealNetworks's submission of 26 February 2004)
[1061]   Cf. the District Court's findings in the US Microsoft case: "*[...] The primary reason is that the other channels require users to expend effort before they can start browsing. The traditional retail channel, for example, requires the consumer to make contact with a retailer, and retailers generally do not distribute products without charging a price for them.*" Findings of Facts of 5 November 1999, United States District Court for the District of Columbia, *United States v. Microsoft Corporation*, Civil Action No. 98-1232 and 1232 (TPJ), at paragraph 145.

provides it with a significant competitive advantage, which is liable to have a harmful effect on the structure of competition in that market.

5.3.2.1.4.2 Effect on content providers and software developers

(879)   Content providers and software developers look to installation and usage shares of media players when deciding – under resource constraints - on the basis of which technology to develop their complementary software. Media players constitute platform software in so far as applications and content are developed for them.[1062] Microsoft itself stresses the importance of the interdependency between player usage and availability of content and applications (without stating that ubiquity of the "platform" influences content and applications development).[1063]

(880)   To develop their solutions to Microsoft's WMP ensures content providers' and software developers' products a possible reach which is equal to Microsoft's share of the client PC market, that is to say, above 90% worldwide.[1064] So they will primarily target WMP. In Microsoft's own words:

> "independent software vendors […] find it beneficial to be able to rely on ubiquitous APIs. Microsoft's decision to integrate its media player in Windows enables software developers to count on the presence of multimedia APIs on all machines where the operating system is installed."[1065]

(881)   Once complementary software is encoded in the proprietary Windows media formats, it can only be played back on independent vendors' media players if Microsoft chooses to license its technology. In the absence of format and codec interoperability, the compatibility of content and applications with a specific media player constitute in their own right significant competitive factors. They help drive popularity of the media player which, in turn, drives uptake of the underlying media technology, including supported codecs, formats (including DRM) and media server software.

[1062] "*The way in which multimedia technology in Windows has made it progressively easier for software developers to create multimedia applications exemplifies the platform characteristics of Windows.*" (Microsoft, 3 June 2001, on page 9) See also: "*In some cases the vendors simply include media players developed by others, but often media players are integral to the platform and expose APIs for use by developers and to support hardware devices.*" Microsoft's submission of 17 October 2003, NERA, on page C-4.

[1063] See Microsoft's submission of 17 April 2002 (NERA), on page 11. Usage statistics will be looked into in Section 5.3.2.1.4.3 below.

[1064] "*By designing Windows to include multimedia playback functionality, […] Microsoft ensures wide distribution of the multimedia playback APIs within an integrated platform. Software and hardware developers can design media-enabled products that will work on any PC with running Windows.*" (Microsoft's submission of 21 October 2003 (M. Iansiti), *Platform Integration and its Implications for Media Players and Operating Systems*, on page 24)

[1065] Microsoft's submission of 17 April 2002 (NERA), at paragraphs 22 and 43.

(882)   Through tying WMP, Microsoft thus creates a positive feedback loop reminiscent of the one that propelled Windows to its quasi-monopoly position in the client PC operating system market. The possibility for OEMs to hide end-user access to WMP will not alter this mechanism. As long as the WMP *code* is present, content streamed from the Web or applications running on the client PC are able to call upon this code – whether end-user access is removed or not.

5.3.2.1.4.2.1 Content providers

(883)   Content providers select the technology (for example codecs, file formats, DRM[1066]) in which to encode their content for access by end-users. Since supporting many different technologies generates additional development, infrastructure and management costs, content providers have natural incentives to favour a single technology on the basis of which to develop and manage digital content provided that this technology allows them to reach a wide audience. Microsoft's contention that "*it is not costly to encode in multiple formats*"[1067] is not only not borne out by the content providers' replies to the Commission's requests for information but is also contradicted in its own submission of an IDC research paper which states that to encode streaming content for delivery in multiple formats is "*expensive and time-consuming for content providers and confusing for end users.*"[1068]

(884)   In the framework of the Commission's 2003 market enquiry, companies which the Commission considered were active in the content provision business[1069] were asked whether making content available for more than one technology generated additional costs.[1070] All respondents answered in the affirmative, mentioning mainly additional person/hours for content preparation, additional hardware/infrastructure costs and also additional licensing costs.[1071] The estimates of the importance of the additional costs range between 20% and 100% of the original costs of providing content in only

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[1066]   See recital (65).

[1067]   Microsoft's submission of 17 October 2003, NERA, at paragraph 65. See also D. Berlind, *Microsoft blows smoke, but will the European Union smell it?*, 5 January 2004, http://techupdate.zdnet.com/techupdate/stories/main/Microsoft_blows_smoke.html, printed on 14 January 2004.

[1068]   See Microsoft's submission of 17 October 2003 (NERA), Exhibit 44, S. Kevorkian, *Microsoft and Streaming Media: A Profile*, December 2001, on page 3.

[1069]   15 companies in total of which 12 provided an answer: Entity T10, Entity T11, Entity T12, Entity T13, Entity T 14 (entities attributed T numbers claimed confidentiality as regards their identity), Entity T15, Entity T16, Entity T17, Entity T18, Entity T19, Entity T20, Entity T34, IFILM (no answer), Listen.com (no answer), VidZone (no answer).
        Entity T11, Entity T18 and Entity T20 also develop applications (see answers to questions 43 to 56 of the Commission's request for information). Entity T16 answers questions 43 to 56 referring to integration work it carries out.

[1070]   Question 19 of the Commission request dated on 16 April 2003 reads: "*Does it cost more for your company to make available the same content based on two (or more) different technologies when compared to making it available based on just one?*"

[1071]   Of the 12 companies which responded, all saw themselves in a position to give an answer and answered in the affirmative.

one format, with the average lying at above 50%.[1072]   Entity T34, a digital music service provider (business-to-business and business-to-consumer), answers *"Yes – very significantly more - the cost is primarily in integrating our applications with other suppliers, the licensing costs are not really a major factor."*[1073]   Entity T3[1074] states that *"[...] the relatively high costs of content preparation may reduce the economic incentive for record companies and/or online portals to support multiple formats with different reaches. Individual record companies will balance these additional costs against the benefits of extended reach and supporting multiple Technologies.*[1075]   Last but not least, Microsoft itself states that *"[f]inally, content authors have made large investments in using Windows Media formats for encoding their audio and video."*[1076]

(885)   Wide (or wider) spread instalment of a given media player that includes a given set of media technologies is an important factor in convincing content developers to develop media content in support of the particular set of technologies implemented in that media player.[1077]   By supporting the widely disseminated media player, developers maximise the potential reach of their own product.[1078]   They can reach the user directly and are not dependent on the user installing a media player to interact with their content.   In turn, the more (and richer) complementary content and software is available for a given media player, the higher the consumer demand for this media player will be, since – as has been explained - an important "feature" of a media player in the eyes of end users is its ability to interact with a significant amount of quality media.   NERA, on behalf of Microsoft, submits that *"[c]onsumers*

[1072]   Question 20 of the Commission request dated 16 April 2003: *"If there are additional costs for your company, how much, in terms of percentages, do these additional costs amount to relative to the original costs of providing content in only one format?"*   Of the 12 companies which responded, 8 saw themselves in a position to estimate the additional costs: Entity T11 (70%), Entity T14 (54%), Entity T15 (30-40%), Entity T16 (20-30%), Entity T18 (20%), Entity T19 (100%, from response to question 19), Entity T20 (50-80%), Entity T34 (50%). The average of over 50% is a result of the average of the mean values given (for example, if a company indicates 30 to 40% as the additional costs, the mean used for calculating the overall average is 35% for this company).

[1073]   Entity T34's submission of 7 August 2003, at answer 19.

[1074]   Entity T3 represents the international recording industry. It has as members around 1500 record companies in 76 countries and recognises national trade associations as Entity T3 National Groups in 46 countries.

[1075]   Entity T3's submission of 3.6.2003, at answer 4. Question 4 of the Commission request dated 16 April 2003 asked media associations whether they consider a digital media distribution Technology's reach to be a significant factor in deciding which technology to support.

[1076]   Microsoft's submission of 21 October 2003 (M. Iansiti), at p. 7.

[1077]   Microsoft states that this is the case discussing RealNetworks business model: *"[…] RealNetworks can then urge content providers to encode their content in Real proprietary formats for an additional reason: the software required to play such content is in the hands of hundreds of millions of consumers."* (Microsoft's submission of 16 November 2001, at paragraph 135)

[1078]   See Microsoft's submission of 21 October 2003 (M. Iansiti), *Platform Integration and its Implications for Media Players and Operating Systems*, on page 19: *"Content providers benefit from the integration of multimedia playback functionality in Windows – they can encode their content in Windows Media formats, knowing that many potential viewers already have the ability to view the content on their desktops, and knowing that if users need an updated version of the multimedia playback functionality in Windows, they can easily download the required software from the Internet."*

have a preference for those media player technologies for which there are more content (records, videos, etc.) and more software applications and services available."[1079]

(886)   The content providers were asked whether a technology's reach and the presence of media client software on PCs were significant factors in deciding which technology to support.[1080]   *All* companies who answered these questions did so in the affirmative.[1081]   Asked whether a technology's reach with consumers is important in its decision as to which technology to support, Entity T8, a content owner, states that "*reach is the primary issue for us. We believe that the almost ubiquitous presence of Microsoft's media player on personal computers (at no cost) is a fundamental reason for its current market position.*"[1082]

(887)   Entity T20, one of the largest content providers, states that

"[t]he more widespread the Technology on the users' PCs, the more inclined [company] will be to offer services for that Technology and support the Technology. […] [Company[1083]] has all but stopped supporting Real as a Technology because it viewed the cost of supporting a second multimedia player as disproportionate to the number of users taking advantage of the Technology. It is much simpler and more cost-effective to support only one player if that Technology has become virtually ubiquitous with users and such technology is generally of an equivalent or better quality."[1084]

(888)   A member of an association of digital media and technology companies[1085] states that "[t]*he final decision is often a compromise between the ideal total reach and its economic feasibility. Therefore retailers must in practice select a limited number of*

[1079]   See submission of 17 April 2002 (NERA), on page 11 (emphasis added). Usage statistics will be looked into in the section entitled "Market developments" below.

[1080]   Question 33 of the Commission request dated 16 April 2003: "*Is the Technology's reach, i.e. how many users can or will be able to interact with the Technology (and content), a significant factor in deciding which Technology to support?*" Question 34 of the Commission request dated 16 April 2003: "*How if at all does the presence of certain client software on personal computers (or devices) influence your decision to use certain Technologies?*"

[1081]   Of the 12 companies which sent a reply, all answered question 33 in the affirmative. As regards question 34, 11 out of these 12 companies answered this question (Entity T14 claims confidentiality for its answer to Question 34.) All 11 companies indicate that the presence of certain client software is significant for their decision to use certain technologies.

[1082]   Entity T8's submission of 30 May 2003, at answer 33.

[1083]   Company name of Entity T20 is confidential.

[1084]   Entity T20's submission of 21 May 2003, at answer 13.

[1085]   A European association whose members are companies, representing key technology developers, webcasters, online and "click & mortar" retailers, and music community web sites and law firms.

supported players, reason why this company has decided to support WMP because of its dominant share in the base of installed players".[1086]

(889)   Many large content owners do not take the decision as to which technology to use themselves, but rather leave this to intermediaries (such as for example Entity T34). One of the large content owners surveyed by the Commission, Entity T9, provides its opinion on intermediaries' incentives:

> "As far as the technologies used by [company]'s partners, "reach" appears to be the single most important factor. As mentioned above in response to question 15, [company] views LiquidAudio as having the best solution, but virtually none of [company]'s intermediaries use it because it has no reach. This is a case where a superior Technology vis à vis consumer experience and security (LiquidAudio) falls behind because of lack of reach."[1087]

> "[…] if [company] were to stream its content directly to users, it is very likely that it would choose a solution with the ability to reach all PC consumers.   [company] simply could not ignore any Technology that existed on all PCs. The only question is whether [company] would also use a second solution, which would depend on the cost-benefit tradeoff described in question 36."[1088]

(890)   Three major content owners state that the intermediaries they deal with in order to distribute digital content increasingly become Microsoft-oriented.[1089] In a statement supplied by Microsoft, [confidential] states that "*we felt it would be confusing for consumers if we offered them at the same time digital downloads in multiple different formats*".[1090] This trend is not invalidated by Microsoft's reference to the fact that the majority of content owners and content developers presently still support multiple

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[1086]   Entity T1's submission of 18 May 2003, at answer 5. Question 5 of the Commission request dated 16 April 2003 asked media associations whether the presence of certain client software on personal computers (or devices) influences the decisions of their members to use certain Technologies.

[1087]   Entity T9's submission of 12 June 2003, at answer 33. Question 33 of the Commission request dated 16 April 2003 asked content owners: "*Is the Technology's reach, i.e. how many users can or will be able to interact with the Technology (and content), a significant factor in deciding which Technology to support? In other words, how if at all does the presence of certain client software on personal computers (or devices) influence your decision to use certain Technologies?*"

[1088]   Entity T9's submission of 12 June 2003, at answer 37. Question 37 to content owners was: "*If you knew all or virtually all users on client PCs that are part of your intended audience would definitely have a particular client software that would allow them to play back content and/or view the streams in a format accessible with the client software, how would that influence your Technology choice including the format choice?*" Question 36 was: "*If one Technology were to become the clear leader would it still be worthwhile to support other formats and at what point would the costs outweigh the benefits?*" See also Entity T11's submission of 18 July 2003, at answer 27.

[1089]   Entity T9's submission of 12 June 2003, at answer 26. Entity T4's submission of 10 June 2003, at answer 29. Entity T8's submission of 30 May 2003, at answer 12.

[1090]   [Confidential]'s statement in Microsoft's submission of 17 October 2003, at Annex B.

formats.[1091] As long as third party media players' usage is still significant, the trade-off of supporting additional formats may indeed be positive for providers of complementary content and software. The same holds true for software developers. Entity T25 states that "*[w]e are willing to incur these additional costs to offer consumers a media player software that plays a large variety of file formats as long as it is necessary to reach the overall majority of consumers. This might change if one Technology will have gained such a strong position that additional Technologies will have become more or less irrelevant.*"[1092] Furthermore, some respondents further qualify their support of other formats than Windows Media: "*[Company] currently only offers support for Windows Media formats in a prominent way. Some but not all services still offer some support for Real formats.*"[1093] When asked whether the additional costs of multiple format support are in the future likely to influence companies' decisions on whether to develop applications for Technologies other than Windows Media, 12 out of 13 software developers state that this is the case.[1094]

(891) By virtue of tying WMP, Microsoft can assure content providers that end-users will be able to play back their content, that is to say, that they reach a wide audience.[1095] Ubiquity of WMP on Windows PCs therefore secures Microsoft a competitive advantage unrelated to the merits of its product. Once content based on a given format is widespread, the competitive standing of compatible media players is reinforced; entry for new contenders is difficult.[1096] Entity T4, a content owner, states that "*Microsoft has a clear advantage since it ships its MediaPlayer together with the Windows operating system software and therefore has a great consumer*

[1091] Microsoft's submission of 17 October 2003, NERA, on page A4-A6, referring to the answers of content owners and content providers to question 27. Question 27 of the Commission request dated 16 April 2003 reads: "*Please answer the following questions for each of the given formats: Have you ever used it? If so why did you choose to use it? Do you still support it in a prominent way? If not, why not? - MP3 or MPEG-4, - QuickTime formats, - Windows Media Formats?- RealTime Formats?*" Likewise, Microsoft argues that the answers to questions 3 and 4 demonstrate that 11 of 14 software developers write to multiple APIs (see table A-2 in Microsoft's submission of 27 October 2003, NERA report *The Commission's 'tying' case - A review of the economic evidence*, Annex A, on page 7)

[1092] Entity T25's submission of 13 June 2003, at answer 16. Entity T25 currently supports Windows Media and MP3 but not Real- and QuickTime formats because "*these companies only provide access to the necessary codecs/libraries for a fee.*" (Entity T25's submission of 13 June 2003, at answer 4). Question 4 of the enquiry was: "*Do you write calls to interfaces provided by RealNetworks or QuickTime? If not, why not? If so, what are the benefits of writing to non-Microsoft platforms?*"

[1093] T20's submission of 21 May 2003, at answer 27. See also T9's submission of 12 June 2003, at answer 27; Entity T12's submission of 4 June 2003, at answer 27; T4's submission of 10 June 2003, at answer 27; Entity T23's submission of 19 June 2003, at answer 3.

[1094] Entity T21, Entity T22, Entity T24, Entity T25, Entity T27, Entity T28, Entity T30, Entity T31, Entity T32, Entity T11, Entity T20, Entity T18.

[1095] "*The more prevalent its playback and security technology is on consumer electronics devices, the better position Microsoft is in when it tries to sell its technology - and Windows operating systems - to media companies that want to deliver material to consumers in digital form.*" (New York Times, 7 January 2003, *Microsoft Moves to Strengthen Its Position in Digital Media*, printed 21 January 2003)

[1096] 13 of 16 content providers and content owners state that there are entry barriers. (Question 17: "*Do you consider that there are barriers to entry for possible alternative providers of novel Technologies?*")

base of its player software. It is obvious that this base is a significant obstacle in establishing new competing media player software and/or file formats".[1097] Entity T20 contends that "*even if a new entrant were to develop a product of equivalent quality and price to Windows Media Player, it would not be possible for any such Technology to compete against Windows Media Player in light of the virtual ubiquity of that Technology on end-user devices and its inability in any economically feasible manner to match that ubiquity*".[1098]

5.3.2.1.4.2.2 Software Developers

(892)   WMP is a product to which applications are developed.[1099]   In fact, Microsoft emphasises that software programmes can be written to the Windows Media Player APIs[1100] and offers separate Software Developer's Kits for its Windows Media technologies (see above at recital (813)).   Software developers will write to several platforms if that is necessary to make their products available to the greatest number of users, but if they can get nearly full "coverage" by writing to a single platform, most will take into consideration the effort and expense to port, market and support their programs on other platforms.[1101]   This gives developers the greatest opportunity to make sales, recover their costs and make the most efficient use of their limited development resources.

(893)   As part of its 2003 market enquiry, the Commission sent requests to twenty software developers,[1102] twelve of which sent a reply.[1103]   Three companies in the content

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[1097]   T4's submission of 10 June 2003, at answer 17.
[1098]   Entity T20's submission of 21 May 2003, at answer 17.
[1099]   See Howard D., *Introducing the Windows Media Player SDK*, September 2002 http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnwmt/html/wmplayer_9_sdk_intro.asp, printed 25 November 2002.
[1100]   "*Newer style applications such as Yahoo! Player and MusicMatch Jukebox - which allow users to download, organize and play audio files - are built on top of WMP and will not work if WMP is not present in the operating system. [...] Moreover, Websites that give users access to audio and video content, such as MSNBC (www.msnbc.com) and Billboard Radio (http://billboardradio.com/billboardradio/index.jsp), also depend on the presence of WMP in the operating system. These Websites offer users the opportunity to download WMP if they have an older version of Windows without up-to-date streaming media functionality, but requiring users to download more than ten megabytes of software code before they can access multimedia content is extremely inconvenient.*" (Microsoft's submission of 3 June 2001 in Case 37.345, at pp. 10 and 11)   See also Microsoft's submission of 17 April 2002 (NERA), on page 6 where MusicMatch, Jukebox and Winamp are identified as products which would not properly work if the Windows Media Player APIs were removed from Windows.
[1101]   Microsoft gives two examples for media players which only support WMP: the Sonique audio player is "*only available for Windows*" and "*relies in part on Windows Media Player APIs for playing media*". The Whisset player is available only for Windows. See submission of 17 April 2002 by Microsoft (NERA), at paragraphs 10 and 11.
[1102]   Entity T21, Entity T22, Entity T23, Entity T24, GE IT Solutions, Hypnotizer, Entity T25, Mobile Video Imaging, Entity T26, Netquartz, Entity T27, Radio 96, Radioceros, Entity T28, Rioport, Entity T29, Entity T30, Entity T31, The Music Mountain and Entity T32.
[1103]   GE IT Solutions, Hypnotizer, Mobile Video Imaging, Netquartz, Radio 96, Radioceros, Rioport and The Music Mountain did not send a reply.

providers group indicated they also developed software and answered the relevant questions in the survey.[1104] In total therefore, fifteen companies sent replies relevant to software development.[1105] Of these fifteen companies, fourteen provided an answer to the question on whether developing applications to support multiple media technologies involved additional costs.[1106] These fourteen companies confirmed that this is the case, mainly because of additional person/hours for development and additional licensing requirements.[1107] Entity T27, for instance, stated that *"[t]here is always a research, confirmation, design, coding, testing, implementation, review, user training and ongoing support cost for EACH format."*[1108] According to Entity T30, *"[a]dditional costs would influence how many applications are developed and for which technologies. For certain applications where the demand for technologies other than Windows Media is perceived to be low, the additional cost of developing that application for other technologies may not be financially justifiable."*[1109] Entity T31, another software developer, stated that Quicktime does not justify developing applications because of its limited dissemination.[1110] All of the respondents indicated that they are in the future likely to develop applications for Windows Media Technology.[1111]

(894)   Eleven out of the fifteen respondents provided an estimate of the relative additional costs that supporting additional technologies entails.[1112] According to these

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[1104]   Entity T11, Entity T18 and Entity T20

[1105]   Questions 2 and 43 (to Entity T11, Entity T18 and Entity T20) respectively read: *"Do you (also) develop software taking advantage of streaming media capabilities (e.g., for help functions, for training, for communications, for content manipulation, or other applications)?"*

[1106]   Questions 8 and 48 respectively of the Commission's request dated 16 April 2003 read: *"Do you consider that there are costs involved in writing applications or versions of applications which support more than one Technology(for the purposes of this Annex "Technology" shall cover server and client software including formats, DRM, codecs, streaming protocols)?"* Entity T26 does not answer this question conclusively.

[1107]   Entity T21, Entity T22, Entity T23, Entity T24, Entity T25, Entity T27, Entity T28, Entity T29, Entity T30, Entity T31, Entity T32, Entity T11, Entity T18 and Entity T20.

[1108]   Entity T27's submission of 28 April 2003, at answer 8.

[1109]   Entity T30's submission of 13 May 2003 at answer 16. Question 16 reads software developers: *"Are these additional costs [of developing software for more than the Windows Media technology] likely in the future to influence your company's decision on whether to develop applications for Technologies other than Windows Media? If so, please explain."*

[1110]   Entity T31's submission of 25 April 2003, at answer 13. Question 13 of the Commission's enquiry reads: *"Other than additional costs, are there any other factors associated with providing content based on multiple Technologies that might cause you to have a preference for developing applications which include support for one Technology only? If so, what are those factors?"*

[1111]   Question 15 asked software developers: *"Is your company in the future likely to develop applications for Windows Media Technology? Will developing applications for additional, non-Microsoft Technologies impose additional costs on your company?"* All 12 respondents (100%) answered in the affirmative to both aspects of the question.

[1112]   The relevant question of the enquiry is question 9: *"If developing applications that include support for more than one Technology imposes additional costs on your company (compared to the costs involved in developing applications for only one Technology), how much, in terms of percentages, do these additional costs amount to relative to the original costs of developing applications which include support for only one format?"* Entity T21, Entity T23, Entity T24 and Entity T26 do not provide any estimates or do not answer the question conclusively.

estimates, the additional costs of supporting multiple technologies range from 1% to 100%, the average being about 58%.[1113] Twelve out of the thirteen respondents who answered Question 16 fully[1114] stated that the costs involved in supporting additional non-Microsoft technologies are in future likely to influence their decision on whether to develop applications for additional technologies.

(895)   Software developers who write applications relying on a media player will have incentives to write foremost to WMP (assuming approximate equivalence of media players in terms of functionality)[1115] as WMP is tied to the client PC operating system that is installed on the large majority of PCs that are manufactured.[1116] Thus, Entity T18, a webcast service provider, stated that it *"select[s] the most appropriate technology based on the number of users that have the ability to play back the content. This is becoming almost exclusively Microsoft Windows Media."*[1117] Furthermore, Entity T18 stated that the additional costs of developing to multiple platforms *"will in the future influence our company's decision whether to offer content based on technologies other than Microsoft's because the client will not usually want to pay disproportionately extra for a small extra audience."*[1118]

[1113]   The companies provide the following estimates: Entity T22 (100%), Entity T25 (10%), Entity T27 (25-35%), RealNetworks (100%), Entity T29 (80%), Entity T30 (35-100%), Entity T31 (100%), Entity T32 (1%), Entity T11 (60%), Entity T18 (30%) and Entity T20 (30-80%). The average of 58% is a result of the average of the mean values given (for example, if a company indicates 30 to 80% as the additional costs, the mean used for calculating the overall average is 55% for this company).

[1114]   Question 16: *"Are these additional costs [see question 15] likely in the future to influence your company's decision on whether to develop applications for Technologies other than Windows Media? If so, please explain."* Entity T29 says this is not so; Entity T23 and Entity T26 do not provide a conclusive answer to the question.

[1115]   See for example Microsoft's own submission of 21 October 2003 (M. Iansiti), *Platform Integration and its Implications for Media Players and Operating Systems*, on page 18: *" [... software developers] can write applications that call upon those features through published APIs knowing that they will run on may desktops without the end user needing to download (or otherwise obtain) additional software."*

[1116]   See, for example, Entity T31's view that *"the rentability of investing in an application which supports multiple technologies depends directly on the number of additional clients one can reach by doing so [la rentabilité d'investir dans une application multitechnologie dépend directement du nombre de clients incrémentaux que l'on peut toucher]."* (Entity T31's submission of 25 April 2003, at answer 13) Entity T23, another software developer, also considers that the availability of Quicktime and Real will further diminish and that it will take *"a conservative view of development, and react to the media player landscape. Over the last year the demand for real player encoding has diminished. C/b expect it to continue to fall. Quicktime is very rarely requested."* (Entity T23's submission of 19 June 2003, at answer 17) Microsoft criticises this as selective quotation (Microsoft submission of 17 October 2003, NERA, on page A-13). But of ten respondents who answer to that question (*"Do you expect one Technology to gain such a leading position that alternative Technologies are consigned to niches of the market? Which one? Please state your reasons. In the affirmative, please explain your view of the time horizon for this to happen. If applicable, does your expectation about this influence your programming decisions?"*) seven (Entity T31, Entity T30, Entity T29, Entity T28, Entity T25, Entity T23, Entity T22) say that Windows Media is likely gain such a leading position; three (Entity T24, Entity T27, Entity T32 of which one (Entity T27) mentions Windows Media as the most likely candidate all the same) answer the question in the negative.

[1117]   Entity T18's submission of 13 May 2003, at answer 13.

[1118]   Entity T18's submission of 13 May 2003, at answer 31.

(896)   Ten out of fourteen respondents which answered Question 7[1119] of the Commission's request for information identified the presence of a media player on PCs as being the most important or the second most important factor when deciding which technology to write applications for.[1120]   Thirteen replied to the question on whether it is important to them that the interfaces to Microsoft's Media Player are present on almost all Windows PCs, with 10 out of the 13 confirming that this is the case.[1121]

5.3.2.1.4.2.3 Spill-over effects

(897)   Populating all Windows desktops with WMP therefore assists the uptake of Microsoft's server-software and Microsoft's formats at the content and software developer side, and will eventually also affect complementary business areas such as media players on wireless information devices (although these media players are significantly smaller in size and functionality)[1122], on set-top boxes[1123] or DRM solutions and on-line music delivery[1124].   Entity T8 states that a "*[a] further concern which we have is that with a dominant technology for media distribution, PC operating systems Microsoft would be able to extend this position to other devices and start charging excessive prices.*"[1125]   NERA states on behalf of Microsoft that Microsoft distributes its media player as part of Windows to increase the sales of its client and server operating systems: "*[S]ince Microsoft's streaming server software runs on servers using its own Windows NT/2000 server operating system, the increased use of its streaming formats leads to additional demand for its server operating systems*".[1126]   If WMP is not unbundled, Microsoft will be able to continue to harness the relevant network effects to its own exclusive advantage.

[1119]   Question 47 for content providers.

[1120]   Question 7 of the request was: "*Notwithstanding your answer to the previous question, if you were to limit yourself to the following five factors, how would you rank them in order of importance: a) transaction cost of software license b) ubiquity of streaming format c) ubiquity of client software for particular format d) technological superiority of the streaming technology e) other (please describe)?*" Entity T26 does not answer the question.
Entity T22 states that "*the majority of [its applications] is done in windows media – since that is the player that everyone has automatically on their PCs. (…) The Windows Media player is the default media player on all Windows PCs. It does not require a download since it is in the OS as standard. Since the majority of end users just use this player by default – we are forced to use it.*" (Entity T22's submission of 15 May 2003, at answers 4 and 6)

[1121]   Software developers were asked in question 14 of the request: "*Is it important to you that the interfaces to Microsoft's Windows Media Player are on almost all Windows PCs?*"   Entity T23 states that "*this is the single, most influential factor*".   (Entity T23's submission of 19 June 2003, at answer 14.)

[1122]   Microsoft offers media players for handheld devices for instance for Pocket PCs (the player is, for example, called "Windows Media Player 7.1 for Pocket PC" and has a size of 1.765 KB.   Windows CE is Microsoft's operating system for wireless information devices such as personal digital assistants. Windows CE powered personal digital assistants are called "Pocket PCs".

[1123]   See for example statements of [confidential] and [confidential] in Microsoft's submission of 17 October 2003, at Annex B.

[1124]   In *AOL/Time Warner* (Case COMP/M.1845, 11 October 2000, at paragraph 26) the Commission found that a market for on-line music delivery was emerging.

[1125]   Entity T8's submission of 30 May 2003, at answer 38 which asked content owners whether they consider it important for media players to be available on different platforms.

[1126]   Microsoft's submission of 17 April 2002 (NERA), at paragraph 29.

(898)   DRM, for example, is a software technology which enables secure distribution of paid digital content via the Internet to users, thereby helping music, entertainment, and content owners protect their intellectual property rights. In this field, Microsoft offers Windows Media Rights Manager version 7 including its DRM technology.[1127] WMP has the Windows Media Rights Manager component built-in. Other companies depend on a Microsoft licence to incorporate the Windows Media Rights Manager Software Development Kit (SDK) into their media player.[1128] Using Windows Media Rights Manager, developers can create applications that encrypt (package) digital media files and issue licences[1129] for those digital media files.

(899)   To play the digital media file, the consumer needs a media player that supports Windows Media Rights Manager. Microsoft is able to assure content developers and software developers who aim to reach the widest possible audience that files based on Microsoft's DRM solution can be played on all Windows PCs. Five out of seven content providers concerned with DRM informed the Commission that the DRM scheme they employ is in fact influenced by the client software present on PCs.[1130] Entity T26, an important software developer in the digital media area, states that its support of the Microsoft DRM is in turn "*a primary driver in Entity T26's codec decision*" since Microsoft's DRM is "*inseparably linked to the WMA codec*".[1131] If Microsoft came to control the media player market, then its proprietary codecs, formats and DRM technology could constitute a significant barrier to market entry, not only to the media player market but also to related markets in which streaming media technologies are used (handheld devices).

5.3.2.1.4.3 Market development

(900)   The various indicators tracked by market analysts and by market surveys commissioned by Microsoft itself are consistent with the results of the Commission's 2003 market enquiry.

[1127]   Windows Media Rights Manager version 7, includes both server and client software development kits (SDKs) that enable applications to protect and play back digital media files. The client SDK is part of the Windows Media Format SDK, while the server SDK is called Windows Media Rights Manager SDK.

[1128]   *Windows Media Rights Manager 7 FAQ*, at Microsoft Homepage, http://www.microsoft.com/windows/windowsmedia/WM7/DRM/FAQ.aspx, printed 15 January 2003. See also MusicMatch's submission of 14 November 2002, on page 12 reporting the problems encountered in playing WMA files at security level 2000 which corresponds to Windows Media Format 7.1 SDK and Windows Media Player 7.1 and later.

[1129]   DRM technology for instance provides the ability to manage rights after sale (for example the right to burn the file on a CD ROM), which includes the ability to revoke or reinstate a licence.

[1130]   See question 35 of the Commission's request: "*Is the DRM scheme you employ influenced by the client software (operating system, multimedia software) present on personal computers? Is the DRM scheme you employ influenced by the server operating system / server streaming software used by your organisation?*" 7 out of the 12 content providers responded to this question. 5 out of these 7, namely Entity T12, Entity T13, Entity T15, Entity T16 and Entity T19, answered in the affirmative.

[1131]   Entity T26's reply dated 12 June 2003, on page 5-6.

(901)   Before turning to the analysis of the available data, some preliminary observations are in order.

(902)   First, as regards streaming media players, the focus is on WMP, Real(One) Player and QuickTime. MusicMatch and Winamp, for which some of the data series mentioned provide figures, constitute players which do not focus on streaming video.[1132] Moreover, MusicMatch Jukebox and Winamp do not support their own proprietary media formats (file formats, codecs and DRM) but third parties' formats.[1133] For illustration, MusicMatch Jukebox supports MP3(Pro) and Microsoft's WMA format (MusicMatch Jukebox does not support Real or QuickTime formats). Winamp supports MP3, WAV and Microsoft's WMA format (Winamp does not support Real or QuickTime formats). The network effects which the usage of MusicMatch Jukebox and Winamp bring about therefore work *inter alia* in Microsoft's favour (as MusicMatch Jukebox and Winamp also support MPEG standards, their usage also enhances the position of MPEG-based encoding and transmission tools). Last but not least, as was noted above at recital (143), MusicMatch and Winamp are not active in the sale of server encoding or transmission software. Even if one did not take into account the marginal usage shares of these media players, all the foregoing considerations would suggest that the competitive discipline they can exert on the other players is limited.

(903)   A second note of caution is that there is not yet an established methodology to evaluate the respective competitive strengths of the various actors. This means that the methodologies underlying the various data series are therefore not wholly consistent with one another or across time. While this is understandable, since the digital media technology space is a rather recent field of business, it implies that the various data must be analysed with care.

(904)   Furthermore, the "multi-sided" nature of the market implies that it can be analysed from various angles. In particular, data can be computed in terms of media player usage, format usage, format encoding.

5.3.2.1.4.3.1 Player Usage

(905)   As regards media player usage, in 2001, Microsoft described Media Metrix as the leading market research firm in this area.[1134] Media Metrix data series already provided information on media player usage *before* Microsoft bundled its streaming media player. Table 7 (covering the second quarters of 1998 and 1999) covers all

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[1132]   See for example Microsoft's submission (NERA) of 17 April 2002, on pages 5 and 6. MusicMatch and Winamp have recently added some degree of video support to accompany the audio playback or stream of music tracks.

[1133]   Cf. Microsoft's submission of 7 February 2004, on page 52.

[1134]   See NERA Report attached to Microsoft's submission of 16 November 2001, at paragraph 350.

usage (that is to say, home and work alike). It gives the average monthly user number in thousands.

Table 7: Average number of monthly users (home and work usage)

Home & work	RealPlayer	WMP	QuickTime
Q2 1998	9,836[1135]	5,893[1136]	5,405
Q2 1999	16,383[1137]	5,043[1138]	6,254

Source: Media Metrix SoftUsage data (in thousands)[1139]

(906)   Until the second quarter of 1999, RealPlayer was leading the market, with almost twice as many users as WMP. QuickTime had about as many users as Microsoft's player.[1140]   Furthermore, WMP was losing ground to both RealPlayer and QuickTime. It is noteworthy that the figures for WMP relate to a media player that did not include its own streaming technology. RealNetworks notes that "*Microsoft's standalone NetShow Player was never able to attract more than a few hundred thousand users*".[1141]

(907)   This is in clear-cut contrast with the situation *after* Microsoft started to tie (May 1999). From the second quarter of 1999 to the second quarter of 2002, according to Media Metrix, the total number of users of WMP (home and work usage) increased by an extent roughly equal to RealNetworks' and Apple's combined increase in users (about 39 million additional users). This occurred despite RealNetworks' presumed advantage of having had an early "start" in the market and the consequent cushion of an important installed base of compatible content. It must be noted that Winamp and MusicMatch each attract more than three times fewer users than WMP.

Table 8: Average number of monthly users (home usage)

Home	RealPlayer	WMP	QuickTime	Winamp	MusicMatch
Q2 2000	24,432	15,892	6,519	4,702	1,263
Q2 2001	30,465[1142]	21,459	7,648	6,572	4,269
Q2 2002	32,667[1143]	30,096	12,370	7,964	7,374

Source: Media Metrix SoftUsage data (in thousands)[1144]

[1135]   This number shows only RealPlayer usage. RealJukebox was introduced in May 1999.
[1136]   Counting Media Player (not WMP 6) and NetShow Player.
[1137]   Counting RealPlayer and RealJukebox.
[1138]   Counting Media Player and NetShow Player.
[1139]   See June 2002 Media Metrix data supplied in RealNetworks' submission of 13 January 2003.
[1140]   RealPlayer 9,836, Microsoft's player (NetShow and Media Player) 5,893, QuickTime Player 5,405 (June 2002 Media Metrix data supplied in RealNetworks' submission of 13 January 2003).
[1141]   RealNetworks' submission of 6 June 2003, R.E. Litan, on page 3.
[1142]   This includes embedded usage in the AOL client.
[1143]   This includes embedded usage in the AOL client.
[1144]   See June 2002 Media Metrix data supplied in RealNetworks' submission of 13 January 2003.

Table 9: Average number of monthly users (work usage)

Work	RealPlayer	WMP	QuickTime	Winamp	MusicMatch
Q2 2000	7,668	5,441	1,428	1,033	254
Q2 2001	11,432[1145]	9,123	2,238	1,988	755
Q2 2002	12,697[1146]	14,069	4,037	2,557	1,532

Source: Media Metrix SoftUsage data (in thousands)[1147]

(908)   Microsoft disagrees that Media Metrix's figures before and after the release of Windows 98 SE can be compared. First, Microsoft points to differences in the methodology concerning the 1998-1999 figures and the 2000-2002 figures. Before January 2000, Media Metrix did not eliminate double counting of users who used more than one product from the same vendor, whereas the figures after January 2000 counted "unique users", that is to say, if a user used two media player versions of the same vendor he was only counted once.

(909)   Furthermore, Microsoft argues that until 1999, Media Metrix did not record the use of its WMP 6, which was released in July 1998, and not bundled with Windows until the release of Windows 98 Second Edition in May 1999. Usage of WMP 6 would have been recorded in the "Other" category, and not in the category related to the figure for WMP displayed in Tables 8 and 9. This would mean that the 1999 figures in Tables 8 and 9 underestimate the usage of Microsoft's media players. Microsoft argues that 8.8 million versions of that media player were downloaded in the 12 months following the release of WMP 6.[1148]

(910)   However, it is noteworthy that this figure of 8.8 million includes updates, and is therefore not a good proxy for actual usage. RealNetworks points out that with the exclusion of WMP 6 from the "Others" category, the number of users in that category did not change substantially.[1149] The understatement of the usage of WMP 6 *prior* to bundling would therefore appear rather limited.

(911)   More importantly, it is interesting to compare this figure of 8.8 million downloads in 12 months with the figure (mentioned by Microsoft itself in the same context) of 7.9 million shipments of Windows 98 SE from July to September 1999. In *three months*, Microsoft achieved through tying WMP 6 with Windows roughly the same distribution as it had been able to achieve *in one year* through downloading. This would suggest in itself that downloading is not as efficient a distribution channel as OEM pre-installation.

[1145]   This includes embedded usage in the AOL client.
[1146]   This includes embedded usage in the AOL client.
[1147]   See June 2002 Media Metrix data supplied in RealNetworks' submission of 13 January 2003.
[1148]   See Annex B to NERA's submission on behalf of Microsoft of 17 October 2003.
[1149]   See RealNetworks' submission of 5 January 2004. Media Metrix did not count unique users before January 2000.

(912) In any case, due to the network effects of the market, it could be expected that there is some delay before tying has its full impact on player usage, as player usage is influenced by past choices made by content providers as to which technology to use for encoding their content. The question of whether or not there is a "spike" in WMP usage following the release of Windows 98 Second Edition is less relevant than the general trend from 1999 to 2003 which corroborates the Commission's analysis. In terms of this trend, the Media Metrix data show that, between 2000 and 2002, WMP has overtaken RealPlayer and become the leader in terms of usage.

(913) Microsoft argues that, in the same period, "*the Media Metrix data show that usage of Apple's QuickTime media player in the workplace is growing at a faster rate than Windows Media Player's workplace usage*".[1150] Microsoft states that "*usage of Windows Media Player in the workplace grew by 259% between 2000 and 2002*" and that "*QuickTime's workplace usage grew by 283% during that same period*".

(914) It is first noteworthy that in 2002, QuickTime's usage in the workplace was less than one third of that of WMP. Even assuming that the two player's growth continued at the exact same pace, in 2012 QuickTime's usage would still be less than half of WMP's usage. Furthermore, more recent data show that QuickTime is no longer growing at a quicker pace than WMP.

(915) Last but not least, it is not surprising that QuickTime, being preinstalled with Apple computers, shows a certain resilience in relation to WMP. In that respect, it should be borne in mind that Apple's products have traditionally been very popular in certain work environments, such as publishing, or media. As regards home usage, it must also be highlighted that the share of Apple computer users among the "online population" is higher than the share of Apple computers shipped. According to a study by Nielsen/Netratings[1151] in July 2002, "*[with] 10.9 million people logging onto the Web using Macintosh computers, Apple Computer has a grip on 8.2 percent of the online population in the United States*", and Mac users "*are twice as likely as other surfers to use Apple's QuickTime*".[1152]

(916) Furthermore, Media Metrix does not normally count usage of a media player from within a Web browser ("*embedded*" usage) and where such usage occurs, the browser receives the credit.[1153] Media Metrix concedes that "*significant player*

[1150] See Microsoft's submission of 17 October 2003, on page 116.
[1151] Nielsen/Netratings describes itself in the following terms: "*Nielsen//Netratings provides the industry's global standard for Internet and digital media measurement and analysis, offering technology-driven Internet information solutions for media, advertising, ecommerce and financial companies which enable customers to make informed decisions regarding their Internet strategies*". See http://www.nielsen-netratings.com/corp.jsp.
[1152] See Nielsen, *Close-Up, Profiling the Mac User Online*, July 2002.
[1153] See NERA's submission on behalf of Microsoft of 17 October 2003, Annex B.

usage occurs embedded within a browser"[1154] and therefore, this limitation must be taken into account. Given the fact that the usage share of Microsoft Internet Explorer has grown during the period considered by Media Metrix (up to above 90% in 2002)[1155] and the fact that Microsoft has in the course of that period started to embed WMP in Internet Explorer/Media Bar (and MSN[1156]), the given numbers are likely to underestimate WMP usage, especially for the most recent data (which means that it also underestimates the growth of WMP usage).[1157] In the same vein, RealPlayer has been the default player in AOL's Internet Access service (AOL versions 6.0 and plus) since January 2001. As such, the figures above overestimate the growth of RealPlayer usage between 2000 and 2002.[1158]

(917)   Media Metrix stopped tracking media player usage in June 2002. It is therefore necessary to look at other sources of information in order to get a broader picture of the market evolution in the relevant time period.

(918)   The source of information that provides data for the longest period of time is survey data collected on Microsoft's behalf by Synovate.[1159] Synovate has collected information since October 1999 about the extent and types of use of "digital media" from US home users. Question 12 of these surveys asked respondents to identify the media player(s) they used in the preceding month. Table 10 shows how the ratio of the number of RealPlayer (and also QuickTime, MusicMatch and Winamp) users has evolved relative to the number of WMP users.[1160]

[1154]   See for example June 2002 Media Metrix data supplied in RealNetworks' submission of 13 January 2003, Binder 5.

[1155]   A recent study showed Internet Explorer with a 95% usage share. *Internet Explorer 95.3, Mozilla 0.4*, Cnet, 24 June 2002, printed on 30 January 2003. Quoting OneStat-study: "*For the month ended June 21, 95.3 percent of all Web surfers used various versions of Microsoft's Internet Explorer browser to access Websites included in the survey. [...] OneStat said its research is based on a sample of 2 million visitors divided into 20,000 visitors from 100 countries each day. Global shares of usage were calculated by measuring during the period the number of visitors who, through a specific browser, accessed Websites that use one of OneStat's services.* "

[1156]   Microsoft Network, Microsoft's Internet access service.

[1157]   See June 2002 Media Metrix data supplied in RealNetworks' submission of 13 January 2003.

[1158]   NERA Report of 19 November 2001, at paragraph 350 (annex to Microsoft's submission of 16 November 2001).

[1159]   See NERA's submission on behalf of Microsoft of 17 October 2003, Annex B and Microsoft's submission of 9 January 2004.

[1160]   NERA indicates that "*the first two of these surveys were done in October 1999 and April 2000; the surveys were performed monthly from June 2000-June 2003; as of August 2003, they became bi-monthly. Samples for individual surveys have ranged from 200-600 respondents*". See NERA's submission on behalf of Microsoft of 17 October 2003, Annex B, on page B-9.

Table 10: Number of RealPlayer (respectively QuickTime, MusicMatch, Winamp) users, compared to the number of WMP users

Year	Month	Reach of RealPlayer / Reach of WMP	Reach of QuickTime / Reach of WMP	Reach of MusicMatch / Reach of WMP	Reach of Winamp / Reach of WMP
1999	10	2.00	1.00	-	0.00
2000	1	2.24	1.47	-	0.32
2000	4	1.65	0.98	-	0.29
2000	6	1.65	0.84	-	0.43
2000	7	1.71	0.90	-	0.50
2000	8	1.49	0.67	-	0.38
2000	9	1.84	1.00	-	0.43
2000	10	1.42	0.60	0.21	0.60
2000	11	1.51	0.81	0.13	0.53
2000	12	1.41	0.74	0.13	0.37
2001	1	1.35	0.81	0.18	0.40
2001	2	1.33	0.79	0.10	0.29
2001	3	1.17	0.69	0.19	0.37
2001	4	1.50	0.82	0.27	0.27
2001	5	1.43	0.73	0.20	0.41
2001	6	1.19	0.70	0.17	0.32
2001	7	1.34	0.59	0.27	0.39
2001	8	1.13	0.79	0.08	0.43
2001	9	1.34	0.75	0.21	0.38
2001	10	1.16	0.63	0.13	0.43
2001	11	1.38	0.81	0.17	0.31
2001	12	1.04	0.51	0.19	0.38
2002	1	0.93	0.44	0.14	0.22
2002	2	1.20	0.67	0.20	0.43
2002	3	1.27	0.62	0.19	0.43
2002	4	1.06	0.50	0.27	0.38
2002	5	0.92	0.58	0.27	0.29
2002	6	0.89	0.63	0.24	0.34
2002	7	0.97	0.65	0.18	0.28
2002	8	0.94	0.52	0.22	0.34
2002	9	0.99	0.52	0.24	0.36
2002	10	0.96	0.75	0.20	0.27
2002	11	0.92	0.62	0.14	0.27
2002	12	0.94	0.54	0.15	0.33
2003	1	0.88	0.48	0.23	0.17
2003	2	0.91	0.61	0.20	0.26
2003	3	1.05	0.77	0.30	0.22
2003	4	0.81	0.54	0.12	0.26
2003	5	0.77	0.54	0.24	0.23
2003	6	0.81	0.52	0.23	0.31
2003	8	0.81	0.42	0.31	0.29

Source: Microsoft's response of 17 October 2003 to the Commission's Supplementary Statement of Objections and Microsoft's submission of 9 January 2004.

(919)   The data show a trend in favour of WMP as compared to RealPlayer and QuickTime. At the end of 1999 and at the beginning of 2000, QuickTime had roughly the same

number of users as WMP. Since April 2003, in any given month, QuickTime had one third less users than WMP. A similar evolution can be observed for RealPlayer: at the end of 1999 and at the beginning of 2000, RealPlayer had more than 50% more users than WMP. Since April 2003, all samples show that WMP has a clear lead over RealPlayer.[1161]

(920)   Synovate also asked "multiple" users, that is to say, users who use more than one media player, to state which media player they used most often. The table below indicates, for each of the relevant media players (for example RealPlayer, WMP or QuickTime) the proportion of multiple users who use the respective media player most often. While in October 1999, 50% of multiple users said that the media player they used most often was Real Player, in August 2003 this figure had fallen to 19%. WMP's share in the same period increased significantly from 22% to 45%.

Table 11: Percentage of users that say that WMP, RealPlayer and QuickTime is the player that they use most

	Oct-99	Oct-00	Oct-01	Oct-02	Aug-03
WMP most used	22%	19%	28%	40%	45%
RealPlayer most used	50%	35%	33%	24%	19%
QuickTime most used	15%	12%	13%	12%	11%

(921)   A further source of data is the *Internet Applications Report* in which, since October 2002, Nielsen/Netratings has been tracking usage of, among other applications used to access content *via* the Internet, Windows Media Player, RealOne / RealPlayer and Apple QuickTime, WinAmp and MusicMatch.[1162] Tables 12 and 13 chart these data, for home and work usage in the United States.[1163]

[1161]   Since the beginning of 2001, Winamp and MusicMatch have constantly had less than half the number of users of WMP.

[1162]   The methodology is not fully comparable with that of Media Metrix. Microsoft itself refers to the Internet Applications Report, see also Microsoft's submission of 21 October 2003 (M. Iansiti), at p. 6.

[1163]   As Media Metrix's, Nielsen NNR's figures show that WinAmp and MusicMatch are trailing behind WMP, RealPlayer and QuickTime in terms of usage.

Table 12: Number of monthly player users in the US, for home usage (in thousands)

Home	WMP	RealPlayer	QuickTime	WinAmp	MusicMatch
Oct-02	25,400	19,600	8,440	5,470	5,800
Nov-02	27,905	18,751	8,90	5,58	6,17
Dec-03	28,023	19,677	9,909	5,75	6,876
Jan-03	28,305	17,964	9,645	4,416	6,792
Feb-03	28,790	21,265	9,804	3,911	6,606
Ma-03	30,766	21,859	10,270	3,970	6,806
Apr-03	29,762	18,317	9,503	3,872	6,273
May-03	29,082	17,819	9,090	3,680	6,014
Jun-03	29,071	18,965	8,563	3,618	6,090
Jul-03	29,374	17,835	8,794	3,813	6,022
Aug-03	28,851	18,881	8,843	3,691	6,144
Sep-03	29,590	19,809	8,630	3,531	6,064
Oct-03	30,831	17,625	9,230	4,090	6,265
Nov-03	35,200	19,474	9,478	4,576	7,092
Dec-03	35,210	20,354	9,277	4,084	7,330
Jan-03	37,299	19,978	10,509	4,497	8,229

Source: Nielsen/Netratings data[1164]

Table 13: Number of monthly player users in the US, for work usage (in thousands)

Work	WMP	RealPlayer	QuickTime	WinAmp	MusicMatch
Oct-02	18,500	13,500	5,340	3,000	2,240
Nov-02	18,769	11,762	5,49	3,09	2,090
Dec-03	16,476	11,754	5,275	2,856	2,342
Jan-03	17,325	11,296	5,708	2,072	2,400
Feb-03	17,038	12,099	5,265	1,982	2,061
Ma-03	17,763	12,275	5,420	1,849	2,235
Apr-03	18,548	11,169	5,426	2,252	1,797
May-03	19,588	11,200	5,546	2,154	1,893
Jun-03	19,618	11,902	5,387	1,774	2,306
Jul-03	18,602	10,936	5,160	1,981	2,204
Aug-03	18,293	11,600	4,943	2,077	2,196
Sep-03	18,422	12,075	5,307	2,045	2,211
Oct-03	20,370	10,926	6,051	2,580	2,214
Nov-03	19,641	11,237	4,862	2,240	2,297
Dec-03	20,632	11,280	5,038	2,264	2,363
Jan-03	21,241	11,406	5,794	2,436	2,770

Source: Nielsen/Netratings data[1165]

(922) The data in Tables 12 and 13 show that WMP has attained a distinct lead over both RealPlayer (more than 50% more unique users) and QuickTime (three times as many

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[1164] RealNetworks' submission of 13 January 2003 (fifth binder), and RealNetworks's submission of 25 June 2003. See also Time Warner's submission of 8 January 2003, on page 5 for the month of September 2002 (page 3 of the non-confidential version). See also print-outs from Nielsen/Netratings' web page (Internet applications) of 23 December 2003 and 22 March 2004.

[1165] RealNetworks' submission of 13 January 2003 (fifth binder), and RealNetworks's submission of 25 June 2003. See also Time Warner's submission of 8 January 2003, non-confidential version of 22 January 2003, on page 5 for the month of September 2002. See also print-outs from Nielsen/Netratings' web page (Internet applications) of 23 December 2003 and 22 March 2004.

unique users). This lead has been increasing in the period from October 2002 to January 2004. As regards home usage, WMP has increased its reach by more than 11 million unique users, while RealPlayer has remained fairly stable and QuickTime has won additional 2 million unique users. As regards work usage, the number of unique users has decreased RealPlayer and slightly increased for QuickTime, while the number of unique users of WMP has increased by more than 2 million unique users.

(923)   Microsoft's prediction at the end of 2001 that "*[a]lthough several other media player vendors, including Microsoft, would like to overtake RealPlayer, there is no market evidence that RealPlayer's leading position will not persist*"[1166] has proven wrong. Microsoft has now had to acknowledge that "<u>*until recently, more consumers used RealNetworks's players than used WMP*</u>",[1167] this is no longer the case.

(924)   Microsoft criticizes Nielsen/Netratings's data on player usage, without, however, explaining how the alleged methodological difficulties distort the picture in favour of WMP. First, Microsoft notes that these data fail to aggregate consistently across different products distributed by the same firm.[1168] However, this would affect RealNetworks' products and not those of Microsoft. This means that RealPlayer's position might be overestimated, but not WMP's. Second, Microsoft argues that such data does not measure use of streaming content played inside a browser window.[1169] However, as is the case for Media Metrix's measurements (see recital (916)), this would tend to underestimate the use of WMP.

(925)   There are further aspects why the data on player usage may underestimate the competitive strength of Microsoft in the market for streaming media players. Indeed, it is interesting to compare other data recorded by Nielsen/Netratings that provide information on the *intensity of use* of the various players. Indeed, if two players have been used by a person respectively thirty times and once in a given month, that person will count as *one* unique user for both these players. However, Nielsen/Netratings also tracks the "*time per person*", that is to say, the "*average time spent by unique persons on [the relevant] Internet Applications for the specified reporting period*" and "*sessions per person*", that is to say, "*the average number of sessions each active user had over the specified reporting period*", a "session" being defined as "*a continuous series of user activity via [...] running applications*".[1170]

(926)   In the period from October 2002 to November 2003, the average number of sessions per person as well as the time per person has been consistently higher for WMP than for RealPlayer and RealPlayer has consistently kept a lead over QuickTime.

1166   Microsoft's submission of 19 November 2001, NERA, on page 194.
1167   Microsoft's submission of 17 October 2003, NERA, on page 21 (emphasis added).
1168   See NERA's submission on behalf of Microsoft of 17 October 2003, Annex B.
1169   This allegation is based on "personal communication" with a representative of Nielsen.
1170   See Nielsen, *Netview Glossary of Terms and Conditions*, October 2003.

5.3.2.1.4.3.2 Format usage

(927) Media players (such as for example RealPlayer playing a WMA file) are used to access content formatted in formats other than their proprietary one, whereas such usage would obviously be still counted with reference to the media player used (not the format accessed). It is therefore useful to complement the media player usage data with data on format usage.

(928) There is format usage data published by Nielsen/Netratings.[1171] Nielsen/Netratings suspended all reporting in January 2002, citing methodological concerns. It began reporting again in April 2002 and produced (proprietary) format usage reports on the basis of an updated methodology.[1172] According to RealNetworks, for the period from October 2002 to January 2003, these data were not published but were available from Nielsen/Netratings on a custom basis.[1173]

(929) In submissions to the Commission in 2001, Microsoft has argued in favour of using such format usage data, which at the time were available from Nielsen/Netratings, rather than the player usage data from Media Metrix. Microsoft pointed out that Nielsen/Netratings "*provide[d] data directly relevant to the streaming media usage*". Microsoft explained that "*[l]ike Media Metrix, Nielsen/Netratings use[d] tracking software on computers, but [that] it track[ed] all use of streaming media from the Web, regardless of whether it [was] played using a player on a stand-alone basis or from within a browser*".[1174] However, Microsoft also points out that "*shortly after [Microsoft's submission of 16 November 2001], Nielsen/Netratings stopped publishing the data, because its methodology overcounted use of the RealNetworks format*". Microsoft explains that "*in April 2002, Nielsen/Netratings began publishing a new series on format use, based on a new methodology. After September 2002, however, Nielsen/Netratings did not publish the new data, because*

[1171] In April 2002, CNet News reported that Microsoft had taken the lead as regards work-use: "*Nielsen/NetRatings this week began publishing media player statistics that use a new method of counting the most popular products for accessing video and audio on the Internet* […] *The software giant [Microsoft] saw its Windows Media file format take the top spot in the at-work market for April 2002, a first for the company, which has been steadily closing on industry leader RealNetworks for several years.*" (*Media player play musical chairs*, 21 June 2002, Cnet News.com, printed on 27 January 2003) In June 2002, CNet News reported: "*In this arena, Microsoft's digital media formats are steadily making headway against rivals. The latest evidence came last week, when Web statistics company Nielsen/NetRatings published a report showing Microsoft and RealNetworks neck and neck in the race for supremacy between their competing, proprietary formats. [...] The close results are partly the result of aggressive strategies by Microsoft that include bundling more functions within its Windows operating system.*" (*Digital media: Will Microsoft win again?*, Cnet news, 25 June 2002, printed on 27 January 2003)

[1172] *Inter alia*, the new methodology, called "Web Multimedia Formats Report", counts only user requested URLs. The previous reports ("Media Formats Reports") did not exclude non-user requested URLs.

[1173] RealNetworks's submission of 25 June 2003.

[1174] See NERA Report attached to Microsoft's submission of 16 November 2001, on page 197.

it decided that its new methodology undercounted the use of the RealNetworks formats".[1175]

(930)   The figures given in Table 14 and Table 15 refer to access to the particular format in percentages of all users accessing one of the proprietary formats ("share of all format users").[1176]

Table 14: Percentage of all users of digital content accessing content in a given proprietary format at least once in the given month (US, home usage)

Home	Windows Media Format (in %)	Real Format (in %)	QuickTime Format (in %)
Apr-02	53.5	60.2	27.8
May-02	54.5	61.4	26.6
Jun-02	56.5	60.9	25.4
Jul-02	57.8	59.7	25.3
Aug-02	61.1	58.4	24.2
Sep-02	60.7	59.2	21.5
Oct-02	64	56.4	22.3
Nov-02	66.8	56.5	20.4
Dec-02	67.3	55.5	20.7
Jan-03	66.1	55.8	22.3

Source: Nielsen/Netratings, Internet Media Service, US, format usage

Table 15: Percentage of all users of digital content accessing content in a given proprietary format at least once in the given month (US, work usage)

Home	Windows Media Format (in %)	Real Format (in %)	QuickTime Format (in %)
Apr-02	63.6	60.6	29.6
May-02	64.9	64.2	28.0
Jun-02	67.1	60.3	26.2
Jul-02	66.6	62.3	28.7
Aug-02	69.2	59.6	29.3
Sep-02	67.3	61.3	26.7
Oct-02	70.9	59.4	27.3
Nov-02	73	58.2	25.2
Dec-02	71.8	55.4	25.5
Jan-03	71.1	56.6	29.5

Source: Nielsen/netratings, Internet Media Service, US, format usage

(931)   Although it is – because of the methodological problems - difficult to undertake a comparison between the use of Real format and the use of Windows Media format, it is interesting to note that the usage data tracked by Nielsen/Netratings for Windows Media format have been growing at a quicker pace than both those for Real format and those for QuickTime format.

[1175]   Microsoft's submission of 17 October 2003 (NERA), Annex, on page B-10.
[1176]   The numbers refer to unique people that have used a multimedia format at least once in the defined time period. If a person uses the same multimedia format more than one time they are only counted once. (see RealNetworks' submission of 25 June 2003). The numbers add up to more than 100% as users access more than one format.

(932) While these data cover the US, where digital media is probably most developed, Nielsen/Netratings also produces surveys of format usage in European countries. It conducted custom surveys for RealNetworks in the following 7 Member States: Germany, Spain, France, Italy, the Netherlands, Sweden and the United Kingdom.[1177] These surveys covered the period between March 2002 and September 2003. In each of these countries but one, the leading media format in March 2002 was RealPlayer.[1178] At the end of the period, the leading media format in all but one of the countries was Windows Media.

(933) The format usage data are therefore consistent with the trend identified on the basis of player usage data.

5.3.2.1.4.3.3 Content offered by Web sites

(934) Microsoft has provided the Commission with data from Netcraft relating to media formats used on Web sites.[1179] Microsoft states that "*Netcraft's surveys use software 'robots' to visit Web sites and determine various characteristics of the sites, including (in the surveys considered here) the numbers of pieces of multimedia content in various formats*".[1180]

(935) A first group of four surveys, conducted from August 1999 to April 2001, was submitted in November 2001. A second group of two surveys conducted in 2002 were submitted to the Commission in May 2003.[1181]

(936) The results of these surveys are set out in Table16.

Table 16: Netcraft data on media formats used by Web sites, presented by Microsoft (NERA)

Date	Real format	Windows Media format	Other
20 000 random European sites			
Aug-99	47%	2%	63%
Feb-00	37%	6%	71%
Oct-00	36%	9%	74%
Apr-01	36%	8%	74%
European demand (customers and partners of Microsoft)			
Feb-02	45%	21%	58%
Nov-02	45%	23%	59%

Source: Microsoft's submission of 17 October 2003 (NERA) quoting Netcraft (Netcraft does market research for Microsoft EMEA).

[1177] See RealNetworks' submission of 26 November 2003.
[1178] In Spain the usage of RealPlayer represented 96% of the usage of WMP, however in April and May, RealPlayer was more used than WMP.
[1179] Netcraft, an Internet services company based in Bath, England, provides research data and analysis on many aspects of the Internet. See http://news.netcraft.com/archives/2003/01/01/about_netcraft.html.
[1180] See Microsoft (NERA) submission of 1 May 2003, on page 2.
[1181] See Microsoft's submission of 1 May 2003.

(937)   According to Microsoft, "*the data show that in November 2002, RealNetworks' formats continued to be much more common on the Web, even on sites chosen for study by Netcraft because they were maintained by Microsoft's customers and partners, and hence would be expected to use Microsoft formats more intensively than average*". Microsoft further states that this "*should allay any possible concerns that use of the different formats has 'tipped' dramatically to Microsoft in the last year or so*".[1182]

(938)   It must first be noted that Microsoft's analysis of the Netcraft data is inconsistent with all the other media format and player usage sources presented so far in this Decision. If attractive content on the Web were encoded primarily in Real formats, with the latter having such an unchallenged lead over Windows Media formats as Microsoft asserts on the basis of the Netcraft data, then, since neither WMP nor QuickTime are able to play content encoded in Real format, both should be very far behind RealPlayer as regards streaming player usage. As outlined above, this is not the case.

(939)   Furthermore, Microsoft's conclusion is undermined by methodological deficiencies inherent to the Netcraft study.

(940)   Netcraft surveys the number of documents in a given format that an automated robot has encountered while navigating the Web. A document that will be viewed by millions of users (RealNetworks mentions as an example the official World Cup site) will thus be counted as *one* document, as will documents that are unlikely to have the same number of users accessing them (for example a site showing family home videos).[1183] Furthermore, Netcraft surveys content *present* on Web sites, as opposed to content *presently used* on Web sites. It cannot be excluded therefore that a non-insignificant proportion of the content found by Netcraft's robots is legacy content put on Web pages by private users.

(941)   Such content is likely to be encoded in formats that were popular in the past, as was the case for RealNetworks which took the lead in the market for streaming media players. The lead that RealNetworks' format enjoys in the Netcraft analysis would thus be accounted for by the specific methodology Netcraft uses and, under this angle, would not be surprising, nor would it invalidate the data from Media Metrix and Nielsen/Netratings.

(942)   In its survey conducted in 2001, Netcraft established a distinction between "new" and "old" content and found no significant difference between the results for these

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[1182]   See Microsoft (NERA) submission of 30 April 2003, on page 4.
[1183]   See RealNetworks (Litan) submission of 6 June 2003, on page 6.

two types of format.[1184] In making that distinction, however, Netcraft relied on the "last modified" date, if present, of the "meta-file" to which the content is attached (digital media on the Internet is usually actually a link to a short "meta-file" rather than a media file, and this meta-file contains a direct link to the media file).[1185] This date does not reflect the date on which the digital media file was encoded in a given format. For instance, if subsequent to the encoding of the content, the file is transferred via http or ftp, which may happen for instance when upgrading the server hardware on which the file is present or changing the operating system software of the relevant server, the "last modified" date will be modified. This means that the "last modified" date used by Netcraft is not a very reliable measure of the date on which the content was encoded. As such, the analysis by Netcraft of the comparison between "new" and "old" content with a view to identifying a trend – or rather the absence of a trend – in the encoding choices of content providers, is not conclusive.

5.3.2.1.4.3.4 Installed base

(943)   Microsoft claims that Real Player's installed base rivalled WMP's installed base in 2001 as regards US home PCs.[1186] RealPlayer's installed base has fallen to [60% to 70%] in 2003 for US home PCs (and to [40% to 50%] for US business PCs).[1187] Moreover, both figures are lower internationally. In contrast, Microsoft has a 100% installation rate on Windows PCs and an over 90% installation rate on client PCs, whether home or work use, worldwide.

5.3.2.1.4.3.5 Conclusion

(944)   It follows from the above that the relevant market data collected by the leading market intelligence firms in the media area (Media Metrix and Nielsen/Netratings) consistently point to a trend in favour of usage of WMP and Windows Media formats to the detriment of the main competing media players (and media player technologies). The limitations alleged by Microsoft for each of the surveys do not affect the relevance of this conclusion for the purpose of this assessment. Synovate's market research corroborates this conclusion. Finally, Netcraft's data, which relates to the available content on websites, is the result of a specific methodology and is, for this reason, not incompatible with the conclusion that there is a distinct trend in the market towards WMP.

[1184] See Microsoft (NERA) submission of 1 May 2003, on page 5. Microsoft did not provide such differentiation for its 2002 study.

[1185] See Netcraft's submission of 7 April 2003, Digital Media Analysis, December 2001, Methodology.

[1186] Microsoft, referring to RealNetworks' statements, states that this share was 92% in 2001 for US home PCs (Microsoft's submission of 19 November 2001 (NERA), on page 201 and Microsoft's submission of 7 February 2004, on page 38).

[1187] *Presentation to European Commission on Behalf of RealNetworks*, Steven Salop, 14 November 2003, at Slides 7 and 14. See also Microsoft's submission of 7 February 2004, on page 36 wherein Microsoft acknowledges that these figures represent a decline in RealNetworks' usage share since 2001.

5.3.2.1.4.4 The business model of independent media player vendors

(945) Contrary to Microsoft's suggestion that RealNetworks' business model is not dependent on revenues from licensing its basic client software to consumers[1188], RealNetworks derives income directly and indirectly from licensing its software to consumers.[1189] RealNetworks licenses the premium versions of its RealOne Player and RealJukebox applications for a fee, and charges for maintenance and support of those products as well. Consumer software and related services revenue amounted to USD 31.2 million in 2002. RealNetworks' subscription services revenues amounted to USD 75.5 million for 2002.[1190] Systems revenues, derived from sales of RealNetworks' media delivery system software, including RealServers and Helix system software, and related authoring and publishing tools, support and maintenance services, were USD 69.1 million in 2002.[1191]

(946) In any event, that a company might survive in the face of anti-competitive conduct on the part of a dominant company does not prove the absence of a foreclosure effect of tying.[1192] If it were otherwise, antitrust scrutiny in certain software markets would come too late as evidence of market impact would likely be concomitant to the "tipping" of the market, that is to say, a technology would gain enough momentum so that the attendant network effects themselves would propel the technology to dominance. Under Microsoft's "last-man-standing" foreclosure rule, a dominant company would actually be given the time to achieve the very objective of tying. But at that point, Microsoft could no longer be subjected to any meaningful antitrust remedy because providing for the formal conditions of a level playing field would not be sufficient to overcome the externalities (for example applications and content in the case of streaming media technologies) which tend to insulate network markets once they have tipped.

[1188] Microsoft's submission of 3 June 2001, on page 15.
[1189] See RealNetworks' Annual Report to the United States Securities And Exchange Commission for the year ended December 31, 2002., item 7. http://www.sec.gov/Archives/edgar/data/1046327/000089102003000987/v88043e10vk.htm, printed on 12 May 2003.
[1190] See RealNetworks' Annual Report to the United States Securities And Exchange Commission for the year ended December 31, 2002., item 7. http://www.sec.gov/Archives/edgar/data/1046327/000089102003000987/v88043e10vk.htm.
[1191] See RealNetworks' Annual Report to the United States Securities And Exchange Commission for the year ended December 31, 2002., item 7, printed from http://www.sec.gov/Archives/edgar/data/1046327/000089102003000987/v88043e10vk.htm.
[1192] "[…] *The lawfulness of the refusal at the time when it occurred cannot depend on whether the competitor was later willing and able to remain on the route in spite of the disadvantages imposed on it.*" (Decision in Irish Midland, at paragraph 29) See also:" *[...] Moreover, where an undertaking in a dominant position actually implements a practice aimed at ousting a competitor, the fact that the result hoped for is not achieved is not sufficient to prevent that being an abuse of a dominant position within the meaning of Article 86 (*Compagnie Maritime Belge Transports*, para. 149). [...]"* See also Judgment in Irish Sugar, at paragraph 191. This was recently confirmed by the Court of First Instance in its judgment of 30 September 2003 in Case T-203/01 Michelin, at paragraph 245.

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5.3.2.1.4.5 Microsoft interpretation of the data is invalid, and does not disprove the Commission's analysis of the market trend

5.3.2.1.4.5.1 Competition on the merits

(947)   Microsoft argues that "*the Commission cannot show that the decline of RealNetworks' share was the result of anticompetitive foreclosure or business missteps by the company*".[1193]   However, the Commission's 2003 market enquiry as well as the publicly available data on media player usage and data submitted by Microsoft all point to the fact that there is indeed foreclosure. Microsoft makes a general statement that "*RealNetworks has taken some actions that reduced the appeal of its media player*".[1194]   However, the evidence that Microsoft submits in support of this statement is not convincing.

(948)   It is correct that the reach of a given media player is not the only factor to influence users' and content providers' decisions.[1195]   Quality of the media player[1196] and licensing costs are important, too.[1197]   However, there is no reason to assume that the reversal of usage shares to the detriment of, in particular, RealNetworks is due to a product deficiency of RealNetworks' player or a merit-based advantage of WMP. In fact, Microsoft's own October 2003 submission illustrates that the reviews presented (1999-2003) rate the best product to be RealNetworks' player more often than WMP.[1198]

(949)   For illustration, Microsoft itself presents 15 "*Competitive reviews of media players*" in its October 2003 submission to the Commission.[1199]   The table drawn in Microsoft's submission is reproduced below as Table 17.

[1193]   NERA Report, *The Commission's 'Tying' Case, A Review of the Economic Evidence*, in Microsoft's submission of 17 October 2003, at paragraph 56.

[1194]   It is also noteworthy that Microsoft has not made any similar statement with respect to QuickTime, which has also lost ground to WMP.

[1195]   See also Microsoft's submission of 7 February 2004, on page 45.

[1196]   See Microsoft's submission of 17 October 2003 (NERA), Annex B.

[1197]   See for example MusicMatch's submission of 8 July 2003, on page 5. Entity T25 currently supports Windows Media and MP3 but not Real- and QuickTime formats because "*these companies only provide access to the necessary codecs/libraries for a fee.*" (Entity T25's submission of 13 June 2003, at answer 4).

[1198]   See Microsoft's submission of 17 October 2003, NERA, on page F-2.

[1199]   See Microsoft's submission of 17 October 2003, NERA, on page F-2, Table F-1 entitled "*Summary of Comparative Reviews*".

Table 17: Summary by Microsoft (NERA) of "Comparative Reviews" of media players

Publication Date (Source)	RANK		MEDIA PLAYERS REVIEWED					
	First Place	Second place	Windows Media Player (WMP)	RealOne/ RealPlayer (R)	QuickTime (Q)	MusicMatch (MM)	Winamp (WinA)	Media Jukebox (MJ)
PC Magazine, Feb. 4, 2003	R Plus, MM Basic/ Plus	R Basic, WMP	X	X	X	X	X	X
PC Magazine, Nov. 19, 2002	R	WMP	X	X				
PC Magazine, Jan. 29, 2002	MM	R	X	X	X	X	X	X
PC Magazine, Jan 2, 2001	MM		X	X		X	X	
PC Magazine, Oct. 3, 2000	R	Q	X	X	X			
PC Magazine, Oct. 3, 2000	MM	R, RioPort Audio Manager	X	X		X	X	X
PC Magazine, Sept 21, 1999[1200]	R		X	X	X			
PC Magazine, Sept 21, 1999[1201]	R	WMP	X	X	X			
PC Magazine, Sept 21, 1999[1202]	MM			X		X		
PC World, Dec. 2002	WMP	WinA	X				X	
PC World, Feb. 2002	R	WMP	X	X	X			
CNET.com, May 3, 2001	WMP		X	X	X			
CNET.com, Feb 29, 2000	R, WinA			X			X	
PC Computing, Feb 2000	R			X		X	X	
PC Computing,, Aug. 1999	Liquid Audio[1203]	R, MP3Spy	X	X	X		X	

Source: Microsoft's submission of 17 October 2003, NERA, at p. F-2, entitled "Summary of Comparative Reviews"

(950)   RealPlayer takes first place in eight out of these 15 reviews, while Microsoft's WMP comes first in two of them.[1204]   As regards codec quality, KeyLabs, a Microsoft

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1200   Streaming audio

1201   Streaming video

1202   Jukebox

1203   Liquid Audio does no longer exist.

1204   Both WMP and RealPlayer are listed on the second place in 4 reviews. MusicMatch Jukebox takes the first place in 4 of the 15 reviews. In a very recent review in PC Magazine on 11 November 2003 RealOne Player 2.0 obtains 4 out of 5 possible "merit points" and is awarded the Editors' Choice Award,   http://www.pcmag.com/article2/0,4149,1356868,00.asp   and http://www.pcmag.com/category2/0,4148,4797,00.asp, printed 11 January 2003; (so is MusicMatch

Certified Solutions Provider, issued a study on 30 September 2002 comparing RealNetworks RealVideo 9 and Windows Media Video 9 and concluded that viewers preferred RealVideo 9.[1205]

(951)   These various data do not point to a comparative advantage in terms of quality of Microsoft's media player.[1206] The ubiquity of the tied WMP on Windows client PCs, however, constitutes a unique competitive advantage for Microsoft. Entity T30 states that "*[c]ustomer demand would in turn typically be mainly driven by the ubiquity of the client software on the desktop, given that it is generally considered that there is not a great difference in technical performance between the existing formats from an end user point of view.*"[1207]

5.3.2.1.4.5.2 Public statements by Microsoft's competitors

(952)   Microsoft also draws on public comments and press releases by RealNetworks and infers that RealNetworks, by its own statements, is not subject to foreclosure.[1208] One should be wary not to ascribe too great a value to RealNetworks' public comments in the context of an industry where customer expectations as to which products will eventually prevail can prove crucial. All media player vendors have incentives to claim that their products are on the verge of winning the "media player war".

(953)   In stark contrast, RealNetworks' filings before the US Securities and Exchange Commission betray a sense of vulnerability. RealNetworks advised investors that, "*[i]n light of Microsoft's efforts and dominant position in operating systems, our market position may be difficult to sustain.*"[1209]

(954)   Microsoft's own commercial statements, which tend to square ill with its efforts to present RealNetworks as the industry leader, should naturally also be treated with caution.[1210] Nevertheless, it is worth mentioning that Microsoft informed analysts as early as in 2001 that WMP "*is now the fastest growing and most popular media*

Jukebox, also 4 out of 5 "merit points". Also Microsoft WMP obtains 4 out of 5 "merit points" but not the Editors' Choice Award.)

[1205]   The study was commissioned by RealNetworks and is available at http://www.keylabs.com/results/realnetworks/vidperf9.shtml.

[1206]   "*Microsoft and Real's latest streaming products are more or less equal in terms of functionality.*" (Bertelsmann's submission of 10 June 2003, at answer 15). Entity T30's submission of 13 May 2003, at answer 6. See also Entity T11's submission of 18 July 2003, at answer 60. See also Microsoft's submission of 7 February 2004, on page 45, referring to a November 11, 2003 review by *PC Magazine*.

[1207]   Entity T30's submission of 13 May 2003 at answer 6.

[1208]   Microsoft's submission of 16 November 2001, at paragraph 136.

[1209]   *Ibid.*

[1210]   "*Windows Media is the leading digital media platform, [...] Windows Media Player, available in 26 languages, is the fastest-growing media player*". See http://www.microsoft.com/presspass/press/2001/Oct01/10-24DMFeaturesforXPpr.asp, printed on 27 August 2002.

player among US Internet users both at home and at work."[1211] And already in 2000, Microsoft reported that between April and October 2000, the usage of Windows Media Technologies among large organisations had grown to 68%, compared with 41% usage share for the next largest competitor, and that the number of organisations deploying Windows Media as their only digital media platform had increased from 23% to 39%.[1212]

5.3.2.2 Justification put forward by Microsoft

(955)   Microsoft's arguments discussed under this section attempt to show efficiencies from tying WMP which would outweigh any possible anti-competitive effects from tying WMP, thereby precluding Microsoft's liability for the bundling of WMP with Windows. Conceptually, the following considerations could also be discussed under the separate product test, as the upshot of Microsoft's argumentation is that it is no longer appropriate to consider the "integrated product" (Windows and WMP) a bundle of two separate products.

5.3.2.2.1 Tying WMP and efficiencies

5.3.2.2.2 Tying WMP and efficiencies related to distribution

(956)   Claims regarding the efficiencies of tying in terms of lowered transaction costs for consumers, that is to say, that it reduces time and confusion to have a set of default options in a personal computer "out of the box", fail to differentiate between the benefit to consumers of having a media player pre-installed along with the client PC operating system and Microsoft selecting the media player for consumers.[1213] In a market where OEMs were free to offer whichever packages of software consumers desired (for example Windows with a third party media player, or Windows with WMP), the market would provide those varieties of packages preferred by consumers.

(957)   In fact, OEMs customise their client PCs in terms of hardware and software in order to differentiate them from competing products and to meet specific consumer demand. OEMs generally have sophisticated skills with respect to both hardware

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[1211]   E-mail from Microsoft to reporters and analysts of 20 September 2001, as corrected by e-mail to reporters and analysts of 21 September 2001, attached as Exhibit 100 to RealNetworks' submission of 11 January 2002.

[1212]   Microsoft Press Release, *Windows Media Usage Share Increases to 68 Percent Among Enterprise Customers Using Streaming Media* (9 November 2000) available at http://www.microsoft.com/presspass/press/2000/Nov00/EnterpriseMediaPR.asp, printed on 27 August 2002) . See also Exhibit 100 to RealNetworks' submission of 11 January 2002: "*One in four large companies now use streaming media, with two-thirds of those large organizations using Windows Media*".

[1213]   See for example the general considerations in Microsoft's submission of 17 April 2002 (NERA), on pages 17 and 18.

and software and they are able to integrate software products for use on their machines. In short, OEM services involve more technical expertise than the process of loading and configuring applications onto client PCs.[1214] The market would therefore respond to the efficiencies associated with the purchase of a full package of hardware, operating system and software applications such as media players, and, in addition, the market would be free to offer the variety that consumers demand. Consumers could choose bundles of client PC operating system and media player offered by OEMs according to their preferences, and would as such be discharged of the possible costs of assembling a bundle themselves. Nothing about potential transaction efficiencies for consumers requires the pre-installation to be undertaken by Microsoft, let alone by Microsoft's exclusive and irreversible bundling of WMP with Windows.

(958)   Another argument relating to reduced transaction costs consists in saying that the economies made by a tied sale of two products saves resources otherwise spent for maintaining a separate distribution system for the second product. These economies would then be passed on to customers who could save costs related to a second purchasing act, including selection and installation of the product.[1215] Irrespective of the accuracy of the assumption that distributive efficiency gains are necessarily passed on to consumers, such savings cannot possibly outweigh the distortion of competition in this case. This is because distribution costs in software licensing are insignificant; a copy of a software programme can be duplicated and distributed at no substantial effort. In contrast, the importance of consumer choice and innovation regarding applications such as media players is high.

(959)   Microsoft states that it should not be set at a competitive disadvantage compared to most of the other operating system vendors who all provide multimedia capabilities with their operating system offerings. First, this Decision does not purport to prevent Microsoft from entering into arrangements with OEMs to pre-install Windows and *a* media player (possibly WMP) on a client PC in order to meet the corresponding consumer demand.[1216] Indeed, OEMs act as purchasing agents for consumers in providing such bundles. What is abusive is that Microsoft invariably imposes its own media player through tying.

(960)   Second, comparing its conduct to that of other players in the client PC operating system market, Microsoft disregards the different impact stemming from tying practices engaged in by a dominant company and by non-dominant players in the

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[1214]   See Direct Testimony of John Soyring in US Civil Action No. 98-1232 and 1233 (TPJ), US v. Microsoft, http://www.usdoj.gov/atr/cases/f2000/2054.htm.

[1215]   Microsoft hints at such cost savings in a general way. See Microsoft's submission of 17 April 2002 (NERA), at paragraph 35.

[1216]   RedHat Linux, SuSe Linux and Solaris all ship with removeable third party media players.

market. The potential degree of foreclosure of tying depends on the market share of the "tying" product.[1217] It is for this reason that the existence of a dominant position is a precondition for a tying abuse under Article 82. Low market shares indicate a small level of potential foreclosure. For illustration, Apple's bundling of QuickTime with the Mac OS affects 2.9% of the relevant market.[1218]

(961)   In this context, it is important to recall that a dominant company may be deprived of the right to adopt a course of conduct which is unobjectionable if adopted by non-dominant undertakings.[1219] The Court of Justice has also held that even if tied sales of two products are in accordance with commercial usage, such sales, if entered into by a dominant company, may constitute abuse within the meaning of Article 82 unless they are objectively justified.[1220] In a competitive environment, market forces attenuate the scope of the deterrent effect on innovation of the tying of separate software with an operating system. While a non-dominant client PC operating system producer who chooses to integrate may control innovation relating to the features on its platform, competitive innovation in the market is still possible because new features may be developed in conjunction with competing platforms. This is not the case where the platform market is virtually monopolised. Tying will deter innovation in the whole market to which the integrated product belongs.

5.3.2.2.2.1 Tying WMP and efficiencies related to WMP as a platform for content and applications

(962)   By way of preliminary observation, Microsoft has not submitted substantiated evidence that shows that integration of Windows and WMP code bases would lead to superior technical product performance.[1221] Microsoft argues, however, that software developers want to be able to place calls to WMP's APIs.[1222] If the client PC operating system on which developers' applications build (the platform) makes available media APIs, developers do not have to "re-invent the wheel" each time they want to implement a functionality.[1223] They are able to focus on their areas of

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[1217]   See *mutatis mutandis* Judgment of 23 October 2003 in <u>Van den Bergh Foods</u>, at paragraph 172.
[1218]   IDC, *Worldwide Client and Server Operating Environments Forecast, 2002-2007*
[1219]   Judgment in <u>ITT Promedia</u>, at paragraph 139.
[1220]   Cf. Judgment of the Court of Justice in <u>Tetra Pak II</u>, at paragraph 37.
[1221]   At one place Microsoft asserts in a general way that "*integration into the platform typically improves performance*" but does not substantiate this contention or relate it to the media player. (Microsoft's submission of 21 October 2003 (M. Iansiti), *Platform Integration and its Implications for Media Players and Operating Systems*, on pages 13 and 26) In the US Microsoft case, a US District Court found that "*[...] according to several standard programs used by Microsoft to measure system performance, the removal of Internet Explorer by the prototype program slightly improves the overall speed of Windows 98.*" (Findings of Facts of 5 November 1999, United States District Court for the District of Columbia, *USA v. Microsoft*, Civil Action No. 98-1232 and 1232 (TPJ), at paras.181 and 182)
[1222]   Microsoft's submission of 17 April 2002 (NERA), on page 16 *et seq.*
[1223]   Microsoft's submission of 17 October 2003, on page 81.

expertise and commercial interest, the content and quality of their programmes.[1224] Consequently, the value of the operating system package for end-users is increased. There are efficiencies of media player integration which outweigh any possible anti-competitive effects, and therefore WMP and the client PC operating system have to be regarded as one product rather than two.

(963)	It can be left open whether it would have been possible to follow Microsoft's above line of argumentation had Microsoft demonstrated that tying of WMP was an indispensable condition for simplifying the work of applications developers. Microsoft has failed to supply evidence that tying of WMP is indispensable for the alleged pro-competitive effects to come into effect.

(964)	The attractiveness of a client PC operating system is enhanced by the availability of high-quality, complementary applications at low prices. If these applications themselves exhibit APIs, as media players do, efficiency gains follow for software developers who rely on these APIs when writing complementary applications. Media players, in general, exhibit application and platform software characteristics; while they build on the client PC operating system, other applications may build on them[1225]. The efficiencies that may stem from providing a pre-installed bundle of an operating system and a media player are therefore not specific to a bundle of only Microsoft components.

(965)	Moreover, if Microsoft's WMP was pre-installed by OEMs and not imposed by Microsoft, developers would also enjoy the benefits of being able to build API calls to WMP into their applications. Software developers can and do, for example, write to WMP 9, which was released separately from any operating system upgrade and therefore not pre-installed on Windows. In summary, Microsoft neither claims nor demonstrates that applications could not have been developed had Microsoft distributed WMP independently from its client operating system.

(966)	Media players of different makes running on Windows have contributed significantly to the dissemination of multimedia streaming technology and to the consequent development of a host of multimedia-enabled applications creating value or consumers.[1226] For example, AOL 6.0 and 7.0 make API calls to RealPlayer.[1227] RealNetworks' software exposes APIs giving access to over 1000 functions and "*over 500 developers and thousands of internet content providers are developing*

[1224]	Microsoft's submission of 3 June 2001, on page 10.

[1225]	See for example Microsoft's submission of 17 October 2003, on page 86.

[1226]	Applications have been developed building on QuickTime (see http://www.apple.com/quicktime/products/qt/faq.html, printed 19 September 2002) and RealPlayer.

[1227]	See RealNetworks' submission of 11 January 2002, at paragraph 67.

applications using RealNetworks' middleware platform".[1228]   Microsoft itself states
that third party media players expose APIs.[1229]   Microsoft has offered no proof that
developers only want to place calls to WMP.

(967)   Tying WMP with Windows is therefore not indispensable for the developer and
consumer benefits on which Microsoft bases its justification for tying. With OEMs
acting as purchasing agents for end users, it is no more efficient for Microsoft to
create client PC operating system-and-application bundles than for multiple OEMs to
create those client PC operating system-and-application bundles that are desired by
end users.

(968)   The fact that software vendors may place calls increasingly to WMP rather than to
other media players reflects WMP's ubiquity due the tying of WMP. The fact that
only Microsoft, due to its client PC operating system dominance, has the capability
of tipping the media player market through the leveraging of Windows does not
however mean that such conduct is lawful, let alone that the application bundled by
Microsoft with its client PC operating system is (or becomes) *eo ipso* a logical and
inseparable part of Windows.

(969)   This would only be different if one held that - as developers would prefer a
standardised platform - Microsoft's leveraging of its dominance into the market for
media players would spare the industry possible ambiguity as to the outcome of the
competitive   race   among   competing   media   players,   thereby   generating   net
efficiencies. Such an argument, relying in essence on the network effects of the
market, would have the Commission not only condone the extension of the
applications barrier to entry through tying, but make it the cornerstone for the
justification of tying and the possible domination by Microsoft of a software market
neighbouring the client PC operating system market. Under Community competition
law an undistorted competition process constitutes a value in itself as it generates
efficiencies and creates a climate conducive to innovation (innovation being, in
markets such as the software market, a key competition parameter). A justification
relying on Windows' historic success in the client PC operating system market - and
not on the merits of media players - can therefore not have a place within such a
system.[1230]

[1228]   See RealNetworks' submission of 11 January 2002, at paragraph 226.

[1229]   Microsoft's submission of 17 April 2002 (NERA), at paragraph 53. See also Microsoft's submission of
21 October 2003 (M. Iansiti), at p. 5.

[1230]   In the context of Microsoft's exclusive dealing with IAPs (Internet Access Providers) in the US,
Microsoft was found to offer as its only explanation the fact that it wanted to keep developers focused
upon its APIs. The US Court of Appeals stated that Microsoft's desire to keep application developers
focused on its own, rather than competing, APIs (albeit not an unlawful end in itself) was not a pro-
competitive justification for Microsoft's exclusionary conduct. (Judgment of 28 June 2001, United

5.3.2.2.2.2 Conclusion

(970)   Microsoft has not submitted adequate evidence to the effect that tying WMP is objectively justified by pro-competitive effects which would outweigh the distortion of competition caused by it. In particular it has been shown that what Microsoft presents as the benefits of tying could be achieved in the absence of Microsoft tying WMP with Windows. As regards other "benefits" identified by Microsoft, they primarily relate to Microsoft's own profitability and, being furthermore disproportionate to the anti-competitive effects in the market caused by the tying, cannot therefore serve as a valid justification.

5.3.2.2.3   Alleged absence of incentives to foreclose

(971)   Microsoft disputes that it has incentives to engage in "*anticompetitive bundling.*"[1231] As regards the protection of a monopoly position in client PC operating systems, Microsoft argues that such a theory cannot hold because media players do not represent "*a threat to the Windows Platform*",[1232] and that it is unrealistic to expect a client PC operating system vendor to enter "*the operating system market by leveraging a pre-existing position in media players.*"[1233]

(972)   It may be true that media players today are not substitutes for client PC operating systems insofar as no "general purpose" application programs can be written using a media player's APIs only. However, "limited purpose" programs, in particular media applications, can be written using a media player's APIs. Microsoft concedes that media players - Microsoft gives RealPlayer as an example - expose APIs.[1234] The possibility cannot be ruled out that, if such a limited platform for applications became wide-spread, there would be incentives to expand the available APIs so as to allow the writing of applications which would no longer be for "limited purposes" only. Second, middleware such as Java *in combination with* a media player could in fact *be* a general purpose platform substitute today. As such, the media player can be deemed a necessary component of a "full-fledged" platform threat. In this sense, Microsoft has incentives to foreclose third party media players through tying.[1235]

        States Court of Appeals for the District of Columbia Circuit, *United States v. Microsoft*, No. 00-5212, on page 46).

[1231]   NERA submission of 17 April 2002, at paragraph 48 *et seq.*
[1232]   NERA submission of 17 April 2002, at para 52. Paul Seabright, *The Alleged Tying of Windows Media Player to the Windows Operating System: Commentary on the European Commission's Second and Third Statement of Objections to Microsoft*, 11 November 2003.
[1233]   NERA submission of 17 April 2002, para 54.
[1234]   See recital (966).
[1235]   In a Report called "*Anticompetitive Bundling Strategies*" prepared for the Australian Competition and Consumer Commission (January 2003) NERA states that "*[t]ying arrangements could be anticompetitive if they are used for the purpose of reducing competitors' sales in an attempt to eliminate such rivals from the market.*" NERA concludes that in order to assess the lawfulness of tying

(973)   Microsoft's assertion that a competing operating system vendor cannot leverage a pre-existing position in media players to enter the client PC operating system market must be rejected. Not being able to guarantee consumers the availability of a complementary media player which supports (the most) popular application programs and content makes entry and business in the client PC operating system market harder and less likely to be successful. Due to their technological and commercial potential, as well as their attendant indirect network effects, media players have the potential to constitute strategic applications.[1236]

(974)   If Microsoft became dominant in the media player market, the viability of a potential entrant (or a current contender for that matter) in the client PC operating system market would also depend on his ability to provide a media player which supports Microsoft's media technologies.[1237] It has been shown that this is the case because wide dissemination of WMP will influence content providers, developers and home users to encode, develop and store in Microsoft's formats. For this reason, tying WMP is liable to facilitate Microsoft's ability to reduce the prospect of successful entry into the client PC operating system market by a rival supplier through the protection and enhancement of the applications barrier to entry via the control of what is a strategic (platform-type) application, and the dependent complementary applications and media content.

(975)   It should also be highlighted that Microsoft has a clear incentive to attain a strong position in the media player market due to the fact that it can use the ubiquity of WMP on Windows PCs as an argument to propagate its proprietary media formats and technologies at the server software side, in its relationship with content developers (leveraging effect).[1238] The media player market is, in fact, a strategic gateway to a range of related markets[1239], on some of which high revenues can be earned. As such, and as was highlighted at recitals (897) to (899) above, gaining a pre-eminent position in the media player market will provide Microsoft with a

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          it is necessary to consider the practice in the context of the markets in which it occurs (on page 24 of the Report, http://www.accc.gov.au/telco/oth_bundling.pdf).

[1236]   The strategic characteristics of media players are comparable to those of personal productivity application suites such as Office which equally supports proprietary formats. It was widely believed, for example, that if Microsoft had announced that it would stop the development of the next generation of Mac Office in 1997, (Microsoft invested in Apple in 1997), the market would have significantly suffered. Microsoft leveraged this situation in its bearings with Apple (see Findings of Fact of 5.11.1999, United States District Court for the District of Columbia, *USA v Microsoft Corporation*, Civil Action No. 98-1232 and 1232 (TPJ), at paragraphs 344 and 345).

[1237]   In this regard, Microsoft's argument that no operating system vendor has yet leveraged media players in that way (Microsoft's submission of 17 April 2002 (NERA), at paragraph 54) misses the point as no operating system vendor dominates the media player market as of yet.

[1238]   NERA states that Microsoft distributes its media player as part of Windows to *inter alia* increase the sales of its server operating systems as "*the increased use of its streaming formats leads to additional demand for its server operating systems*" (NERA's submission of 17 April 2003, at paragraph 29)

[1239]   See for example Microsoft's submission of 21 October 2003 (M. Iansiti), *Platform Integration and its Implications for Media Players and Operating Systems*, on page 23.

significant advantage in other business areas such as those for content encoding software, format licensing, wireless information device software,[1240] DRM solutions and online music delivery.[1241]

(976) As regards online music distribution services, Microsoft seems to admit as much when it states, referring to a remedy which would entail the distribution of Windows with other media players, that online music services *use their media players to increase sales of content. As a result, their interests would be harmed if the Commission gave RealNetworks and Apple free distribution of their players on new PCs.*[1242] This would appear to also apply to Microsoft's tying of WMP insofar as Microsoft has, in August 2003, announced MSN Music Club[1243] which will sell songs over the Internet to customers using Microsoft's Windows Media Player 9.

(977) For further illustration, if Microsoft's DRM technology, which is bundled with WMP, becomes dominant, any company wishing to sell content (audio or video) in digital form in a secure way will need to have access to it. Microsoft would be able to set a "toll" on each such transaction. Tying could thus facilitate Microsoft's move to a continuous stream of revenue based on per-transaction payments for software use instead of one-off payments for the sale of new software.[1244] As such, this move, facilitated by tying, would de-couple Microsoft's dependence on selling new improved versions of its client PC operating system as a means of generating revenue.

5.3.2.3 Conclusion

(978) The Commission does not purport to pass judgment as to the desirability of one unique media player or set of media technologies (for example DRM, formats) coming to dominate the market. However, the manner in which competition unfolds in the media player market, which may or may not bring about such a result, is of competitive concern. Article 82 must be read in the light of its underlying objective which is to ensure that competition in the internal market is not distorted (see Article

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[1240] Windows Media Player 7.1 is available for Pocket PCs. See http://www.microsoft.com/windows/windowsmedia/download/default.asp, printed 28 January 2003 and 16 September 2003. (Windows CE powered personal digital assistants are called Pocket PCs).

[1241] *"Whoever controls the most popular file formats can harness them for selling server software. This is something Microsoft demonstrated with its Office productivity suite, in which the ubiquity of file formats is considered a major catalyst for driving Windows sales."* (*Digital media: Will Microsoft win again?*, Cnet news, 25 June 2002)

[1242] Microsoft's submission of 17 October 2003, NERA, on page C-6.

[1243] *OD2 Uses Windows Media Player 9 Series to Enable First Pan-European Pay-as-You-Go Digital Music Stores*, 14 August 2003, http://www.microsoft.com/presspass/press/2003/aug03/08-14OD2PR.asp, printed 8 December 2003.

[1244] *"Microsoft is in the process of reorienting its strategy to focus on generating ongoing revenue streams [...]"* (Microsoft's submission of 17 October 2003 (NERA), Exhibit 44, S. Kevorkian, *Microsoft and Streaming Media: A Profile*, on page 11)

3 (g) of the Treaty).[1245] To maintain competitive markets so that innovations succeed or fail on the merits is an important objective of Community competition policy.

(979)   Through tying WMP with Windows, Microsoft uses Windows as a distribution channel to anti-competitively ensure for itself a significant competition advantage in the media player market. Competitors, due to Microsoft's tying, are *a priori* at a disadvantage irrespective of whether their products are potentially more attractive on the merits.

(980)   Microsoft thus interferes with the normal competitive process which would benefit users in terms of quicker cycles of innovation due to unfettered competition on the merits. Tying of WMP increases the content and applications barrier to entry which protects Windows and it will facilitate the erection of such a barrier for WMP. A position of market strength achieved in a market characterised by network effects – such as the media player market - is sustainable, as once the network effects work in favour of a company which has gained a decisive momentum, they will amount to entry barriers for potential competitors (see recitals (416) to (424) and (891)).[1246]

(981)   This shields Microsoft from effective competition from potentially more efficient media player vendors which could challenge its position. Microsoft thus reduces the talent and capital invested in innovation of media players, not least its own[1247] and anti-competitively raises barriers to market entry. Microsoft's conduct affects a market which could be a hotbed for new and exciting products springing forth in a climate of undistorted competition.

(982)   Moreover, tying of WMP allows Microsoft to anti-competitively expand its position in adjacent media-related software markets and weaken effective competition to the eventual detriment of consumers.

(983)   Microsoft's tying of WMP also sends signals which deter innovation in any technologies which Microsoft could conceivably take interest in and tie with Windows in the future.[1248] Microsoft's tying instils actors in the relevant software

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[1245]   Judgment in Case 322/81 <u>Michelin,</u> at paragraph 29.

[1246]   See Microsoft's submission of 17 April 2002 (NERA), at paragraph 58. Microsoft states that "*the media player business is characterised by network effects*".

[1247]   Cf. "*[...] in recent years, the browser most people rely on -- Microsoft's Internet Explorer -- has been stagnant, offering very few new features. This is a common pattern with Microsoft. The company is aggressive about improving its software when it first enters a market. But once it crushes its competitors and establishes an effective monopoly, as it has in Web browsers, Microsoft seems to switch off significant innovation.*", For Tabbed Browsing And Other New Tricks, Try Explorer's Rivals, by W. Mossberg, Wall Street Journal, 8 January 2004 , http://ptech.wsj.com/ptech.html, printed 13 January 2004.

[1248]   "*The presence of the WM player on top of the Windows XP operating system [is] a major threat to the emergence of competitive technologies. Such problems are common to other applications shipped with Windows XP, such as instant messaging services, which are subject to the same threat.*" Entity T16's submission of 9 June 2003, at answer 57.

markets with a sense of precariousness thereby weakening both software developers' incentives to innovate in similar areas and venture capitalists' proclivity to invest in independent software application companies.[1249]   A start-up intending to enter or raise venture capital in such a market will be forced to test the resilience of its business model against the eventuality of Microsoft deciding to bundle its own version of the product with Windows.[1250]

(984)   There is therefore a reasonable likelihood that tying WMP with Windows will lead to a lessening of competition so that the maintenance of an effective competition structure will not be ensured in the foreseeable future. For these reasons, tying WMP with Windows violates the prohibition to abuse a dominant position enshrined in Article 82 of the Treaty and in particular point (d) of the second paragraph thereof.

5.3.2.3.1   Duration

(985)   Microsoft's tying started in May 1999 when Microsoft introduced Windows 98 Second Edition with its streaming media player tied with the operating system. The conduct is ongoing as Microsoft continues to distribute Windows 98 Second Edition and all its successor versions with (different versions of) its streaming media player.

(986)   Before May 1999, Microsoft had tied its media player with its operating system, but the media player it offered did not provide for media streaming. RealNetworks had been offering a media player with media streaming capabilities since 1995. The fact that Microsoft started to offer a product that matched competitors' products

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[1249]   "*Many investors already had no interest in funding start-ups going head-to-head against Microsoft, [...] says Brett Bullington, a private technology venture investor in Palo Alto, Calif. "You'll probably see less investment go toward application, operating system (and other areas) that can easily be co-opted by Microsoft as it extends its franchise. The mood among venture capitalists gathered two weeks ago was somber, says Larry Marcus, partner with the WaldenVC firm in San Francisco, as Microsoft presented details of Office XP, the newest version of its word-processing and spreadsheet software. "They continue to expand the number of businesses that they're going after," Marcus says. "As an investor in early-stage and private companies, the dance with Microsoft is becoming more important and more dangerous." He assumes that dozens of business plans were scrapped after the Office XP demonstration.*" (USA Today, 28 June 2001, online version, *For small rivals, not much cheer*, printed 13.5.2002).

For the effect of Microsoft's conduct on innovation and in particular drying up of venture capital money see for example Tunney Act comments Nos. 30632, 25990, 28887.

[1250]   See article in Fortune Magazine, Vogelstein F, *The Long Shadow of XP*, 12 November 2001, quoting Adobe's CEO:"*If they* [Microsoft] *decided they wanted to take on Photoshop and put us out of business, could they do it?" Chizen asks. "Yes. It would be tough. It might take a long time. But they could do it." Then he adds, "So I'm glad they're focused elsewhere.*" Cf. also Stewart Alsop, a general partner of New Enterprise Asscociates, a Silicon Valley venture capital firm in the US: "*The most common question for potential investors is: 'What about Windows XP?' You can still compete but if Microsoft bundles it in Windows it makes it much more difficult for any kind of innovation that is in Microsoft's path.*" (The New York Times, 7 September 2001, *Competitors See a Giant That Is Now Largely Unfettered*, Brick M.)

significantly increased the harmful effect of tying on competition. To obtain an additional media player was no longer a necessity for customers interested in media streaming but a move which provided for additional benefits at the margins.

(987)   Microsoft argues that the Commission, in its supplementary Statement of Objections, erred in determining that the abuse had started in May 1999 (release of Windows 98 Second Edition) as Microsoft had for the first time bundled its "unpopular"[1251] NetShow streaming media player with Windows 98 in June 1998.[1252]

(988)   By way of preliminary observation, if this was the case, Microsoft's abuse would actually date back to June 1998; in other words it would lengthen the duration of Microsoft's abuse. At any rate, Microsoft's way of "bundling" the NetShow client was different from its tying of WMP 6.[1253] None of Microsoft's four default installations for Windows 98 included the NetShow client. Users actually had to make an effort and go through the "Add or Remove Components" mechanism in Windows and insert the Windows 98 Installation CD in the PC to install the NetShow Player.[1254] In contrast, Microsoft had made WMP 6 in Windows 98 Second Edition part of the "typical" default installation.

(989)   This Decision therefore establishes Microsoft's liability for tying from May 1999 onwards. This was also the date referred to in the supplementary Statement of Objections, on which Microsoft had the opportunity to comment.[1255]

5.4   Effect on Trade between Member States and between EEA Contracting Parties

(990)   Article 82 of the Treaty prohibits any abuse of dominant position within the common market or in a substantial part of it insofar as it may affect trade between Member States. An abuse of a dominant position affects trade between Member States when it is capable of influencing, either directly or indirectly, actually or potentially, the pattern of trade in goods and services between Member States.[1256]

[1251]   Microsoft' submission of 17 October 2003 (response to supplementary Statement of Objections), on page 104.

[1252]   Microsoft' submission of 17 October 2003 (response to supplementary Statement of Objections), on page 104, referring to paragraph 204 of the supplementary Statement of Objections.

[1253]   See recital (308).

[1254]   RealNetworks's submission of 5 January 2004, on page 1 *et seq.*

[1255]   Microsoft's attempt to construe a different case (i.e. that the Commission would consider Microsoft's addition of media streaming capabilities in WMP 6 in 1998 to be the abuse) to the one presented in the second and the supplementary Statements of Objections (see Microsoft's submission of 17 October 2003, NERA, on page 3, footnote 7) stands ill against its arguments everywhere else (with the exception of Dr. Evans' submission of 30 November 2003 on behalf of Microsoft, *Review of Steven Salop's Presentation to the Commission on behalf of RealNetworks,* see paragraphs 27 and 30, however, different again at paragraph 29), which betray a clear understanding of the content of the objection set out in the Commission's Statements of Objections.

[1256]   See Judgement of the Court of 21 January 1999 in Joined Cases C-215/96 and C-216/96 Bagnasco v BNP and others, [1999] ECR, I-135, at paragraph 47.

(991)   As the Court of Justice held in *United Brands*, if the occupier of a dominant position established in the common market aims at eliminating competitors also established in the common market, it is immaterial whether this behaviour relates directly to trade between Member States once it has been shown that such elimination will have repercussions on the patterns of competition within the common market.[1257]

(992)   Microsoft's anti-competitive behaviour weakens effective competition on the markets for work group server operating systems and media players in an appreciable way. Microsoft's refusal to supply interface information brings about a risk of elimination of competition on the world-wide market for work group server operating systems. Microsoft's tying of WMP with Windows risks impairing the effective structure of competition in the world-wide market for media players.[1258]

(993)   Therefore, over the period considered, Microsoft's abuses of its dominance have had an appreciable effect upon trade between Member States within the meaning of Article 82 of the Treaty. For the same reasons, Microsoft's abuses of its dominance have had an appreciable effect upon trade between the Contracting Parties to the EEA within the meaning of Article 82 of the EC Treaty and Article 54 of the EEA Agreement.

6   REMEDIES AND FINES

6.1   Article 3 of Regulation 17

(994)   Where the Commission finds that there is an infringement of Article 82, it may, in accordance with Article 3 of Regulation 17, require by decision that the undertaking concerned brings such an infringement to an end. According to Article 5 of Council Regulation (EC) No 2894/94 of 28 November 1994 concerning arrangements for implementing the Agreement on the European Economic Area[1259] "*the Community rules giving effect to the principles set out in Articles 85 and 86 [now Articles 81 and 82] of the EC Treaty [...] shall apply mutatis mutandis*" in respect of the EEA.

(995)   A decision pursuant to Article 3 of Regulation No 17 may include an order to "*do certain acts or provide certain advantages which have been wrongfully withheld as well as prohibiting the continuation of certain action, practices or situations which are contrary to the Treaty*".[1260]   The Commission may require the undertaking

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[1257]   Judgement of the Court of 14 February 1978 in Case 27/76, United Brands v Commission [1978] ECR 207, at paragraph 201.
[1258]   See Judgement of the Court of 15 May 1975, Case 71/74, Frubo, [1975] E.C.R. p. 563, at paragraph 38.
[1259]   OJ L 305, 30.11.1994, p.6.
[1260]   Judgement in Commercial Solvents , at paragraph 45. See also Magill, at paragraph 90.

concerned to submit to it proposals with a view to bringing the situation into conformity with the requirements of the Treaty.[1261]

(996)   The requirement that a remedy has to be effective[1262] empowers the Commission to enjoin a dominant company to refrain from adopting any measures having an equivalent effect as the conduct identified as abusive.[1263]

(997)   Finally, it is established case-law that the remedy must apply in relation to the infringement that has been established[1264] and be proportional[1265] to the infringement identified.[1266]

6.1.1   Remedy concerning refusal to supply

(998)   The natural remedy to Microsoft's abusive refusal to supply is an order to supply what has been refused.

[1261]   Judgement in <u>Commercial Solvents</u>, at paragraph 45.

[1262]   See, for example, Judgement in <u>Commercial Solvents</u>, at paragraph 46: "*In the present case, having established a refusal to sell incompatible with article 86, the Commission was entitled to order certain quantities of raw material to be supplied to make good the refusal of supplies as well as to order that proposals to prevent a repetition of the conduct complained of be put forward. In order to ensure that its decision was effective the Commission was entitled to determine the minimum requirements to ensure that the infringement was made good and that Zoja was protected from the consequences of it. In choosing as a guide to the needs of Zoja the quantity of previous supplies the Commission has not exceeded its discretionary power.*"

[1263]   Judgment of the Court of First Instance in <u>Tetra Pak II</u>, at paragraph 220. In its decision in Tetra Pak II, the Commission not only considered the contractual tying Tetra Pak had engaged in to be abusive and required its termination pursuant to Article 82 of the Treaty, but also ordered Tetra Pak in Article 3 of the decision to refrain from adopting measures having equivalent effect as the ones found unlawful. In Article 3 Tetra Pak was *inter alia* ordered to "*inform any customer purchasing or leasing a machine of the specifications which packaging cartons must meet in order to be used on its machines.*" (See Decision 92/163/EEC, Article 3(5) and Judgment of the Court of First Instance in <u>Tetra Pak II,</u> at paragraph 139.)

In <u>Hilti</u>, in addition to imposing a fine and requiring that the infringement be brought to an end, the Commission ordered that Hilti: "*shall refrain from repeating or continuing any of the acts or behaviour specified in Article 1 and shall refrain from adopting any measures having an equivalent effect.*" (Commission Decision 88/138/EEC in Cases IV/30.787 and 31.488 - Eurofix-Bauco v. Hilti (OJ L65, 11.3.1998, p.19, Article 3). See also Commission Decision 93/252/EEC in Cases No IV/33.440 Warner- Lambert/Gillette and Others and No IV/33.486 BIC/Gillette and Others (OJ L116, 12.5.1993, p.21) and Decision in British Midland and the judgment in <u>Commercial Solvents</u> , at paragraph 45.)

[1264]   See, for example, judgement in *Commercial Solvents*, at paragraph 45.

[1265]   The principle of proportionality is enshrined in Article 5(3) of the Treaty according to which "*any action by the Community shall not go beyond what is necessary to achieve the objectives of this Treaty*". The Court of Juctice has interpreted this as meaning that measures adopted pursuant to Community law "*must not exceed what is appropriate and necessary to attain the objective pursued, and that where there is a choice between several appropriate measures, recourse must be had to the least onerous, and the disadvantages caused must not be disproportionate to the aims pursued*" (Case 15/83, <u>Denkavit,</u> [1984] ECR 2171, paragraph 25 and Case C-354/95, <u>The Queen v Minister for Agriculture, Fisheries and Food, ex parte National Farmers' Union and Others,</u> [1997] ECR I-4559, paragraphs 49 and 50).

[1266]   See, for example, judgement in *Magill,* at paragraph 93.

6.1.1.1 Order to disclose interoperability information for the development of interoperable products

(999)   Microsoft should be ordered to disclose complete and accurate specifications for the protocols used by Windows work group servers in order to provide file, print and group and user administration services to Windows work group networks. This includes both direct interconnection and interaction between a Windows work group server and a Windows client PC, as well as interconnection and interaction between a Windows work group server and a Windows client PC that is indirect and passes through another Windows work group server. The use of the term "specifications" makes clear that Microsoft should not be required to disclose its own implementation of these specifications, that is to say, its own source code. The term "protocol" relates to the rules of interconnection and interaction between instances of the Windows client PC operating system and the Windows work group server operating system.

(1000)   In defining the information to be disclosed, account must be taken of the fact that the presently marketed Windows client PC and work group server operating system products consist of different generations of the relevant Windows products and that over the course of time, successor versions and updates will be distributed, which may implement modified or altogether new variants of the relevant protocol specifications. In this respect, it must be borne in mind that an important criterion that customers will take into account when deciding to purchase a given work group server operating system product is whether that product is able to interoperate with their installed base of work group network products – which may include older products no longer marketed – and whether it can be expected to interoperate with the customer's future planned work group network.

(1001)   The importance of interoperability with products purchased in the past by customers and that they still use should be reflected by ensuring that the disclosure order relates to all products for which Microsoft still supports online self-help support, instead of focussing only on the ones that are still marketed by Microsoft.[1267]

[1267]   These are, for Microsoft's client PC operating system products: Windows 98, Windows 98 SE, Windows NT Workstation 4, Windows Me, Windows 2000 Professional, Windows XP Home Edition, Windows XP Professional. See, on Microsoft's Web site, *Windows Desktop Lifecycle Support and Availability Policy for Consumers*, printed on 12 December 2003 from http://www.microsoft.com/windows/lifecycle/desktop/consumer/default.mspx and *Windows Desktop Lifecycle Support and Availability Policy for Businesses*, printed on 12 December 2003 from http://www.microsoft.com/windows/lifecycle/desktop/business/default.mspx. For Microsoft's work group server operating system products, the corresponding products are: Windows NT Server 4.0, Windows 2000 Server and Windows 2003 Server Standard Edition. See on Microsoft's Web site, *Retiring Windows NT Server 4.0: Changes in Product Availability and Support*, printed on 12 December 2003 from http://www.microsoft.com/ntserver/ProductInfo/Availability/Retiring.asp, and *Windows Server Product Life-Cycle Policies*, printed on 12 December 2003 from http://www.microsoft.com/windows2000/support/lifecycle/.

(1002) The importance of interoperability with planned future purchases means that the disclosure order should apply in a prospective manner to future generations of Microsoft's products.[1268] Accordingly, the disclosed information will have to be updated each time Microsoft intends to bring to market new versions of its relevant products. Furthermore, although the request by Sun focused on the Windows technologies that were relevant up until the Windows 2000 generation of Microsoft's products (simply by virtue of the point in time when it was made), this should not be a basis for limiting the scope of the disclosure order to these technologies. As such, the relevant protocols should be defined according to the generic services (file, print and group and user administration) that have been identified as essential in the work group server operating system market.

(1003) The objective of this Decision is to ensure that Microsoft's competitors can develop products that interoperate with the Windows domain architecture natively supported in the dominant Windows client PC operating system and hence viably compete with Microsoft's work group server operating system. Microsoft should thus allow the use of the disclosed specifications for implementation in work group server operating system products. The order to supply is therefore not limited to disclosing specifications but also encompasses authorising the implementation of such specifications in work group server operating system products.

(1004) As outlined above in Section 5.3.1.1.2, this Decision does not contemplate compulsory disclosure of Windows source code as this is not necessary to achieve the development of interoperable products. The disclosure order should concerns the interface specifications only. Furthermore, as regards the subsequent use of the specifications, the specifications should also not be reproduced, adapted, arranged or altered, but should be used by third parties to write their own specification-compliant interfaces. In any event, to the extent that this Decision might require Microsoft to refrain from fully enforcing any of its intellectual property rights, this would be justified by the need to put an end to the abuse.

[1268] Similarly, in its decision in Commercial Solvents, the Commission's order to supply raw material was not limited to the quantities requested, but went further and required a longer term supply obligation. See Commission Decision 72/457/CEE in Case IV/26.911 Zoja/CSC – ICI, OJ L 299, 31.12.1972, p51: "*whereas as regards how the identified infringement should be put to an end, the necessity to foresee the immediate delivery to ZOJA of certain amounts of raw material which would be sufficient, in view of ZOJA's last request, to fulfil the most urgent needs of that undertaking; whereas it is moreover adequate, in order to ensure effective conditions of competition, that ZOJA can benefit from a longer term supply*" ("*considérant, en ce qui concerne la manière dont il devra être mis fin à l'infraction constatée, la nécessité de prévoir la livraison immédiate à ZOJA d'une certaine quantité de matière première susceptible, compte tenu de la dernière demande de ZOJA, de satisfaire les besoins les plus urgents de cette entreprise ; que, d'autre part, il est opportun, pour assurer le maintien de conditions de concurrence effectives, que ZOJA puisse bénéficier d'un approvisionnement à plus long terme*"). The Court of Justice (see footnote 1262 above) confirmed that in that case the Commission "*was entitled [...] to order that proposals to prevent a repetition of the conduct complained of be put forward*" (emphasis added).

6.1.1.2 Reasonable and non-discriminatory terms, timeliness of the disclosures

(1005)   Microsoft must not be allowed to render the order to supply ineffective by imposing unreasonable conditions with respect to the access to, or the use of, the information to be disclosed.

(1006)   It should be stated that Microsoft must disclose the specifications and allow the use thereof on a *non-discriminatory* basis.   If it was otherwise, the remedy would discriminate against undertakings[1269], thereby introducing new distortions of competition, and allow Microsoft to abuse its dominant position in relation to third parties.   It would not achieve the objective of "*ensuring that competition in the common market is not distorted*"[1270].   The disclosures should be made to any undertaking having an interest in offering work group server operating system products.

(1007)   The requirements that the terms imposed by Microsoft be reasonable and non-discriminatory should apply on a forward-looking basis to the disclosures that will take place for successor products or updates of present products.   Furthermore, these future disclosures should be made in a timely manner.

(1008)   The requirement for the terms imposed by Microsoft to be reasonable and non-discriminatory applies in particular:

    (i)   to the conditions under which Microsoft allows potential beneficiaries to evaluate the business value to them of implementing the disclosed specifications in their products; in that respect, there is a need to ensure that potential beneficiaries will have the opportunity to review, themselves or through third parties designated by them, the specifications to be disclosed; Microsoft should be able to impose reasonable and non-discriminatory conditions to ensure that this access to the disclosed specifications is granted for evaluation purposes only;

    (ii)   to any remuneration that Microsoft might charge for supply; such a remuneration should not reflect the "strategic value" stemming from Microsoft's market power in the client PC operating system market or in the work group server operating system market;

    (iii)   to restrictions that Microsoft may impose as to the type of products in which the specifications may be implemented; such restrictions should not create

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[1269]   Thus, in <u>Magill</u> the Commission ordered ITP, BBC and RTE "*to supply each other and third parties on request and on a non-discriminatory basis with their individual advance weekly programme listings and by permitting reproduction of those listings by such parties*".   (Article 2 of Commission Decision 89/205/EEC in Case IV/31.851 - Magill TV Guide/ITP, BBC and RTEOJ L 78, 21.3.1989, p. 43. In paragraph 27 of that Decision the Commission states: "*To confine an order for the supply of these listings to ITP, BBC and RTE, inter se, would discriminate against third parties wishing to produce a comprehensive weekly guide in a manner which would not be compatible with Article 86.*"

[1270]   Article 3(g) of the Treaty.

disincentives to compete with Microsoft, or unnecessarily restrain the ability of the beneficiaries to innovate;

(iv)   to the need for the terms imposed by Microsoft in the future to be sufficiently predictable; implementing the specifications will indeed constitute a significant investment, which competing work group server operating system vendors will not incur if they have no assurance that the terms under which they can make use of the disclosed specifications will remain reasonably stable.

(1009)   As regards the need for timeliness, the Commission takes the view that a suitable mechanism should take as a starting point the date when Microsoft already has a working and sufficiently stable implementation. For instance, as regards releases of new products, the reference should be the point in time when Microsoft makes such new products available to potential customers for beta testing purposes.

6.1.1.3 Timing

(1010)   Microsoft must have sufficient time to take the measures necessary to comply with the order to supply, not least because it will need to draw up the relevant specifications. The order to supply should therefore take effect at the latest after 120 days following the notification of this Decision.

6.1.2 Remedy concerning tying

6.1.2.1 Scope

(1011)   Under this Decision, Microsoft will have to offer a version of Windows for client PCs which does not include Windows Media Player. The remedy applies to Windows licensed directly to end users (home users via retail and corporate customers) and licensed to OEMs for sale in the EEA. Microsoft will retain the possibility to also offer to OEMs and end users a bundle of Windows and WMP.

(1012)   Microsoft must refrain from using any technological, commercial, contractual or any other means which would have the equivalent effect of tying WMP to Windows. The unbundled version of Windows must in particular not be less performing than the version of Windows which comes bundled with WMP, regard being had to WMP's functionality which, by definition, will not be part of the unbundled version of Windows. Should it prove that Microsoft demotes the performance of the unbundled version of Windows, thus rendering the remedy ineffective, the Commission retains the possibility to review the present decision and impose an alternative remedy that will put an end to the abuse.

(1013)   Microsoft's obligation under a remedy not to resort to measures having an effect equivalent to tying must furthermore rule out any of the following activities:

(i) Microsoft must not hinder the performance of rival media players through selective, inadequate, or untimely disclosures of Windows APIs;[1271] in other words, Microsoft shall not reserve privileged interoperability with Windows to WMP, for instance by providing selective access to Windows APIs;

(ii) Microsoft must not give WMP favourable treatment on Windows, for instance by providing on users' PCs for a WMP download link while such a link is not provided for competitors' products,[1272] or by promoting WMP in any other way over competitors' products through Windows;

(iii) Microsoft must not give OEMs or users a discount conditional on their obtaining Windows together with WMP, or *de facto*, financially or otherwise, remove or restrict OEMs' or users' freedom to choose the version of Windows without WMP;

(iv) Microsoft must not "punish" or "threaten" OEMs or users who obtain Windows without WMP;

(v) Microsoft must not ship WMP tied with another Microsoft product which would exhibit a similar ubiquity as Windows (for example Microsoft Office).

(1014) The above examples are enumerative and without prejudice as to what other conduct would amount to a measure equivalent in its harmful effects to tying.

6.1.2.2 Timing

(1015) Given the way Microsoft has structured technically, contractually and commercially its offering of the bundled operating system and media player, an effective un-tying can only take place once Microsoft has unravelled the various links that tie these two products.

(1016) However, it is also important that Microsoft's change of conduct occurs in a timely manner so as to restore undistorted competition in the media player market before tying affords WMP critical mass to tip the market due to the network effects that have been identified.

(1017) In the light of the foregoing, Microsoft should be given 90 days to implement the remedy concerning tying. 90 days is a long enough period to implement the necessary changes, in particular the software-related ones, while not likely to be too late to prevent the market from tipping due to tying.

[1271] Rivals must have access to all default settings for every instance of media player usage.

[1272] There is for example an Automatic Update facility for Windows XP that can access users' PCs to deliver updates and downloads without a specific user request.

6.1.2.3 The remedy is sufficiently determined

(1018) According to Microsoft, it "*would not be at all clear what software code Microsoft was supposed to remove.*"[1273] As Microsoft does not accept that WMP is a separate product from Windows, its argument that there is no clear-cut notion about the WMP code to be removed would seem consistent.[1274]

(1019) But the foregoing cannot obfuscate that as of today, the code of Microsoft's streaming media player application called WMP 9 is determined by choices that Microsoft has made in the past. RealNetworks has shown that by removing WMP 9 application files from the Windows XP Embedded operating system,[1275] an intact version of the operating system without the WMP code can be built.[1276] Microsoft argues that if *all* Media Code is removed,[1277] certain basic operating system functionality such as the narrator function[1278] for the visually impaired would no longer work.[1279] However, this argument need not be further pursued as this Decision does not order Microsoft to remove *all* media files in Windows but only the ones which constitute WMP. Importantly, these files contain the technologies which have been identified as bringing about the foreclosure effect by virtue of WMP being tied to Windows, namely the files that support the proprietary Microsoft codecs, file

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[1273] Microsoft's submission of 17 October 2003, on page 119.
[1274] It is, however, noteworthy that at the Oral Hearing Microsoft presented a Windows operating system version with *all* "Windows Media Code" removed. This was done in order to show that removing the "Windows Media Code" would break the Windows functionalities which rely on multimedia capabilities contained in the code. (Microsoft Presentation, *Hearing in Case No COMP/C-3/37.*792, 13 November 2003, slide Z10. See also slides Z5 and Z6 "*What Windows Media Code Is*".)
[1275] For Windows XP Embedded see recital (1028) *et seq.*
[1276] RealNetworks's email of 20 January 2004, *Description of process used by RealNetworks to build the operating system on the personal computers used during the Microsoft hearing and provided to the European Commission*
[1277] In order to remove *all* the Media Code "*Microsoft focused on Windows Media Player redistribution packages - WMP6.4 and WMP9*". Thus, Microsoft counts 186 files that should be removed (Microsoft's submission of 19 January 2004, on page 2 and 5 and 6) while RealNetworks counts 89 plus 52 (i.e. 141) files (corresponding to components 8 – 11 of the appendix to Microsoft's letter of 19 January 2004; see RealNetworks' email of 22 January 2004).
[1278] Microsoft's submission of 19 January 2004, on page 2 and Microsoft's submission of 7 February 2004, on page 64.
[1279] Earlier in the proceedings, Microsoft had claimed that "*it [was] clear that RealNetworks did not use Windows XP Embedded to remove multimedia functionality from the operating system [...] Instead, RealNetworks at most removed certain user interface elements that enable end-user access to multimedia functionality in Windows XP. [...] Such a version of Windows XP removes end-user access to Windows Media Player without removing the underlying multimedia functionality.*" Alternatively, the WMP code would have been brought back in again by the workings of the dependency checking mechanism in Windows XP Embedded during the building of the RealNetworks version of Windows XP Embedded. (Microsoft's submission of 1 December 2003, on page 30 to 32) This no longer seems to be Microsoft's line of argumentation: "*As Microsoft explained before the 23 January 2004 meeting, there is no dispute that RealNetworks used Windows XP Embedded to build a custom runtime that excluded a portion of the media playback functionality of Windows XP.*" (Microsoft's submission of 6 February 2004, on page 1) In the meantime, RealNetworks had submitted further information on its demonstration at the Oral Hearing, to which Microsoft had access.

formats and DRM formats and the WMP user interface.[1280] Going forward, Microsoft - according to the remedy incorporated in the present Decision - will have to make sure that it does not tie these components with Windows.

(1020) Not included in these files are low-level operating system layer media components (such as components that support for example .wav formatted system sounds or "DirectShow" APIs[1281]); functionality such as for example the narrator function for the visually impaired will therefore not be disabled.[1282]

(1021) Last, but not least, Microsoft's argument that the files to be removed are arbitrary and simply reflect files that RealNetworks' RealPlayer does not rely on (while other media players may rely on these files) is invalid.[1283] Not only does RealPlayer actually rely on Microsoft's proprietary codecs in order to play Microsoft .wma files (and removing these files therefore impacts RealPlayer)[1284] but in addition, the delineation of the code to be removed is in accordance with Microsoft's own designation of files as Windows Media files in Windows XP Embedded.[1285]

6.1.2.4   The remedy is proportionate

(1022) The requirement that Microsoft offers a version of Windows with WMP removed relates to the media code causes complementary media software and content to be platform-specific, that is to say, the software and the content will only run on Microsoft or Microsoft licensed platforms. If these elements of WMP were not covered by not covered by the remedy order, the foreclosure effect that Microsoft's conduct brings about would be left unaddressed.

[1280]   The fact that these components support Microsoft proprietary technologies is important. In contrast, the dissemination of open standard technology is different as there is no attendant lock-in effect (see the example of an HTML standard compliant reader engine in Windows (see for example Microsoft's submission of 21 October 2003 (M. Iansiti), at p. 12, 14 and 22)).

[1281]   Microsoft's submission of 7 February 2004, on page 57. Microsoft states that it agrees with Entity T32 (Entity T32's response to Article 11 letter, at Question 3) that DirectShow is part of *Windows*. Entity T32's response to Question 3 reads: "*[Entity T32] accesses some of the functions provided by Microsoft DirectShow for playing video files. This is only indirectly related to Windows Media Player – DirectShow (sometimes also called "Windows Media Technologies") is part of Windows, but the Windows Media Player uses it as well.*"

[1282]   The inclusion of support for open file formats such as .wav or MIDI in Windows in 1992 did not entail a lock-in effect.

[1283]   Microsoft's submission of 19 January 2004, on page 3.

[1284]   See Microsoft's own submission of 6 February 2004, on page 3 and in the spreadsheet, item 9 "Play a WMA, WMV, MP3 file"). As Microsoft states itself, applications like MusicMatch Jukebox are able to play Microsoft proprietary .wma files because MusicMatch "*redistributes some of the media-related software in Windows XP*". (Microsoft's submission of 19 January 2004, on page 2)

[1285]   "*To keep the footprint of a given Windows XP Embedded runtime as small as possible for use in hardware devices with limited amounts of memory, it is possible to exclude a wide range of components from that runtime, including components labeled Windows Media Player.*" (Microsoft's submission of 7 February 2004, on page 65, emphasis added)

(1023)   The remedy will not hinder Microsoft's ability to market its media player nor will it restrain its behaviour other than prohibiting tying or measures having an equivalent effect. In particular, Microsoft will be able to continue to offer a bundle of Windows and WMP.

(1024)   In rejecting an un-tying remedy, Microsoft points out that "*there is no meaningful consumer demand for client operating systems without [multimedia] functionality.*"[1286]

(1025)   But the un-tying remedy does not mean that consumers will obtain PCs and operating systems without media players. Many of them are, in fact, likely to want to purchase a bundle including a PC, a client PC operating system and a media player from OEMs. The difference is that the configuration of such bundles will reflect what consumers desire and not what Microsoft imposes. Under the remedy, the user benefits which derive from obtaining a pre-installed bundle of an operating system *and* a media player will therefore *not* be eliminated whilst the ability to *choose* the media player component of the bundle will be restored.

6.1.2.4.1   Interdependencies between Windows and Windows Media Player

(1026)   Microsoft states that removing the WMP code would undermine the integrity of the operating system.[1287] The code bases of Windows and WMP contain interdependencies in the sense that Windows makes calls to WMP APIs. If the Commission ordered the removal of *all* WMP related software then users could, for instance, not stream files, play back files on the hard disk, play a CD or a DVD and use the Media Bar in Internet Explorer.[1288] In other words, Microsoft claims efficiencies for which the integration of WMP would be a precondition.

(1027)   The argument relying on essential and irreversible inter-dependencies between Windows and WMP cannot be accepted as an objective justification for tying. The existence of such inter-dependencies would be the result of a deliberate choice by Microsoft.[1289] As such they could not pre-empt in themselves the Commission's assessment of the lawfulness of Microsoft's conduct under Article 82 of the Treaty.

(1028)   In any event, it is technically possible for Microsoft to have Windows handle the absence of multimedia capabilities caused by code removal (and the resulting effect on any interdependencies) in a way that does not lead to the breakdown of operating

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[1286]   Microsoft's submission of 17 October 2003, on page 87.
[1287]   Microsoft's submission of 15 March 2001, on page 13.
[1288]   Microsoft's submission of 17 October 2003, on page 120-121. See also Hearing in Case No COMP/C-3/37.792, Microsoft Presentation, 13 November 2003, slide Z 10.
[1289]   Cf. Microsoft's submission of 7 February 2004, on page 64: "*That is because other parts of Windows XP were designed to call upon the media playback functionality that is part of the operating system [...]*"

system functionality. Windows XP Embedded is a case in point. It is described on Microsoft's homepage as the "componentised" version of Windows XP. According to Microsoft, Windows XP Embedded "*is based on the same binaries as Windows XP*" and "*includes all Windows 2000 technology, as well as the latest Windows XP technology.*"[1290]

(1029) Windows XP Embedded enables developers to deploy selected features of Windows so that the operating system is reduced in size according to the specific need of devices such as automatic teller machines and set-top boxes.[1291] Windows XP Embedded can be configured to span as little as 5 megabytes ("MB") of code.[1292] As the "integral" version of Windows XP Embedded contains WMP, which itself has ≥10 MB of code, a configured version of 5 MB can, by definition, not contain WMP.[1293] Windows XP Embedded can hence be configured not to include WMP without this harming the integrity of the non-media related operating system functionality, suggesting that Windows is designed to "gracefully" deal with interdependencies, that is to say, without undermining the functioning of the "rest" of the (in Microsoft's view) operating system.[1294]

(1030) Microsoft's contention that Windows XP Embedded is licensed for special purpose devices and not for general purpose PCs is immaterial in this regard, as Microsoft's licensing policy cannot detract from the technical reality that there is a version of Windows XP which has been designed with a view to making components removeable to reduce the footprint of Windows and to resolve dependency issues.[1295]

[1290] See Microsoft's Windows Embedded homepage, Frequently Asked Questions, printed 15 May 2002.

[1291] "*To keep the footprint of a given Windows XP Embedded runtime as small as possible for use in hardware devices with limited amounts of memory, it is possible to exclude a wide range of components from that runtime, including components labeled Windows Media Player.*" (Microsoft's submission of 7 February 2004, on page 65)

[1292] See Microsoft's Windows Embedded homepage, Frequently Asked Questions, printed 15 May 2002.

[1293] Windows Media Player 7.1 is a 10.187 MB program, taking 49 minutes to download (at http://www.microsoft.com/windows/windowsmedia/download/default.asp, printed 16 May 2002).

[1294] Demonstration of RealNetworks at the Oral Hearing, *Case COMP/C-3/37.792-Microsoft*, 14 November 2003, slides 23-26. In the US, trial evidence was put forward but then not admitted because of procedural reasons that Windows XP worked well when WMP was removed. "*Even though I neither added nor changed any code to compensate for the removal of the Windows Media Player, removing the Windows Media Player did not cause a system crash for any application or function. It appears that a Windows XP operating system with the Windows Media Player removed continues to be very stable, even without adjustments to the remaining code.*" (J. Bach, May 2002, Civil Action No. 98-1233 (CKK) at paragraph 71). Microsoft avoids to state that Windows XP Embedded would break if WMP is removed, but points out that a general statement to the effect that Windows XP Embedded does *not* break would be "meaningless" as such a statement can "*only be made with reference to a particular runtime created using Windows XP Embedded [...]*" (Microsoft's submission of 7 February 2004, on page 65. See also Microsoft's submission of 6 February 2004, on page 5, first paragraph)

[1295] Microsoft's submission of 17 October 2003 (NERA), at paragraph 79. See also "*Can I use an embedded operating system on my home computer? No. Microsoft does not license the embedded*

(1031)   Any efficiency implications of code removal would weigh heavier if Microsoft had shown that the integration of WMP was a precondition for these efficiencies. Microsoft has not provided evidence to that effect. While, in general, it is accurate that multimedia functionality cannot be called upon when it is not present on a client PC, other streaming media player vendors implement services such as "stream files", "play back files on the hard disk" and "play a CD or a DVD" by devising their own solutions.[1296] Microsoft itself states that RealPlayer running on top of Windows XP Embedded without WMP – without further development work by RealNetworks - replaces 21 features that WMP normally offers.[1297] Software developers can also rely on media player redistributable code (such as WMP redistributable) which exposes the corresponding APIs.[1298] Microsoft's suggestion that "*[t]here is little point in documenting APIs or protocols if the software code that supplies the functionality exposed by those APIs and protocols is not present in the operating system*" would be odd if it was to mean that it only makes sense to document APIs if they are part of the operating system: WMP 9 was not part of the operating system when first introduced on the Internet and Microsoft still documented its APIs.[1299]

(1032)   If developers devise their own solutions or integrate a third party's redistributable code in their application, they do not depend on the presence of the media player on the user's client PC. The benefit for the customer is that these functionalities *are* provided, not that they are provided by the integrated WMP. Nothing in Microsoft's submissions points to evidence that end users could not enjoy this functionality through a bundle of Windows and a third party media player.

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operating systems for use on a general-purpose personal computer.", *Windows Embedded Frequently Asked Questions*, http://www.microsoft.com/windows/Embedded/faq/default.asp, printed 3 December 2003.

[1296]   RealNetworks's submission of 18 December 2003, Annex. Microsoft itself does not claim that third parties' products cannot implement such functionality: "*For example, a media player vendor might decide to call upon Windows to play MP3 audio files but to rely on its own application to play MPEG-2 video files. [...] Even if one were to assume that third-party media players could replicate the media playback functionality supplied by Windows, [...]*" (Microsoft's submission of 7 February 2004, at pp. 60 and 64.)

[1297]   As regards the other 20 features that "*Microsoft intended the operating system to have*", Microsoft states that they are not available with WMP removed. Microsoft does, however, not state that they could not be developed and offered in other media players (assuming that Windows' APIs are sufficiently documented) or that Windows would not work, regard being had to the non-availability of these functionalities. (Microsoft's submission of 6 February 2004, on page 2)

[1298]   For example, through its Windows Media Player 9 Series Redistribution License, Microsoft offers software developers the possibility "*to redistribute the player as part of their application and from their Web site*". (*Redistributing and Licensing Windows Media Components*, September 2003, http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnwmt/html/lic_redist.asp, printed 23 December 2003.) This is what, for example, MusicMatch takes advantage of in its Jukebox application.

[1299]   Microsoft also states that "*RealNetworks media players expose some of their functionality through documented APIs*"; RealNetworks' media players are not present in the operating system *a priori*. (Microsoft's submission of 7 February 2004, on page 68)

(1033) Moreover, it is obvious that if WMP is removed, certain multimedia functionalities that WMP normally delivers will not be available. But, firstly, another media player (or even WMP itself) implementing these functionalities can be installed on the PC. And, second, in any event, it is appropriate to differentiate between *technical* dependencies which would by definition lead to the non-functioning of the operating system and *functional* dependencies which can be dealt with "gracefully".

(1034) It is interesting to note that a US Court of Appeals in a related (but not identical) context took issue with Microsoft's commingling of browser code with Windows to prevent OEMs and consumers from removing such browser code from a Windows PC under the legal doctrine of monopoly maintenance. The Court found that Microsoft had not proffered a justification for code-commingling, and concluded that Microsoft's conduct "*reduces rivals' usage share and, hence, developers' interest in rivals' APIs as an alternative to the API set exposed by Microsoft's operating system*" in an anticompetitive manner.[1300]

6.1.2.4.2 Interdependencies between Windows and third party applications

(1035) According to Microsoft, content providers would be harmed as they invoke Windows Media Player APIs to play audio and video.[1301] Code removal would also injure software developers who write applications that rely on WMP.[1302] For example, RealNetworks' media player could no longer play video or audio files in the Windows Media format.[1303] MusicMatch Jukebox would not work without WMP.[1304]

(1036) However, the presence of WMP on a PC is not a precondition for content providers and software developers to rely on WMP functionality (see footnote 1298).

(1037) As regards the impact of code removal on content providers, it is not an unusual situation that content providers implement solutions which examine what media player is installed on a user's PC, and that they foresee the necessary steps in case the presentation of their content requires a particular media player or a particular version of a given media player.[1305] In a submission to the Commission, Microsoft confirms

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[1300] Judgment of 28 June 2001, United States Court of Appeals for the District of Columbia Circuit, *United States v. Microsoft*, No. 00-5212, on page 39.

[1301] Microsoft's submission of 17 October 2003, on page 125.

[1302] Microsoft's submission of 17 October 2003, on page 122.

[1303] Microsoft's submission of 17 October 2003, on page 123. Microsoft specifies that RealNetworks' player would not be able to do so if also the DirectShow APIs were removed.

[1304] Microsoft's submission of 17 April 2002, NERA, on page 6.

[1305] In the context of explaining the procedures and requirements for including Windows Media components in an application setup Microsoft states that a registry lookup is all developers need to do to determine which version of Windows Media Player is present on a PC. (*Redistributing Windows Media Components*, February 2003, http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnwmt/html/rediswmedc.asp)

that "*[w]hen users encounter content in a particular format on the Web, typically the Web site provides a button that directs users to the appropriate vendor's Web site, where they can download and install a new or updated copy of the media player free of charge.*"[1306]

(1038) For instance, content providers need to provide for the possibility that content based on Windows Media 9 Series is requested by a user who uses the older and not fully compatible version 6.4 of WMP.[1307] To provide for such an eventuality is a common industry practice used notably by Microsoft's competitors and Microsoft itself. It is not necessary to employ a significant programming effort to adapt a content provider's site so that it detects the possible absence of WMP and directs the user towards options of how to proceed.[1308]

(1039) RealNetworks demonstrated at the Oral Hearing that MusicMatch Jukebox and RealOne Player worked on a PC running Windows XP Embedded without WMP.[1309] As mentioned at recital (1028) *et seq.*, Windows XP Embedded offers customers *inter alia* the possibility to remove the WMP application via the Windows XP Embedded Target Designer.[1310]

(1040) In its demonstration, RealNetworks did not remove lower level media functionality (called "infrastructure" by Microsoft in the Windows XP Embedded Target Designer, e.g. DirectSound files[1311]). What was removed, however, was the WMP application as featured in the Target Designer including the codecs and file container files (including DRM).[1312] MusicMatch Jukebox could still play Windows Media files after WMP was removed as it contains the WMP redistributable.[1313]

(1041) Microsoft argues furthermore that "*if Windows ceased to be a consistent platform, software developers would tend to target particular versions of the operating system*

[1306] Microsoft's submission of 17 October 2003, NERA, at paragraph 48. An example of this is OD2 and Microsoft with a "Get Windows Media Player 9 Here" link on the website of the MSN Music Club (http://sib1.od2.com/common/frameset/frames.asp).

[1307] *Compatibility and Future Support for the Windows Media Player ActiveX Control*, January 2003, http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnwmt/html/6-4compat.asp, printed 23 December 2003. Content created using Windows Media 9 Series works with Windows Media Player 7 and later versions.

[1308] This was also confirmed in the Oral Hearing by Ms. Linda Averett, Microsoft, on questions of the Commission.

[1309] Presentation of RealNetworks at the Oral Hearing, *Case COMP/C-3/37.792-Microsoft*, 14 November 2003, slides 23-26.

[1310] RealNetworks's email of 20 January 2004, *Description of process used by RealNetworks to build the operating system on the personal computers used during the Microsoft hearing and provided to the European Commission*

[1311] These files (for example dsound.dll) are designated by Microsoft as operating system files in the properties/product name fields, and not as Windows Media files.

[1312] See RealNetworks's email of 22 January 2004.

[1313] See also Microsoft's own submission of 19 January 2004, on page 2.

in developing their applications, hindering interoperability."[1314]   However, software developers need to target particular versions of WMP (and Windows) today.[1315]

(1042)   More fundamentally unacceptable is the further-reaching rationale seemingly underpinning Microsoft's argument: Microsoft's dominance in the client PC operating system market uniquely enables Microsoft to leverage its market power through tying its streaming media player.   Microsoft's argument appears to be that for the sole reason that Microsoft has this option at its disposal, implementing it should not be of competitive concern.[1316]   By doing so, Microsoft would provide a focal point for software developers who build on media players.   This is not a legitimate line of conduct or argument under Community competition law as it distorts competition on the merits.

6.1.3   Monitoring Mechanism

(1043)   It must be ensured that the Commission will be in a position to efficiently oversee Microsoft's compliance with this Decision.   A mere reporting mechanism is not sufficient in that respect.   For instance, as regards the refusal to supply abuse, the accuracy and completeness of the specifications to be disclosed can only be ascertained on a case-by-case basis and by having the possibility to interrogate Microsoft's source code.

(1044)   The effective monitoring of Microsoft's compliance with this Decision will therefore have to be ensured by establishing a suitable monitoring regime including a monitoring trustee.   Microsoft will have to submit a proposal to that effect.   Guiding principles for Microsoft in this respect are outlined in the following.

(1045)   The primary responsibility of the Monitoring Trustee should be to issue opinions, upon application by a third party or by the Commission or *sua sponte*¸[1317] on whether Microsoft has, in a specific instance, failed to comply with this Decision, or on any issue that may be of interest with respect to the effective enforcement of this Decision.

[1314]   See for example, Microsoft's submission of 17 October 2003, on page 83.

[1315]   "*Because there are multiple versions of Windows Media Player in use, you might choose to continue supporting multiple versions. The Windows Media Player 9 Series Software Development Kit (SDK) includes a sample that demonstrates how to detect which Player (and Web browser) the user has and then provide a Web page tailored for that user. If you choose this approach, you can be sure to provide the best experience for every user while getting the benefits of migrating your content to the latest platform.*" (Compatibility and Future Support for the Windows Media Player ActiveX Control, January 2003,   http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnwmt/html/6-4compat.asp, printed 23.12.2003.)

[1316]   See Microsoft's submission of 7 February 2004, on page 61 quoting Microsoft's response to the supplementary statement of objections and on page 64.

[1317]   The Monitoring Trustee should not only be reactive, but should play a proactive role in the monitoring of Microsoft's compliance.

(1046)   As regards interoperability, the Monitoring Trustee's responsibility should, in particular, involve assessing whether the information made available by Microsoft is complete and accurate, whether the terms under which Microsoft makes the specifications available and allows the use thereof are reasonable and non-discriminatory and whether the ongoing disclosures are made in a timely manner.

(1047)   As regards tying, the Monitoring Trustee's responsibility should, in particular, be to advise the Commission whether substantiated complaints by third parties about Microsoft's compliance with this Decision are well-founded from a technical point of view. In particular, but not exclusively,

(i)   the Monitoring Trustee should advise whether Microsoft has unbundled WMP from Windows as ordered by this Decision;

(ii)   the Monitoring Trustee should advise whether the unbundled version of Windows is less performing than any bundled version of Windows that Microsoft would continue to offer, regard being had to the fact that media functionality included in WMP would, by definition, not be part of the unbundled Windows;

(iii)   the Monitoring Trustee should advise whether Microsoft hinders the performance of rival media players through selective, inadequate, or untimely disclosures of Windows APIs.

(1048)   Microsoft's proposal, which shall comprise a mandate for the Monitoring Trustee, should have regard to the following principles:

(i)   the Monitoring Trustee should be designated by the Commission from a list of (legal) persons submitted by Microsoft; in submitting such a list, Microsoft should provide sufficient information for the Commission to verify that the proposed Monitoring Trustees can adequately fulfil his function; a procedure should be foreseen which allows the Commission to designate a Monitoring Trustee of its choosing in case it does not deem any of the persons proposed by Microsoft adequate for the task;

(ii)   the Monitoring Trustee should be independent of Microsoft and provisions should be established to ensure that the Monitoring Trustee is not and will not become exposed to a conflict of interest; he should possess the necessary qualifications to carry out his mandate, and have the possibility to hire experts to carry out certain precisely defined tasks on his behalf;

(iii)   provisions should be established in order to guarantee that the Monitoring Trustee has access to Microsoft's assistance, information, documents, premises and employees to the extent that he may reasonably require such access in carrying out his mandate;

(iv)   the Monitoring Trustee should have full access to the source code of the relevant Microsoft products (any controversy as to the accuracy and completeness of the specifications that will be disclosed can only be resolved

if the technical information is checked against the actual source code of Microsoft's products);

(v) all costs of establishment of the Monitoring Trustee, including a fair remuneration for the Monitoring Trustee's activities, should be borne by Microsoft.

6.1.4 Consistency of the remedies with the Community's international obligations

(1049) According to Microsoft, the proposed remedies violate the Community's international obligations. In this respect, Microsoft's argument is twofold.

(1050) First, Microsoft argues that the remedy concerning the refusal to supply abuse would violate the Community's obligations under the World Trade Organisation Agreement on Trade-Related Aspects of Intellectual Property Rights[1318] ("the TRIPS Agreement").[1319] In Microsoft's view, the remedy *"implicates various intellectual property rights protected by the TRIPS Agreement"* including *"at least patents, copyright and trade secrets"*.[1320] As regards copyright, Microsoft argues that a compulsory disclosure of its copyright fails to meet the requirements which Article 13 of the TRIPS Agreement[1321] sets out for limitations and exceptions to copyrights.[1322] Concerning the other intellectual property rights protected by the TRIPS Agreement, Microsoft does not further substantiate any possible violations of the relevant obligations under the TRIPS Agreement.

(1051) Second, Microsoft argues that to order the removal of WMP code would violate the Community's obligations under the World Trade Organisation Agreement on Technical Barriers to Trade[1323] ("the TBT Agreement").[1324]

(1052) The Commission has carefully considered all of Microsoft's arguments and sees no inconsistency between this Decision and the Community's international obligations,

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[1318]   Agreement on Trade-Related Aspects of Intellectual Property Rights, Annex 1C of the Agreement Establishing the World Trade Organization of 15 April 1994, OJ L 336, 23.12.1994, p. 214, http://www.wto.org/english/docs_e/legal_e/27-trips.pdf.

[1319]   Microsoft's submission of 17 November 2000, at paragraphs 5 and 32; Microsoft's submission of 16 November 2001, at paragraph 168; Microsoft's submission of 17 October 2003, on page 11.

[1320]   Microsoft's submission of 17 November 2000, at paragraph 172 (footnotes omitted), see also, although not in the context of the TRIPS Agreement, Microsoft's submission of 30 November 2003, on page 2: *"There can be no doubt that the technology the Third SO would require Microsoft to divest or license constitutes highly valuable intellectual property that is protected by trade secret, copyright and patent laws."*

[1321]   Article 13 TRIPS "Limitations and Exceptions": *"Members shall confine limitations or exceptions to exclusive rights to certain special cases which do not conflict with a normal exploitation of the work and do not unreasonably prejudice the legitimate interests of the right holder."*

[1322]   Microsoft's submission of 17 November 2000, at paragraphs 174-180, and Annex Z, on page 7-12.

[1323]   Agreement on Technical Barriers to Trade, Annex 1A of the Agreement Establishing the World Trade Organisation of 15 April 1994, OJ L 336, 23.12.1994, p. 86 http://www.wto.org/english/docs_e/legal_e/17-tbt.pdf.

[1324]   Microsoft' submission of 17 October 2003 (response to supplementary Statement of Objections), at p.131-133.

since the action the Commission is taking under this Decision is fully consistent with its obligations under the WTO Agreements, in particular the TRIPS and the TBT Agreements. These agreements allow the imposition of an obligation to bring to an end the infringement identified in this Decision.

(1053) Furthermore, it is settled case-law that "*having regard to their nature and structure, the WTO agreements are not in principle among the rules in the light of which the Court is to review the legality of measures adopted by the Community institutions*".[1325] It also follows from this case-law that "*[i]t is only where the Community intended to implement a particular obligation assumed in the context of the WTO, or where the Community measure refers expressly to the precise provisions of the WTO agreements, that it is for the Court to review the legality of the Community measure in question in the light of the WTO rules*".[1326] In this case, these conditions are not satisfied and Microsoft can therefore not invoke the TRIPS Agreement or the TBT Agreement to challenge the legality of this Decision.

6.2   Article 15 (2) of Regulation 17 - Fines

(1054) Under Article 15 (2) of Regulation 17, the Commission may, by decision, impose fines upon undertakings or associations of undertakings where, either intentionally or negligently, they infringe Article 82 of the Treaty and/or Article 54 of the EEA Agreement. Such fines can be a sum from EUR 1,000 to EUR 1,000,000 or a sum in excess thereof, but not exceeding 10% of the turnover in the preceding business year of each of the undertakings participating in the infringement.

(1055) In fixing the amount of the fine, the Commission must have regard to the gravity and duration of the infringement. In addition, the fine imposed should reflect any aggravating or attenuating circumstances.

(1056) In its reply to the supplementary Statement of Objections[1327] and at the Oral Hearing, Microsoft stated that the Commission should not impose any fine on Microsoft for the following reasons:

   (i)   Microsoft cannot be found to have infringed any provision of the Treaty;

   (ii)   in both the refusal to supply and the tying case, the Commission is applying a new rule of law;

   (iii)   the corresponding novel theories of liability are not ones that would have been apparent to Microsoft or anyone else in the software business;

[1325]   Judgement of the Court in Case C-149/96 <u>Portugal v Council</u> [1999] ECR I-8395, at paragraph 47; confirmed for the TRIPS Agreement in Judgment of the Court in Case C-491/01, <u>British American Tobacco</u> [2002] ECR I-11453, at paragraphs 154-156).

[1326]   Judgement of the Court in *Portugal v Council*, at paragraph 49.

[1327]   See Microsoft's submission of 17 October 2003, on pages 135 to 138.

(iv)   as regards tying, there is no event that can reasonably be said to have started the abuse; the Commission suggests that such an event occurred in 1999 although multimedia playback functionality has been integrated in Windows since 1992.

(1057) Those arguments cannot be accepted. First, the arguments set out in this Decision constitute, in themselves, sufficient proof that Microsoft has intentionally or at least negligently infringed Article 82 of the Treaty and Article 54 of the EEA agreement.[1328] Second, the Commission is not applying any new rule of law. As far as the refusal to supply is concerned, this case is based on a constant practice as expressed and developed in previous cases including *Commercial Solvents*, *Télémarketing*, and *Magill*, among others. The same goes for tying, for which cases like *Hilti* and *Tetra Pak II* should have constituted sufficient guidance for Microsoft. In the absence of the application of any novel concept of competition law, and in view of the fact that the software industry is not exempted from the application of competition law, Microsoft should have been aware of the fact that it was infringing the competition rules of both the Treaty and the EEA Agreement. Finally, as regards Microsoft's argument that the starting point for the tying abuse is doubtful, it has to be noted that an earlier starting point of the abuse would not have a bearing on whether a fine should be imposed or not. At most, it should have an effect on the amount to be imposed for the duration of the infringement. In any event, by choosing 1999 instead of 1998 or 1992, the Commission is limiting itself to the period for which, in view of the available evidence, the abuse of a dominant position is clearly established, and is not causing any prejudice to Microsoft. Quite the contrary, since the longer the duration of the abuse, the larger the final amount of the fine would be.

(1058) In summary, in view of the above considerations, the Commission concludes that Microsoft's conduct justifies the imposition of a fine.

6.2.1   The basic amount of the fine

(1059) The basic amount of the fine is determined according to the gravity and duration of the infringement.

6.2.1.1   Gravity

(1060) In its assessment of the gravity, the Commission takes into account the nature of the infringement, the actual impact on the market (where this can be measured) and the size of the relevant geographic market.

[1328]   See Judgment of the Court in Case 19/77 <u>Miller International Schallplatten v Commission</u> [1978] ECR 131, at paragraph 18.

6.2.1.1.1 Nature of the infringement

(1061) Refusal to supply and tying by undertakings in a dominant position have already been ruled against on several occasions by the Court of Justice.[1329]

(1062) It has been established in this Decision that Microsoft holds a dominant position in the client PC operating system market with a market share that is currently well above 90%. The client PC operating system market, as well as the two other markets relevant to this case are characterised by strong direct and/or indirect network effects.[1330]

(1063) In these circumstances, Microsoft has conducted a leveraging strategy which constitutes *two separate abuses*.

(1064) As regards the refusal to supply abuse, Microsoft has engaged in a *general pattern of conduct* which focuses on the creation and sole exploitation of a range of privileged connections between its dominant client PC operating system and its work group server operating system, and on the disruption of previous levels of interoperability. The interoperability information at stake is indispensable for competitors to be able to viably compete in the work group server operating system market.[1331]

(1065) Microsoft's abuse enables it to extend its dominant position to the market for work group server operating systems. This market is in itself of significant value: it concerns products that are part of the basic infrastructure used by office workers around the world in their day-to-day work. In addition, capturing the work group server operating system market is liable to have further effects detrimental to competition. First, it would erect further barriers to entry in the client PC operating system market[1332] and limits the risk of a change of paradigm that could strip Microsoft's overwhelming dominance on the client PC operating system market of its competitive importance.[1333] Second, it would provide a bridgehead from which Microsoft could further leverage its position into other areas of the server industry.[1334]

(1066) As regards the second abuse, Microsoft's tying behaviour ensures that the ubiquity of its client PC operating system is shared by its streaming media player. As described above, this creates disincentives for OEMs to ship third party streaming media

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[1329] See above at recital (1057). See also Commission Decision 2002/180/EC in Case Comp/C-1/37.859 - De Post - La Poste). OJ L 61, 2.3.2002, p. 32.

[1330] For the streaming media player market, see above, at recitals (420) *et seq.* and at recitals (879) *et seq.* For the work group server operating system market, see above at recitals (516) *et seq.*

[1331] See above, Section 5.3.1.2.2 and Section 5.3.1.2.3.

[1332] See above, at recital (769).

[1333] See above, at recitals (770) *et seq.*

[1334] See above, at recitals (775) *et seq.*

players pre-installed on their PCs,[1335] and harms competition in the market for streaming media players.[1336]

(1067) In addition, the abuse has significant effects on the competition landscape for the delivery of content over the Internet and on multimedia software. This is an important commercial sector at present, and will become even more so in the near future (as a source of revenues). Content providers and software developers focus increasingly on Windows Media Player and on Windows proprietary media formats and technologies, because they know that WMP is pre-installed on every Windows PC.[1337] This is notwithstanding the fact that other media players are of similar or even higher quality than WMP.[1338] Furthermore, domination of the streaming media player market may constitute a strategic gateway to a range of related markets, on some of which high revenues can be earned. Microsoft's strategy could lead to a situation where any company wishing to sell content (audio or video) in digital form in a secure way would need to pay a "toll" to Microsoft on each such transaction.[1339]

(1068) For the reasons outlined above, this infringement constitutes by its nature a very serious infringement of Article 82 of the Treaty and Article 54 of the EEA Agreement.

6.2.1.1.2 Impact of the infringement

(1069) The pattern of exclusionary leveraging behaviour engaged in by Microsoft has a significant impact on the markets for work group server operating systems and for streaming media players.

(1070) As regards the market for work group server operating systems, the abuse has already contributed to Microsoft achieving a dominant position in that market, and risks eliminating competition on that market.[1340]

(1071) As regard the market for streaming media players, the abuse has already contributed to Microsoft achieving a leading position in that market. Evidence described in this Decision suggests that the market may already be tipping in favour of WMP.[1341]

(1072) In conclusion, the Commission considers that the impact of Microsoft's abuses on the relevant markets has been significant.

[1335]   See above at recital (851).
[1336]   See above, Section 5.3.2.1.4
[1337]   See above, Section 5.3.2.1.4.2
[1338]   See above, at recitals (947)-(951).
[1339]   See above, at recital (975) *et seq*.
[1340]   See above, Section 5.3.1.2.
[1341]   See above, Section 5.3.2.1.4.

6.2.1.1.3 Size of the relevant geographic market

(1073) For the purposes of assessing the gravity of the abuses, the markets for client PC operating systems, for work group server operating systems and for media players, are EEA-wide in scope.

6.2.1.1.4 Conclusion on gravity

(1074) On the basis of the above, it is apparent that the behaviour of Microsoft involves abuses of a dominant position that are particularly anti-competitive in their nature, and which have a significant impact on markets of strategic importance in the IT sector. In addition, Microsoft's behaviour affects the entire EEA. In view of these factors, it must be concluded that Microsoft has committed a very serious infringement of Article 82 of the Treaty and Article 54 of the EEA Agreement, for which the likely fine is above EUR 20 million.

(1075) The initial amount of the fine to be imposed on Microsoft to reflect the gravity of the infringement should be, in light of the above circumstances, EUR 165,732,101.

(1076) When calculating the initial amount of the fine, account should be taken of the necessity of setting the fine at a level that ensures that it has a sufficient deterrent effect. In order to do so, it is necessary to determine whether any upward adjustment of the initial amount is necessary. Given Microsoft's significant economic capacity,[1342] in order to ensure a sufficient deterrent effect on Microsoft, the initial amount should be adjusted upwards by a factor of 2 to EUR 331,464,203.

6.2.1.2 Duration

(1077) Microsoft's refusal to supply abuse commenced in October 1998 and is still ongoing. Microsoft's tying abuse commenced in May 1999 and is still ongoing. For the

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[1342] Microsoft is currently the largest company in the world by market capitalisation. (see http://news.ft.com/servlet/ContentServer?pagename=FT.com/StoryFT/FullStory&c=StoryFT&cid=105 1390342368&p=1051389855198 and http://specials.ft.com/spdocs/global5002003.pdf - the Financial Times "*World's largest Companies*", updated on 27 May 2003, printed on 13 January 2004). According to the same measure, Microsoft has held a consistently high ranking in the list of the world's largest companies by market capitalisation, being the largest in 2000, the fifth largest in 2001, and the second largest in 2002 (see http://specials.ft.com/ln/specials/global5002a.htm (for 2000, printed on 24 January 2003), http://specials.ft.com/ft500/may2001/FT36H8Z8KMC.html (for 2001, printed on 24 January 2003), http://specials.ft.com/ft500/may2002/FT30M8IPX0D.html (for 2002, printed on 24 January 2003)). Microsoft's resources and profits are also significant. Microsoft's Securities and Exchange Commission filing for the US fiscal year July 2002-June 2003 reveals that it possessed a cash (and short-term investment) reserve of USD 49,048 million on June 30, 2003. As regards profits, this Securities and Exchange Commission filing indicates that in US fiscal year July 2002-June 2003, Microsoft earned profits of USD 13,217 million on revenues of USD 32,187 million (profit margin of 41%). For the Windows PC client PC operating system product during this period ("Client" product segment), Microsoft earned profits of USD 8,400 million on revenues of USD 10,394 million (profit margin of 81%).

purposes of the calculation of the fine, the overall duration of Microsoft's infringement is 5 years and 5 months, that is, an infringement of long duration.

(1078) Consequently, the amount of the fine to be imposed on the basis of the gravity of the infringement should therefore be increased by 50% to take account of its duration. On that basis, the basic amount of the fine is EUR 497,196,304.

6.2.2 *Aggravating and attenuating circumstances*

(1079) There are no aggravating or attenuating circumstances relevant to this Decision.

6.2.3 *Conclusion*

(1080) In view of the considerations that have been outlined above, the final amount of the fine to be imposed on Microsoft is EUR 497,196,304.

HAS ADOPTED THIS DECISION:

Article 1

For the purpose of this Decision, the following definitions shall apply:

(1)   the term "*Interoperability Information*" means the complete and accurate specifications for all the *Protocols* implemented in *Windows Work Group Server Operating Systems* and that are used by *Windows Work Group Servers* to deliver file and print services and group and user administration services, including the Windows Domain Controller services, Active Directory services and Group Policy services, to *Windows Work Group Networks*;

(2)   the term "*Protocol*" means a set of rules of interconnection and interaction between various instances of *Windows Work Group Server Operating Systems* and *Windows Client PC Operating Systems* running on different computers in a *Windows Work Group Network*;

(3)   the term "*Timely Manner*" with respect to disclosure of protocol specifications means as soon as Microsoft Corporation has developed a working and sufficiently stable implementation of these specifications; by way of illustration, for protocols supported in a service pack or in a new version of a product, "*Timely Manner*" means as soon as the service pack or the new version is made available outside Microsoft Corporation for beta testing purposes;

(4)   the term "*Windows Client PC*" means a PC connected to a network and on which a *Windows Client PC Operating System* is installed;

(5)   the term "*Windows Client PC Operating System*" means any of the software products marketed by Microsoft Corporation as Windows 98, Windows 98 Second Edition, Windows Millennium edition, Windows NT Workstation 4.0, Windows 2000 Professional, Windows XP Home and Windows XP Professional, and updates (including, without limitation, security patches), upgrades and successors to the latter, as well as updates and upgrades of such successors;

(6)   the term "*Windows Media Player*" means the media code which Microsoft Corporation currently distributes as WMP in Windows XP Embedded (thus including components that support the Windows Media codecs, Windows Media file formats, WMDRM and the WMP User Interface); for future versions of the *Windows Client PC Operating System*, the term "*Windows Media Player*" shall cover the foregoing components;

(7)   the term "*Windows Work Group Network*" means any group of *Windows Client PCs* and *Windows Work Group Servers* linked together *via* a computer network;

(8)   the term "*Windows Work Group Server*" means a computer connected to a network and on which a *Windows Work Group Server Operating System* is installed;

(9)   the term "*Windows Work Group Server Operating System*" means any of the software products marketed by Microsoft Corporation as Windows NT Server 4.0, Windows 2000 Server and Windows Server 2003 Standard Edition, and updates (including,

without limitation, security patches), upgrades and successors to the latter, as well as updates and upgrades to such successors.

Article 2

Microsoft Corporation has infringed Article 82 of the Treaty and Article 54 of the EEA Agreement by:

(a) refusing to supply the *Interoperability Information* and allow its use for the purpose of developing and distributing work group server operating system products, from October 1998 until the date of this Decision;

(b) making the availability of the *Windows Client PC Operating System* conditional on the simultaneous acquisition of *Windows Media Player* from May 1999 until the date of this Decision.

Article 3

For the infringement referred to in Article 2, a fine of EUR 497,196,304 is imposed on Microsoft Corporation.

The fine shall be paid, within 3 months of the date of notification of this Decision, into Bank account No 001-3953713-69 (Code SWIFT GEBABEBB – Code IBAN BE71 0013 9537 1369) of the European Commission with FORTIS Bank, Rue Montagne du Parc 3, 1000 Brussels.

After the expiry of that period, interest shall automatically be payable at the interest rate applied by the European Central Bank to its main refinancing operations on the first day of the month in which this Decision was adopted, plus 3.5 percentage points, namely 5.50%.

Article 4

Microsoft Corporation shall bring to an end the infringement referred to in Article 2 in accordance with Articles 5 and 6.

Microsoft Corporation shall refrain from repeating any act or conduct described in Article 2 and from any act or conduct having the same or equivalent object or effect.

Article 5

As regards the abuse referred to in Article 2 (a):

(a) Microsoft Corporation shall, within 120 days of the date of notification of this Decision, make the *Interoperability Information* available to any undertaking having an interest in developing and distributing work group server operating system products and shall, on reasonable and non-discriminatory terms, allow the use of the *Interoperability Information* by such undertakings for the purpose of developing and distributing work group server operating system products;

(b) Microsoft Corporation shall ensure that the *Interoperability Information* made available is kept updated on an ongoing basis and in a *Timely Manner*;

(c) Microsoft Corporation shall, within 120 days of the date of notification of this Decision, set up an evaluation mechanism that will give interested undertakings a workable possibility of informing themselves about the scope and terms of use of the *Interoperability Information*; as regards this evaluation mechanism, Microsoft Corporation may impose reasonable and non-discriminatory conditions to ensure that access to the *Interoperability Information* is granted for evaluation purposes only;

(d) Microsoft Corporation shall, within 60 days of the date of notification of this Decision, communicate to the Commission all the measures that it intends to take under points (a), (b) and (c); that communication shall be sufficiently detailed to enable the Commission to make a preliminarily assessment as to whether the said measures will ensure effective compliance with the Decision; in particular, Microsoft Corporation shall outline in detail the terms under which it will allow the use of the *Interoperability Information*;

(e) Microsoft Corporation shall, within 120 days of the date of notification of this Decision, communicate to the Commission all the measures that it has taken under points (a), (b) and (c).

Article 6

As regards the abuse referred to in Article 2 (b):

(a) Microsoft Corporation shall, within 90 days of the date of notification of this Decision, offer a full-functioning version of the *Windows Client PC Operating System* which does not incorporate *Windows Media Player*; Microsoft Corporation retains the right to offer a bundle of the *Windows Client PC Operating System* and *Windows Media Player*;

(b) Microsoft Corporation shall within 90 days of the date of notification of this Decision communicate to the Commission all the measures it has taken to implement point (a).

Article 7

Within 30 days of the date of notification of this Decision, Microsoft Corporation shall submit a proposal to the Commission for the establishment of a suitable mechanism assisting the Commission in monitoring Microsoft Corporation's compliance with this Decision. That mechanism shall include a monitoring trustee who shall be independent from Microsoft Corporation.

In case the Commission considers Microsoft Corporation's proposed monitoring mechanism not suitable it retains the right to impose such a mechanism by way of a decision.

Article 8

The Commission may at its sole discretion and upon a reasoned and timely request by Microsoft Corporation grant an extension of the various time limits provided for in Articles 5 and 6.

Article 9

This Decision is addressed to Microsoft Corporation, One Microsoft Way, Redmond, WA 98052, United States.

This Decision shall be enforceable pursuant to Article 256 of the EC Treaty and Article 110 of the EEA Agreement.

Done at Brussels, 24.03.2004

For the Commission

Mario MONTI
Member of the Commission