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Case No COMP/M.4747 – IBM / TELELOGIC

Only the English text is authentic.

REGULATION (EC) No 139/2004
MERGER PROCEDURE

Article 8(1)
Date: 05/03/2008

Brussels, 05/03/2008

C(2008) 823 final

COMMISSION DECISION

of 05/03/2008

**declaring a concentration to be compatible with the common market
and the EEA Agreement**

(Case No COMP/M.4747 - IBM/ TELELOGIC)

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(Case No COMP/M.4747 - IBM/ TELELOGIC)

(Only the English text is authentic)

(Text with EEA relevance)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to the Agreement on the European Economic Area, and in particular Article 57 thereof,

Having regard to Council Regulation (EC) No 139/2004 of 20 January 2004 on the control of concentrations between undertakings[1], and in particular Article 8(1) thereof,

Having regard to the Commission's decision of 3 October 2007 to initiate proceedings in this case,

After consulting the Advisory Committee on Concentrations[2],

Having regard to the final report of the Hearing Officer in this case[3],

Whereas:

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[1]   OJ L 24, 29.1.2004, p. 1
[2]   OJ C ...,...200. , p....
[3]   OJ C ...,...200. , p....

I.   INTRODUCTION

1.   On 29 August 2007, the Commission received a notification of a proposed concentration pursuant to Article 4 and following a referral pursuant to Article 4(5) of Council Regulation (EC) No 139/2004 ("the Merger Regulation") by which the undertaking International Business Machines Corporation ("IBM", USA) acquires within the meaning of Article 3(1)(b) of the Council Regulation control of the whole of the undertaking Telelogic AB ("Telelogic", Sweden) by way of a public bid which was announced on 11 June 2007.

2.   After examination of the notification, the Commission concluded on 3 October 2007 that the notified operation fell within the scope of the Merger Regulation and that it raised serious doubts as to its compatibility with the common market and the functioning of the EEA agreement. The Commission therefore initiated proceedings in accordance with Article 6(1)(c) of the Merger Regulation.

3.   In order to carry out an in-depth appraisal of the notified operation, the Commission sent IBM a request for information pursuant to Article 11(3) of the Merger Regulation on 19 October 2007. As IBM had failed to produce correct and complete information in the timeframe set by the request for information, on 15 November 2007 the Commission adopted a decision under Article 11(3) of the Merger Regulation requesting the information necessary for the assessment of the transaction, and suspending the time limits foreseen by the Merger Regulation from 5 November 2007 onwards. Upon compliance by IBM, the suspension of the time limits expired on 3 December 2007.

4.   The Advisory Committee discussed the draft of this Decision on 20 February 2008.

II.   THE PARTIES

5.   **IBM** ("the notifying party"), a U.S. company, is active worldwide in the development, production and marketing of a variety of information technology ("IT") products, software and services. Amongst its diverse software activities, IBM develops and sells software development tools, that is to say software that is used in the process of designing and implementing software.

6.   **Telelogic** is a Swedish company active in the development and sale of software development tools[4].

III.   THE OPERATION

7.   On 11 June 2007 IBM publicly announced its intention to make a public tender offer for the entire share capital of Telelogic. IBM's offer is conditional upon, inter alia: (i) IBM's acquisition of at least 90% of Telelogic's issued share capital, and (ii) the approval of the relevant antitrust authorities. Therefore, upon completion of the proposed transaction, IBM will have sole control over the whole of Telelogic through a shareholding of at least 90%.

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4   Telelogic and IBM are collectively referred to as "the parties".

IV. THE CONCENTRATION

8. The proposed transaction consists of the acquisition of sole control over Telelogic by IBM. It therefore constitutes a concentration within the meaning of Article 3(1)(b) of the Merger Regulation.

V. COMMUNITY DIMENSION

9. The notified concentration does not meet the turnover thresholds set out in Article 1(2) and 1(3) of the Merger Regulation.

10. On 28 June 2007, the Commission received a referral request from the notifying party pursuant to Article 4(5) of the Merger Regulation, which has been transmitted to all Member States. Since the notified concentration is capable of being reviewed under the national competition laws of 10 different Member States and no Member State expressed its disagreement with respect to the request to refer the case to the Commission within the time limit defined in Article 4(5), the concentration shall be deemed to have a Community dimension.

VI. RELEVANT MARKETS

VI.1. Relevant product markets

VI.1.1. Definition of the product markets

11. The proposed transaction has an impact on the software development tools industry. Software development tools are used to create new and to develop existing software applications. More specifically, these tools aim at improving the efficiency of the software development process. In an IBM internal document, software development tools are defined as "*a category of software that helps organizations create and manage software assets throughout their lifecycle. Software assets refer to applications, software services and software embedded in devices or systems*"[5].

12. Both IBM and Telelogic are suppliers of software development tools. In the decision to initiate proceedings, the preliminary conclusion was that the proposed transaction raised serious doubts as to its compatibility with regard to two putative product markets: Requirements Management tools and UML[6]-based Modelling tools.

13. The in-depth investigation carried out by the Commission largely confirmed that Requirements Management tools and UML-compatible Modelling tools are to be regarded as relevant product markets; it also showed, however, that for a number of reasons the definition of the relevant product markets has to be treated with great caution in the present case. In order to better understand the reasons for such caution, an overview of the main characteristics of the market place will be provided first.

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* Parts of this text have been edited to ensure that confidential information is not disclosed; those parts are enclosed in square brackets and marked with an asterisk.

[5] […]*, March 2007, page 3. Document submitted in Annex 11 to IBM's response of 5 November 2007 to the Commission request for information of 19 October 2007.

[6] Unified Modelling Language, a general-purpose, open, and standardised modelling language.

VI.1.2. *Industry characteristics of the software development tools*

VI.1.2.1. The software development cycle

14. The software development process can be segmented in five main stages. Different categories of tools assist customers at each of these stages.

15. The first stage corresponds to the conceptual analysis necessary to determine the functionalities to be provided by a new software application. Analysis tools (often called "Requirements Management" tools) assist this process by allowing the user's requirements to be collected, structured, stored, managed and subsequently tracked throughout the development process. As explained by Forrester, an industry analyst: "*The purpose of Requirements Management is to maximize the likelihood that an application will function as intended and deliver its projected value to the business*". Forrester defines requirement management as: "*The storage of requirements, the tracking of relationships among requirements, and the control of changes to individual requirement and groups of requirements*"[7].

16. Once the software application's required functionality has been determined, the details of the software architecture are then mapped out during the modelling (or design) stage. Whereas during the analysis stage the question to be answered is: "*Which function should the software perform?*", during the design/modelling stage the question to be answered is: "*How should the software perform the determined function?*". Modelling tools assist customers in a variety of tasks, including the creation of visual models ("diagrams"), data definitions, and programming specifications. Some Modelling tools can use these models and associated information to automatically generate software source code. Depending on the level of detail present in the models, results vary from simple code frameworks (that then need to be later filled manually) to complete code that does not require additional human intervention.

17. After the application software has been designed and modelled, it needs to be implemented. The implementation (or construction, or coding) stage mainly consists in writing the software code (programming). This is mainly done inside an Integrated Development Environment ("IDE") tool, a software application that facilitates the writing of software code. As mentioned above, some Modelling tools can automatically generate all or part of the source code. At their simplest, building (or construction) tools provide programme editing and compiler functionalities necessary to translate high-level programming languages, such as C, C++, COBOL or Java, to a lower level language that can be readily executed by the targeted deployment platform.

18. Once the application software has been written, it must be tested to identify errors ("de-bugging") and to ensure that the software will operate successfully on the targeted deployment platform, such as Windows, Linux, or UNIX operating systems. Specialised testing tools provide an automated way of performing such tests, whereas some basic testing functionality is sometimes provided either directly by Modelling tools or from within IDEs.

19. Finally, during and after the software development process, developers need to collaborate to deliver and upgrade the software application. Software development

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[7] "*Selecting The Right Requirements Management Tool – Or Maybe None Whatsoever*", Forrester, 28 September 2007, page 2. Document submitted in Annex 15 to IBM's response of 5 November 2007 to the Commission request for information of 19 October 2007.

teams can range from a few members - for simple projects - to hundreds of people working concurrently in different locations for the most sophisticated of projects. Collaboration between software developers typically takes place over a network that connects all collaborators and involves specialised server computers, e.g. for keeping track of the produced software code or for making sure that different parts of an application under development stay synchronised. Team management tools, often called "Software (Change &) Configuration Management" ("SCCM" or "SCM") tools, enable parts of the software application to be stored and retrieved whilst also providing control and version change reporting functions.

VI.1.2.2.IT software and systems software

20. The software development process described above is relevant for the development of two main types of software: IT application software and systems software. IT application software is software designed to run on a standard operating system or platform, and is usually installed on a general-purpose computer (e.g. a generic enterprise-grade server running a Linux or Windows server operating system or, on the client-side, standard desktop or laptop PCs). This type of software is typically designed for end-user interaction; it allows end-users to perform specific tasks. IT application software includes a wide range of programs which, among others, comprise: (i) personal productivity applications (word processors, spreadsheets, etc.), and (ii) enterprise application software (payroll management, customer relationship management, supply chain management, etc.).

21. By contrast, systems software is software which manages and controls hardware components, so that IT application software can access this hardware to perform a task. As such, systems software is closely intertwined with hardware components which can be either general purpose *(*e.g. a generic PC or server) or non-general purpose (e.g. telecom systems, aerospace and defence systems, medical instrumentation systems). End-users typically have no direct contact with this type of software.

22. Within systems software, a sub-category of embedded software can be identified. Unlike systems software in general, embedded software is specifically written for special purpose hardware components, together with which it is tightly bundled (embedded). As such, it constitutes an integral part of the system (or sub-system) it is supplied with. Unlike IT application software, embedded software's principal role is not to allow end-users to perform a task, but rather to manage and control the interaction of the hardware components in which it is included with external factors (e.g. light, pressure, speed, etc.). Embedded software is typically found in cars, mobiles telephones, medical devices, etc.

23. Embedded software can become very sophisticated in complex systems such as airplanes, missiles, and satellites. In such complex systems embedded software has to interact with many other sub-systems. Some embedded software has to perform under strict time constraint ("real-time"). In such cases, embedded software typically runs on specific operating systems, called Real-Time Operating System ("RTOS")[8], as opposed to standard operating systems which can be found in general purpose computers, such as Windows servers. Some embedded software also performs safety critical missions. In such cases, the software development tools used to develop this software are certified by

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[8]   E.g. VsWorkd, Windows CE or in-house proprietary operating systems.

safety authorities, such as the US Federal Aviation Authority or the European Aviation Safety Agency.

VI.1.2.3. Software development tool vendors

24. Suppliers of software development tools are highly diverse and include all types of firms, ranging from small, privately-held companies selling only one or two tools, to very large IT corporations with a broad software portfolio, including a more or less extensive software development tools offering (e.g. IBM, Hewlett Packard ("HP"), Oracle and Microsoft). IBM's software development tools division is called IBM Rational, since the acquisition of Rational in 2003[9]. IBM's requirement management product is Requisite Pro, and its main modelling product families are Rational Software Architect ("RSA")[10] and Rational Rose. The Rational Rose product family includes Rational Rose Enterprise, Rational Rose XDE, Rational Modeler, and Rose Technical Developer. These products are legacy software, that is to say they are not constantly up-dated and actively marketed by IBM to new customers. As a result, most of the revenue achieved by IBM with these products stems from maintenance and support[11].

25. Between these two ends of the vendor spectrum, other companies (including Telelogic) are medium-sized companies with a handful of software development tools in their product portfolios. Telelogic main products are: Doors, Focal Point, Rhapsody, TAU, Synergy, Statemate, SDL Suite, and System Architect, which together account for almost its entire total turnover of EUR 175.87 million in 2006. Telelogic's main requirement management product is DOORS, and its main modelling products are Rhapsody, TAU, Statemate, and SDL Suite, the two latter being legacy products[12]. Telelogic acquired Rhapsody through the acquisition of I-logix in 2006.

26. Suppliers sell their tools either directly via their own sales force, or indirectly via systems integrators. Vendors, including IBM and Telelogic, generally organise their sales forces geographically in different regions of the world with dedicated sales forces in those regions. Within these regions, some of these sales forces may also specialize in dealing with specific large customers, industries or groups of products. For instance, IBM has […]* in its "Americas" division, and a […]* in its South West Europe, Middle East and Africa division. Similarly, Telelogic has dedicated sales managers for […]* respectively in its EMEA division, and a sales manager dedicated to "[…]*" in its Asia Pacific division[13].

27. System integrators are independent service providers who specialise in building complete computer systems on behalf of third-party customers, by putting together components from different hardware and software vendors[14].

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[9]   Commission decision of 20 February 2003, Case COMP/M.3062 – IBM/Rational.
[10]   RSA is the superset combination of Rational Systems Developer ("RSD") and Rational Software Modeler ("RSM").
[11]   See IBM's response of 5 November 2007 to question 23 of the Commission request for information of 19 October 2007.
[12]   See[…]*, page 3. Document submitted by IBM on 8 November 2007.
[13]   See[…]*, document submitted by IBM on 19 October 2007, and […]*, document submitted by IBM on 18 October 2007.
[14]   See "*Dataquest Guide: Software market Research Definitions*", Gartner, 15 March 2007, pages 56-57. Document submitted by IBM on 26 October 2007.

VI.1.2.4. Software development tool customers

28. Based on the purpose for which they use software development tools, customers can be grouped into three main categories.

29. Customers procuring software development tools to create or to up-date software applications tailored to their specific needs constitute the first category. Software applications developed by these customers are not intended to be made commercially available. These customers are using software development tools either for developing IT software applications or systems/embedded software. Whereas the latter are typically active in the industrial or technical sectors (e.g. aerospace/defence, automotive, energy, telecom, medical instruments, electronics, etc.), the former are typically active in the IT, public administration, and services sectors (e.g. distribution/retail, transport, banking/finance/insurance, etc.).

30. At the operational level, this translates into different user profiles: IT software is developed by software developers in conjunction with IT/business analysts and software architects, whereas systems software is developed by systems designers in conjunction with systems analysts and systems engineers[15].

31. In this context, it is worth mentioning that industrial/technical customers often use Requirements Management and Modelling tools in the process of developing technical systems (including their hardware and software components), and not specifically software. Indeed, the design and development of technical systems, especially large and complex ones, entails going through the same analysis and Modelling stages as in software development.

32. As explained by the notifying party: "*While the majority of the software industry uses Modelling as a way for teams to understand and communicate what the software does and how it is architected, engineers who want to validate their complex systems models often also use executable models to describe the actual behaviour (i.e. the logic) of the software*"[16].

33. Similarly, with respect to Requirements Management tools, IBM explains: "*DOORS is a "database-centric", advanced tool geared towards complex projects, with mature, high-structured processes that involve a high number of requirements with a vigorous process for requirements analysis. DOORS is typically used by systems engineers (e.g. in the development of an aerospace system). Conversely, Requisite Pro is a "document-centric" light-weight, IT-focused tool, typically used by business analysts*"[17].

34. Customers procuring software development tools for their own internal needs do so either directly, possibly with the help of external consultants, or indirectly, via system integrators.

35. Independent software vendors ("ISVs") constitute the second category of software development tools customers. ISVs are companies which specialise in developing and marketing software. Typically, ISVs develop and sell IT software applications.

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[15]   See[…]*, pages 3-4. Document submitted by IBM on 20 November 2007.
[16]   […]*, page 4. Document submitted by IBM on 25 September 2007.
[17]   […]*, page 3. Document submitted by IBM on 24 September 2007.

36. The last category of customers is comprised of system integrators, which procure software development tools on behalf of their clients together with other software and hardware components.

VI.1.2.5.Pricing structure

37. The cost to the customer of acquiring a software development tool includes the following components: the cost of the license; the maintenance and support costs; and the implementation cost (that is to say the cost of installing, configuring, integrating and customising the application). Whereas license and maintenance/support costs correspond to revenue accruing to the software supplier, the installation and implementation costs do not necessarily generate revenue for the software supplier; it depends on who does the work.

38. Software suppliers use different licensing models. A first major distinction can be drawn between perpetual and term-based licenses. A perpetual license is a one-time purchase followed by annual maintenance payments, whereas term-based license is a right-to-use software for a specific period of time[18]. Beyond that broad distinction, licensing models are generally based on the number of named or concurrent users ("seats"), and the geographic location of those users.

39. As far as the parties are concerned, IBM offers customers the choice between two main perpetual license models: (i) an "authorised user" license, allowing use of the license by a single user, and (ii) a "floating license", allowing the use of the same license by multiple team members independently from their location, provided that the total number of concurrent users do not exceed the number of purchased floating licenses[19].

40. Telelogic's software license models provide customers with a choice of perpetual or term-based licenses with three principal options: (i) a "node-locked" license, enabling the software to be used by one non-specific user on an identified machine; (ii) a "per user" license, enabling the software to be used by a specific user on any machine networked to the license server, and (iii) various "floating" licenses, allowing for the use of the software by all users under various geographic configurations ("single-site", "multi-site", "continental", and "global"), provided that the total number of concurrent users do not exceed the number of purchased floating license[20].

41. Maintenance typically covers version upgrades, the automatic delivery of bug fixes and patches, and different levels of support. Maintenance is generally charged separately from the license fee. For instance, Telelogic's maintenance fee structure is fixed as a percentage of the list price ([…]* of list price, depending on the level of support)[21].

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[18] See […]*, Document submitted in Annex 6 to IBM's response of 5 November 2007 to the Commission request for information of 19 October 2007.

[19] See IBM's response of 5 November 2007 to question 16 of the Commission request for information of 19 October 2007.

[20] See[…]*, Document submitted in Annex 6 to IBM's response of 5 November 2007 to the Commission request for information of 19 October 2007, and IBM's response of 5 November 2007 to question 6 of the Commission request for information of 19 October 2007.

[21] See[…]*, Document submitted in Annex 6 to IBM's response of 5 November 2007 to the Commission request for information of 19 October 2007, and IBM's response of 5 November 2007 to question 6 of the Commission request for information of 19 October 2007.

However, IBM's license fee includes one year of standard maintenance and support for a fee that equates to […]* of the notional license fee without support[22].

42. Furthermore, subscription models also exist under which customers acquire the right to use software products and to receive maintenance and support for a limited period of time. Under that model the value of the license fee is not separately determinable from maintenance and support[23].

43. Finally, suppliers typically grant […]* or discount to customers. Discount levels can be high in the software development tools industry[24]. For instance Telelogic's –[…]* rules allow for discounts up to […]* off list price on the license fees, and more than […]* of what is usually charged for maintenance[25]. Discounts can be granted either under a global agreement or on a per-contract basis.

44. The in-depth investigation indicated that cost, including license, maintenance and support, and deployment costs, is one of the most important criteria of choice for customers developing IT software applications. By contrast, cost is a far less decisive criterion for companies active in the industrial/technical sectors which place more emphasis upon technical criteria related to the product's features (e.g. the product's functionality, its compliance with standards, its scalability, reliability/maturity and integration with other tools, etc.), its after-sale support ands in some instances the vendor's references, reputation and commitment to the tool[26]. Confidential internal documents submitted by several large industrial customers revealed that cost-related criteria accounted for 30% or less in their tool selection process, compared to 60% or more for technical-related criteria. […]* "*price tends to be a more important consideration for IT application development than for systems development opportunities*"[27].

VI.1.2.6.Procurement process

45. Customers acquire software development tools in three main instances: (i) for new projects; (ii) further to a standardisation initiative; and (iii) for existing projects.

46. Most customers acquire tools on a project basis, meaning that the selected tools will be used for a specific project only. In such cases, the tool selection will often be made at a low-level within the organisation that is to say by the department or the team responsible for the project.

47. Some customers - mainly large organisations typically active in the technical/industrial sectors - have standardised their procurement of software development tools. The purpose of such standardisation efforts is to rationalise the purchasing decisions of the company with a view of maximising discount from suppliers, and to facilitate cooperation across the various business units or divisions across the company.

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[22] See IBM's response of 5 November 2007 to question 16 of the Commission request for information of 19 October 2007.

[23] See "*IDC's Software Taxonomy, 2007*", page 2. Document submitted by IBM on 19 September 2007.

[24] See responses to question 7 of the Commission request for information sent to competitors.

[25] See […]*, Document submitted in Annex 7 to IBM's response of 5 November 2007 to the Commission request for information of 19 October 2007.

[26] See responses to questions 8 (Modelling tools) and 55 (Requirements Management tools) of the Commission request for information sent to customers.

[27] […]*

Companies having standardised their procurement policy have usually first carried out an exhaustive evaluation process of the various tools available in the market place against technical criteria reflecting their needs at a company level. The outcome of this evaluation process is the establishment of a list of "recommended" or "preferred" tools (usually one for each product category) that can be readily acquired by the operational units or projects teams, although in some instances they can also procure other tools. This standardisation is common among customers who need software development tools to develop complex systems/embedded software (e.g. customers active in the aerospace & defence industry).

48. Finally, customers also procure software development tools for their existing projects either when their term-based licenses expire (renewal), or when new team members need to be added for upgrade or expansions reasons (add-on). In such cases, the customer will generally acquire (additional) licenses of the tools already used for the existing project, and will not consider alternative tools. Therefore, no competition occurs in the procurement of software development tools for existing projects.

49. When a customer has a new project, or when it has decided to engage in a standardisation of the procurement process, it first needs to establish its internal needs. This can be a long and complex process in the cases of large organisations, with several business units or subsidiaries active in diverse industries. Subsequently, it would have to inform itself of the products which could possibly respond to its needs. Typically, the customer would first establish a long-list of products (usually from 5 up to 20) on the basis of publicly available information from the suppliers, without prior assessment/testing by the customer. Products are then short-listed following a first basic internal assessment by the customers. Short-lists usually include 2 up to 5 different products. Only short-listed products are subsequently fully evaluated and tested (detailed presentation by the vendors, trials, demos, etc.). This selection process is primarily focused on evaluating product characteristics. It is a learning process for the customer, which is necessary because of the heterogeneity of the numerous available products.

VI.1.2.7. Point products and suites

50. Different tools can assist customers at each stage of the software development process described above. "Point products" (also called "best of breed") provide individual functionality and therefore assist customers at one specific stage of the software development process. Point products are stand-alone products that are sold on their own as distinctive solutions. IDC, an industry analyst, defines point products as follows: "*A point product is a piece of software designed for a single function or very limited set of functions that is sold separately, as opposed to a suite*"[28].

51. In contrast, some tools, often called "suite products", can assist customers at several stages of the development process. Suite products appear as bundles of several software tools performing different and complementary functionalities in the software development process. IDC defines suite products as follows: "*A suite is a combination of software products, modules, or services to provide a more complete set of software functionality and to eliminate redundant activity. Often, the combination is*

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[28] "*IDC's Software Taxonomy, 2007*", page 96. Document submitted by IBM on 19 September 2007.

accomplished in an integrated computer science sense, and just as often the combination is purely on paper in a marketing sense"[29].

52. IDC also explains that "*A common phenomenon in the software industry is for new technologies to first appear on the market as standalone, unique products. Over time, these products often begin to become functions/features of more inclusive products or suites of products*"[30].

VI.1.2.8. Software development tools interoperability

53. No single tool exists that provides all the different functionalities required at each stage of the software development process mentioned above. Given that a significant proportion of customers tend to have a "mix-and-match" policy, that is to say combining several point products, interoperability between software development tools from different vendors is a key issue in the industry and a question to which customers devote particular attention. Therefore software suppliers have an incentive to ensure that the broadest possible range of software can be used in combination with their own, thereby creating […]* a "business partner ecosystem"[…]*[31], which make them attractive for customers.

54. Interoperability between software products of different vendors is either achieved by use of common file formats (that enable a vendor's application to read and understand what another vendor's application has written) or via Application Programming Interfaces ("APIs") which provide the ability to access, and extract an application's data in a structured way according to the user's objectives. For example, a requirements management tool may provide an API that allows other applications to instruct the requirements management tool to select a number of requirements according to a specified condition and then to export all information associated with these requirements in a specific standard format. Such an API would enable another application to seamlessly integrate with the requirements management tool because no human intervention would be needed to make the two tools work together, and they would function as if they were made to interoperate in the first place.

55. In order to facilitate interoperability, suppliers can therefore either give direct access to their proprietary software's interoperability information, or promote the development of common standards. For instance, Eclipse[32], created by IBM in 2001, is a platform that provides technology facilitating the development of software development tools that interoperates with each other. The Object Management Group[33], founded by eleven software vendors, including IBM, which is responsible for the definition and maintenance of the Unified Modelling Language ("UML"), is another example of suppliers' standardisation effort.

VI.1.2.9. Commercial software and open-source software

56. Another feature of the software development tools industry (and of the software industry as a whole) is the emergence and rapid development of so-called "open-source

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[29]   "*IDC's Software Taxonomy, 2007*", page 97. Document submitted by IBM on 19 September 2007.
[30]   "*IDC's Software Taxonomy, 2007*", page 104. Document submitted by IBM on 19 September 2007.
[31]   See e.g. […]*, 30 October 2007, page 40. Document submitted in Annex 10 to IBM's response of 5 November 2007 to the Commission request for information of 19 October 2007.
[32]   See http://www.eclipse.org/
[33]   See http://www.omg.org/

software". Open-source software is software with code source available under a license that allows developers to use, change and improve the software and to redistribute it in a modified or unmodified form[34]. This accessibility leads to the creation of communities of developers working collaboratively to develop software tools.

57. Open-source software is generally offered free of charge, but many companies provide commercial support services for certain open-source products[35]. However, as noted in the decision to initiate proceedings, open-source development software tools are not yet perceived by large industrial customers as a credible alternative to commercial software tools because they do not offer sufficient guarantees in terms of stability, maintenance and enhancement. Indeed, such free products are typically not supported by commercial vendors but by a community of private developers[36].

58. Open-source software's benefits and drawbacks are summarised as follows in […]*[37]:

Table 1: *Key benefits and drawbacks of open-source software are generally consistent across software types.*

Key benefits	Key drawbacks
▪ *No cost or licensing hassles* ▪ *Tools are flexible and extensive* ▪ *Excellent community support (for developers, better than vendor support)* ▪ *Some tools (e.g., Eclipse) are of great quality*	▪ *Perceived risk – no vendor providing support, accountable for failures, ensuring a stable roadmap* ▪ *Quality varies widely by tool* ▪ *Interoperability issues*

VI.1.3. *Relevant markets for the assessment of the present transaction*

59. In a previous decision, the Commission left open the question of whether an overall market for software development tools exists, or whether distinct product markets within the area of software development tools have to be defined[38].

60. In the decision to initiate proceedings, the preliminary conclusion was that the relevant product markets in which the proposed concentration might have a significant competitive impact are the following:

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[34]   See Notification, page 37.

[35]   See Notification, page 37.

[36]   Para. 41. of the Commission Decision to initiate proceedings of 3 October 2007.

[37]   […]*, 29 March 2004, page 14. Document submitted in Annex 11 to IBM's response of 5 November 2007 to the Commission request for information of 19 October 2007.

[38]   See Commission decision of 20 February 2003, Case COMP/M.3062 – *IBM/Rational*, para. 57.

- The market for UML-based Modelling tools, corresponding to Gartner's Object-Oriented Analysis & Design ("OOA&D") category, whether or not this market is further subdivided between tools for IT applications and tools for systems software;

- The market for Requirements Management tools, corresponding to Gartner's Requirements Management category, whether or not this market is further subdivided between tools for IT applications and tools for systems software.

61. Gartner is an industry analyst which provides market data, research and analysis on the information technology sector, including the software development tools area. In particular, Gartner produces market segments on the basis of which it establishes market sizes and vendors' market shares. In previous decisions, the Commission relied on Gartner's segmentation for the purpose of defining the relevant product markets in the IT sector[39]. In the decision to initiate proceedings, the preliminary conclusion was that Gartner's segmentation of software development tools constituted an appropriate framework for the analysis of the competitive impact of the proposed concentration[40].

62. The notifying party contends that Gartner's OOA&D and Requirements Managements categories do not constitute relevant product markets because they fail to adequately take into account (i) open-source products, and (ii) the Modelling and Requirements Management functionality integrated in suite products. Furthermore, as far as Modelling is concerned, Gartner's OOA&D category would fail to adequately take into account Modelling tools that are not UML-compliant. Finally, IBM is of the opinion that no distinct product market should be defined on the basis of types of software developed (IT or systems software) or by industry verticals.

63. Each of these issues is discussed in detail below.

VI.1.3.1. Open-source products

64. Generally speaking, open-source products are gaining popularity in the software industry in general, and in some areas of the software developments tools industry as well. However, the in-depth investigation has indicated that, as far as Modelling and Requirements Management tools are concerned, customers consider that open-source products constitute credible alternatives to commercial software mainly for small software development projects, but not for large and complex ones[41]. The main reasons put forward by customers for not using open-source tools for large projects are: (i) the lack of maintenance and support, (ii) insufficient functionalities, (ii) lack of maturity, (iii) fears about the tools' durability, (iv) the absence of interfaces/interoperability with other tools, and (v) the absence of a policy or strategy within the company to use open-source software.

65. As regards the evolution of customers' policy vis-à-vis open-source tools, the in-depth investigation revealed that some customers may increase the use of such tools in the next two to three years, mainly for small projects for which the use of commercial software is not always cost effective. However, a majority of customers do not intend to

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[39]   See Commission decisions of 22 December 2005 in case COMP/M.3978 – *Oracle/Siebel*, and of 26 October 2004 in case COMP/M.3216 – *Oracle/Peoplesoft*.
[40]   See para. 25 of the Commission Decision to initiate proceedings of 3 October 2007.
[41]   See responses to questions 26 (Modelling tools) and 60 (Requirements Management tools) of the Commission request for information sent to customers.

significantly change their policy vis-à-vis open-source tools because they consider that the current limitations on the use of such tools, in particular their insufficient functionalities and lack of maintenance and support, could not be addressed effectively within such a time frame[42]. As explained by a large customer active in the energy sector: "*We have looked at open source tools but do not expect to use such tools as the lack of clear maintenance and support would restrict our ability to use*"[43]. The main exception to this general feature is when large and sophisticated customers develop open-source software themselves, such as the Topcased[44] project developed by Airbus and several other companies and universities, aiming at creating a new open-source Modelling tool.

66. The in-depth investigation also revealed that suppliers of commercial tools generally consider that their commercial software hardly competes with open-source Requirements Management and Modelling products, as far as large projects are concerned[45]. As noted by a supplier of Modelling tools: "*Artisan does not compete with open source tools in our markets as these rarely scale to large models/teams hence have little knowledge of them*"[46].

67. The outcome of the in-depth investigation is consistent with a recent […]* document[47] […]* setting out the "*drivers*" and "*inhibitors*" to the adoption of open-source software:

> "***Drivers***
> * *Low initial pricing*
> * *Modularity, independence, and flexibility*
> * *Open source community to facilitate innovation*
> * *Exuberance of developers who learned how to program on OSS in universities*
> * *Innovation; no need to reinvent wheel if fits application*
>
> ***Inhibitors***
> * *Quality (driver installation and configuration)*
> * *Lack of reliability and support*"

68. The notifying party does not dispute that competitive pressure on commercial proprietary software development tools coming from open-source software, although growing, is still limited as far as Requirements Management tools are concerned. Indeed, […]* explained: "*open source solutions are also increasingly starting to compete at the low-end of the spectrum*"[48], which may be taken to imply that competition between open-source and commercial software in the high-end segment of the market is much more limited.

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[42]   See responses to questions 27 (Modelling tools) and 61 (Requirements Management tools) of the Commission request for information sent to customers.

[43]   See Areva's response of 16 November 2007 to question 27 of the Commission request for information sent to customers.

[44]   http://www.topcased.org/

[45]   See responses to question 29 (Modelling tools) and 61 (Requirements Management tools) of the Commission request for information sent to competitors.

[46]   See Artisan's response of 2 November 2007 to question 29 of the Commission request for information sent to competitors.

[47]   […]*

[48]   […]*

69. As noted above, the in-depth investigation clearly confirmed that customers do not regard open-source software as a credible alternative to commercial Requirements Management tools. In fact, most of the customers are not aware of any open-source software with Requirements Management functionality, and when they are, they consider that their technical features do not meet their needs.

70. As regards Modelling tools, […]* stated that "*although open source tools are not yet as significant as some commercial products, they still exercise very significant competitive pressure on such products, particularly in Europe*"[49]. […]* also put forward that "*While [...]* accept that commercial support may at present be limited, there is evidence to show that this will change in the future. For example [...]* and [...]* both have commercial support for their open-source Modelling tools*"[50].

71. As noted above, the in-depth investigation revealed that one of the major reasons customers do not consider open-source software as a credible alternative to commercial Modelling software (at least for complex projects) is notably the lack of maintenance and support.[…]*.

72. Another reason restricting the use of open-source Modelling tools for complex software development put forward by customers is that such products' functionalities are limited and therefore do not meet their needs. As noted by Qinetiq, a customer active in the defence industry: "*The Open Source Modelling tools are suitable for small dynamic research projects but not for real-time project support and large multi-site project support. We also require that our standard tools have support from the supplier and a clear product roadmap. These are not readily available for open source tools*"[51].

73. Customers' assessment of open-source Modelling tools use is shared by suppliers[52]. As explained by a small supplier: "*There are some recent Open Source UML initiatives, especially from Airbus (TopCased) and CEA (Papyrus). They are still in very early stages and quite confidential at this stage. Airbus and CEA are not as well Modelling tool vendors, so the impact on the market is so far negligible. Other initiatives include Star UML, Gentleware and many others, but we consider that today, none of them have emerged as credible alternatives*"[53].

74. Interestingly, a supplier of commercial support for open-source Modelling tools explained: "*The open source projects developing a complete tool (and not infrastructure for building tools) we are tracking are: ArgoUML, based on UML 1.3, largely UML-compatible to UML 1.3, and Papyrus, based on UML 2, largely UML-compatible to UML 2.0. Neither is commercially available or supplied by a vendor. They are usable for learning UML and for student projects. They do not really compete with professional tools, yet*"[54].

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[49] […]*, page 14. Document submitted by IBM on 25 September 2007.
[50] […]*
[51] See Qinetiq's response of 2 November 2007 to question 26 of the Commission request for information sent to competitors.
[52] See responses to question 29 of the Commission request for information sent to competitors.
[53] [Company name: CONFIDENTIAL] response to question 29 of the Commission request for information sent to competitors.
[54] [Company name: CONFIDENTIAL] response to question 29 of the Commission request for information sent to competitors.

75. Finally, it should be noted that according to Gartner: "*Open-source system Modelling tools based on the Unified Modelling Language specification are still too immature for distributed or heterogeneous development environments, but should be of interest to small collocated teams*"[55].

76. Overall, it would appear that commercial and open-source Modelling and Requirements Management tools are currently in direct competition only with respect to the low-end of the market, that is to say for small software development projects. Although it cannot be excluded that competition will increase in the near future as regards the mid-range of the market, that is to say for more complex software development projects, it is very unlikely that commercial tools will be under real competitive pressure from open-source products in the two to three next years as regards the high-end of the market, that is to say for complex software development projects.

VI.1.3.2. Point products and suites

77. In the software development tools industry, as in many other software areas, suppliers are increasingly adding functionalities to their point products and are selling them as integrated suite products.

78. In particular, more and more tools provide integrated Modelling and code generation features, so that the source code of the software application is automatically generated from the models. As stated by Forrester: "*Better languages, frameworks, factories, DSLs[56], textual and visual models will make it increasingly difficult to tell where a software Modelling tool ends and a programming languages begins*"[57]. Microsoft Visual Studio[58], Oracle JDeveloper, Sun Netbeans, IBM RSA, Telelogic Rhapsody, Computer Associates AllFusion, amongst others, are examples of tools providing more or less extensive modelling features bundled with code generation functionality[59].

79. Similarly, requirements management functionality is increasingly included in software providing testing as well as change and configuration management functionalities, such as HP QualityCenter, MKS Integrity, Rally Software Development, Kovair Global Lifecycle. Such products are often called Application Lifecycle Management ("ALM") tools, as they aim at providing an end-to-end solution to manage software applications lifecycle[60].

80. In addition, more and more Product Lifecycle Management ("PLM") tools, such as notably Siemens UGS TeamCenter, Oracle Agile Product Data Management, and Dassault MatrixOne, also include Requirements Management capabilities. PLM tools

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[55] "*Open-Source Modelling Tools Maturing, but Need Time to Reach Full Potential*", 20 April 2007. Available at http://www.gartner.com/DisplayDocument?id=503940&ref=g_sitelink.

[56] "DSLs" stand for Domain Specific Languages (see below).

[57] "*Balancing The Costs and Benefits Of Software Modelling*", 8 March 2007, page 11. Document submitted in Annex 15 to IBM's response of 5 November 2007 to the Commission request for information of 19 October 2007.

[58] See "*Microsoft Sees The Future of Software in Modelling*", InformationWeek, 30 October 2007. Document submitted by the notifying party on 30 October 2007.

[59] See "*Magic Quadrant for OOA&D Tools, 2h06 to 1H07*", Gartner, 30 May 2006, pages 6 and 11. Document submitted in Annex 3 to IBM's "*Comments on feedback from the market test relating to Object-Oriented analysis and design tools*" of 25 September 2007.

[60] See "*Selecting The Right Requirements Management Tool – Or Maybe None Whatsoever*", Forrester, 28 September 2007, pages 5-8. Document submitted in Annex 15 to IBM's response of 5 November 2007 to the Commission request for information of 19 October 2007.

help managing descriptions and properties of a product through its development and useful life, mainly from a business/engineering point of view[61]. For this reason, PLM tools with integrated Requirements Management features compete mainly with traditional Requirements Management point products in the systems/embedded segment (see below).

81. As a result of the evolution described above, customers of software development tools increasingly have the choice between suite and point products. Generally speaking, suite products constitute imperfect or loose substitutes to point products, as they do not offer the same level of functionality as point products do. Typically, suite products constitute attractive solutions mainly for those customers who are looking at solutions minimising interoperability issues that may stem from combining tools from different vendors, or for those who are seeking to reduce software development tools acquisition costs. In contrast, large customers, who tend to have a "mix-and-match" policy, usually select the point products that best meet their specific needs at each individual stage of the software development process, and then combine them, either by their own internal means or with the help of system integrators or external consultants[62].

82. As noted in the decision to initiate proceedings[63], the Modelling capability of IDEs is generally perceived by customers as weak compared to that of Modelling point products[64]. However, the in-depth investigation revealed that some tools, notably those of the parties (Telelogic Rhapsody and IBM RSA) as well as e.g. Mathworks Matlab/Simulink, Borland Together, Kennedy Carter iUML, and Artisan Studio, although not necessarily classified as IDEs, are considered by customers as model-driven development software with both strong Modelling and code generation capabilities[65]. This point was also confirmed by suppliers[66], and by Telelogic's internal documents, where the respective Modelling and code generation capabilities of Rhapsody and RSA are compared in detail[67].

83. As regards Requirements Management, the in-depth investigation indicated that some ALM and PLM tools, including Siemens UGS TeamCenter and HP QualityCenter, are regarded by customers as credible alternatives to traditional Requirements Management point products, in particular for systems software development and for systems development[68]. This finding was confirmed by suppliers[69].

84. Furthermore, […]* documents indicate that it considers some ALM and PLM tools (MKS Integrity[70],HP QualityCenter[71] and Siemens UGS TeamCenter[72]) as competing directly against […]* Requirements Management point product ([…]*).[…]*documents also indicate that PLM products are increasingly competing with traditional

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[61] See Commission decision of 27 April 2007, Case COMP/M.4608 – *Siemens/UGS*, para. 8.
[62] See responses to question 28 of the Commission request for information sent to customers. See also Commission decision in Case COMP/M.3062 – *IBM/Rational*, para. 76.
[63] Commission decision to initiate proceedings of 3 October 2007, para. 43.
[64] See responses to question 16 of the Commission request for information sent to customers.
[65] See responses to questions 7, 11 and 28 of the Commission request for information sent to customers.
[66] See responses to questions 16 and 30 of the Commission request for information sent to competitors.
[67] See […]*, 1 May 2007, no page numbering, slide 18 […]*. Document submitted in Annex 4 to IBM's response of 5 November 2007 to the Commission request for information of 19 October 2007.
[68] See responses to questions 54, 58 and 62 of the Commission request for information sent to customers.
[69] See responses to questions 60 and 62 of the Commission request for information sent to competitors.
[70] See […]*.
[71] See […]*
[72] See […]*

Requirements Management point products in the systems area. For instance, it is noted in an IBM's document that "*Multiple market convergence results in new vertical playing fields. PLM and Software converge in the Industrial Segment. SAP/Dassault/Oracle become a larger focus*"[73].

85. Forrester summarises the convergence between traditional Requirements Management point products and ALM tools as follows: "*Requirements Management capabilities within ALM solutions have the most potential. Requirements Management tools have so much in common with other life-cycle tools that it doesn't make sense for them to be standalone offerings. As vendors enhance the Requirements Management capabilities in their ALM platforms, this option will become closer and closer to the ideal*"[74].

86. Furthermore, the in-depth investigation revealed that a large proportion of customers intend to increase their use of suite products with integrated Modelling or Requirements Management functionality in the next two to three years, including for large and complex projects. Indeed, customers stated that they expect those two functionalities to be better integrated within suite products in the near future[75]. As explained by a customer active in the aerospace industry: "*We aim to move forward suite products for real-time project support and large multi-site complex project support. This is to gain the benefit of end-to-end software development (i.e. from requirements, through design, implementation, testing, configuration management and delivery within the same suite of products. Suite products are likely to become better integrated in 2/3 years so the benefits of using suite products will increase*"[76].

87. In conclusion, although competition is generally more intense between point products than between point and suite products (notably as regards large and sophisticated customers), some suite products constitute credible alternatives to Modelling and Requirements Management point products, mainly for systems software development and systems development. It can be expected that competition between point products and suite products offering Modelling or Requirements Management functionality will increase in the next years.

VI.1.3.3. UML and non-UML Modelling tools

88. One of the issues examined in the decision to initiate proceedings concerned the question whether a distinct relevant product market for UML-based Modelling tools should be identified. The preliminary conclusion reached in the decision was that UML-based Modelling tools indeed constitute a separate product market. This preliminary finding was founded upon responses received from customers and suppliers to the requests for

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73   […]*, 6 December 2005, page 10. Document submitted in Annex 10 to IBM's response of 5 November 2007 to the Commission request for information of 19 October 2007.

74   "*Selecting The Right Requirements Management Tool – Or Maybe None Whatsoever*", 28 September 2007, page 7. Document submitted in Annex 15 to IBM's response of 5 November 2007 to the Commission request for information of 19 October 2007.

75   See responses to questions 29 (Modelling) and 63 (Requirements Management) of the Commission request for information sent to customers.

76   See Qinetiq's response of 2 November 2007 to question 28 and 29 of the Commission request for information sent to customers.

information sent during the preliminary investigation[77], which corroborated Gartner's definition of the OOA&D category[78].

89. UML can best be characterised as a general-purpose, open, and standardised modelling language. It is officially defined by an independent body (the Object Management Group). Since the launch of its first version in 1997, UML has gained wide acceptance, and according to Gartner has become the *de facto* standard for object-oriented Modelling. Object-oriented Modelling is a Modelling paradigm that supports the decomposition of a problem primarily as a set of related, interacting "objects".

90. As a general-purpose language using generic concepts, UML does not specifically address the particular problems which arise in each individual industry[79]. For this reason, it suffers a noticeable disadvantage vis-à-vis Domain Specific Modelling Languages ("DSML") targeting specific industries[80].

91. On the other hand, UML is used by a larger community of developers and engineers, and is supported by a larger number of suppliers than any DSML language. It allows for models developed with one tool to be imported into another supplier's tool[81]. For these reasons, UML is particularly attractive to those customers who want to avoid being locked-in to a particular supplier, or a limited group of suppliers, as well as for large companies which want to facilitate cooperation across their various business units and departments.

92. The notifying party contends that "*in terms of market definition, there exists a continuous chain of substitution covering both UML and non-UML Modelling tools with varying functionalities*". In particular, IBM explains that: "*UML is a general purpose-Modelling language, with a very wide scope, spanning analysis (functional Modelling), design (architectural Modelling), and implementation (behavioural Modelling). While other Modelling languages provide a similar scope (e.g., SysML, SDL, IDEF, and AADL), most non-UML languages focus on one aspect of Modelling (function, architecture, or behaviour).*[…]**[82].

93. The in-depth investigation revealed that UML Modelling tools are not perceived by a large majority of industrial/technical customers as fully interchangeable with non-UML

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[77] See responses to question 10.b) of the Commission request for information sent to customers on 30 August 2007, and to question 10.b) of the Commission request for information sent to competitors on 30 August 2007.

[78] Gartner's OOA&D category virtually only includes Modelling tools that are UML-based or compliant. See "*Dataquest Guide: Software Market Research Definitions*", Gartner, 15 March 2007, page 8. Document submitted by IBM on 26 October 2007.

[79] See IBM's response of 5 November 2007 to question 27 of the Commission request for information of 19 October 2007.

[80] E.g. SDL (Specification and Description Language) used in the telecom industry, UPDM used in the aerospace and defence industry, AADL (Architecture and Analysis Design Language) used in the automotive industry, BPMN (Business process Modelling Notation) and BRM (Business Rules Management) used for IT software development.

[81] See IBM's response of 5 November 2007 to question 33 of the Commission request for information of 19 October 2007.

[82] E.g. SDL (Specification and Description Language) used in the telecom industry, UPDM used in the aerospace and defence industry, AADL (Architecture and Analysis Design Language) used in the automotive industry, BPMN (Business process Modelling Notation) and BRM (Business Rules Management) used for IT software development.

tools (that is to say mainly DSLM tools)[83]. The main reason put forward by those customers is that each type of tool has its own benefits, and is therefore used for different projects or needs. As a result, most of industrial/technical customers indicated that they would not switch to non-UML tools in the case of a permanent 10% price increase of UML tools[84].

94. By contrast to the foregoing, the views of customers using Modelling tools for IT software development, mainly active in the IT and banking/financial/insurance, are much more balanced; indeed, roughly one third of these customers consider that UML and other Modelling standards are interchangeable[85].

95. The vast majority of Modelling tool suppliers also indicated that UML and non-UML tools are not fully interchangeable from a customer's standpoint, mainly because they focus on different functions[86]. In particular, a large majority of non-UML tool suppliers explained that they do not consider their products as being in close competition with UML tools[87].

96. In this respect, the in-depth investigation revealed that Modelling tools based on proprietary mathematical languages, such as Mathworks Simulink, Esterel Studio, and dSpace TargetLink, do not provide an alternative, but rather a complement to UML tools. Whereas the latter can be categorised as general-purpose Modelling tools, the former are best characterised as simulation or design tools. This finding is consistent with Venture Development Corporation's ("VDC") position, an industry analyst, which distinguishes UML Modelling tools used for embedded software and systems development, and "*proprietary language based dynamic system design tools [that] intend to automate the process of designing and simulating dynamic systems that involve complex algorithm designs representing the behaviour of complex physical phenomena*"[88].

97. Furthermore, the in-depth investigation indicated that UML tools are not an alternative to non-UML tools used for the development of software or systems compliant with specific industry standards[89].

98. However, it should be noted that the distinction between UML and non-UML Modelling tools would appear to be somewhat too simplistic, as it does not reflect the fact that some tools, although not UML tools in the strict sense, are nonetheless UML compatible. This is primarily the case for those tools that are based on UML profiles,

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[83]   See responses to question 20 of the Commission request for information sent to customers sent on 18 October 2007.

[84]   See responses to question 22 of the Commission request for information sent to customers.

[85]   See Unisys' response of 7 November 2007, Unicredito's response of 31 October 2007, Danske Bank's response of 2 November 2007, and RBS' response of 2 November 2007 to question 20 of the Commission request for information sent to customers.

[86]   See responses to question 24 of the Commission request for information sent to competitors.

[87]   See responses to question 16 of the Commission request for information sent to competitors.

[88]   "*The Embedded Software Market Intelligence Program – 2007 Service Year – Volume 5: Embedded software and system Modelling tools*", VDC, November 2007, page 6. Document submitted by IBM on 11 September 2007.

[89]   E.g. Etas' Ascet product is certified for Autosar-compliant software development (Autosar is an architecture framework used in the automotive industry), Esterel's Scade is certified for developing safety critical embedded software by safety authorities like EASA, FAA and TUV.

such as SysML[90], Executable UML[91], and UPDM[92], or Business Profile Modelling Notation ("BPMN"). Indeed, UML 2.0 and subsequent versions offer mechanisms for customization, on the basis of which UML derivatives tailored to certain specific areas (called "profiles" or "stereotype") have been developed[93]. The current UML version is UML 2.1.1 (update of August 2007)[94].

99. Furthermore, some tools based on proprietary DSMLs are nonetheless UML-compatible, as they use open interfaces that make them interoperable with UML (e.g. Esterel Studio).

100. As a result, although UML and non-UML tools are generally not perceived by market participants as credible alternatives, some non-UML tools are nonetheless UML compatible. These tools can therefore be considered as closer substitutes to UML tools than pure non-UML tools for certain end-applications or for certain customer groups. As noted above, this is particularly the case for customers using Modelling tools for IT software development, for which tools based on BPMN constitute credible alternative to UML tools. As noted by Gartner: "*UML can be used for business Modelling, but the Object Management Group (OMG) Business Process Modelling Notation (BPMN) standard is more suited for business process analysis*"[95].

101. However, it is not necessary for the purpose of the present case to conclude on the existence of a distinct product market for UML Modelling tools. Nevertheless, the elements mentioned above concerning the extent to which UML and non-UML tools are competing in the market place should be taken into account for the competitive assessment of the present concentration.

VI.1.3.4. IT and systems customers

102. The notifying party does not consider that any distinct markets exist for tools used by developers of embedded software. IBM explained in the notification: "*While some vendors market tools specifically for developing embedded software, the vast majority of embedded software developers in fact use the same tools as are used in both generic IT and embedded development (as does Microsoft, among others). For most products, there is little functional difference between generic IT tools and tools marketed for embedded software developers, and customers find generic IT tools to be suitable for products targeted at embedded software developers*"[96].

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[90]   SysML builds on top of UML 2.0 to support a structural Modelling approach that better fits the way system engineers do Modelling. It was only adopted as a standard in July 2006. See IBM's reply of 5 November 2007 to question 28 of the Commission's request for information of 19 October 2007.

[91]   E.*g.* Kennedy Carter iUML.

[92]   UPDM is a UML profile for DoDAF/MoDAF standards. "DoDAF" stands for Department of Defence Architecture Framework. "MoDAF" stands for Ministry of Defence Architecture Framework. DoDAF and MoDAF are system architectural frameworks used by the US and the UK Departments of Defence respectively for their procurements.

[93]   See "*View DSLs and UML as 'Fraternal Twins', Not Competitors*", Gartner, 29 September 2006, page 3. Document submitted by Microsoft on 12 November 2007.

[94]   See IBM's response of 5 November 2007 to question 26 of the Commission request for information of 19 October 2007.

[95]   "*Unified Modelling Language Is Still Going Strong*", Gartner, 2 June 2006, page 1. Document submitted by Microsoft on 12 November 2007.

[96]   Notification of 29 August 2007, page 34.

103. At the outset, it is worth highlighting that the distinction between IT software and systems/embedded software development is widely acknowledged by several industry analysts[97], and by IBM itself. When asked to explain the economic rationale of the concentration, IBM explained in the notification that "*The combination of the Parties' complementary expertise in the areas of system software development and IT applications development will enable IBM to offer a full spectrum of software development tools*"[98].

104. Differences in IT software and systems/embedded software development translate into significant different customer's needs in terms of software development tools' functionalities and features. This point has been acknowledged by IBM with respect to both Modelling and Requirements Management tools. In a document submitted in the course of the in-depth investigation, IBM explained that only […]* of the criteria that IBM itself identified as relevant to compare Modelling tools are equally important to IT application development and systems development, whereas this proportion would be […]* for Requirements Management tools[99].

105. In addition, it should be noted that in the same document IBM identified […]* product's features as the "*IT specific must-haves*" for Requirements Management tools ([…]*), and […]* different product's features as the "*systems specific must-haves*" ([…]*)[100].

106. As regards Modelling tools, IBM, in the same document, identified the following […]* product's features as the "*highest-ranking attributes for IT development*":[…]*.

107. By contrast, IBM identified the following […]* product's features as the "*highest-ranking attributes for systems development*":[…]*[101].

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[97]   For instance, VDC issues a report focusing specifically on the "Embedded Software and System Modelling Tools". Gartner also issues specific reports on "Embedded Software Development Tools and RTOS".

[98]   Notification, page 14.

[99]   "*Functional Substitution Analysis - Methodology*", pages 6 and 7. Document submitted by IBM on 20 November 2007. In this document (page 6), IBM explained in relation to Modelling tools:
"• *A core set of criteria is equally important to IT application development and systems development: these criteria represent about […]* of the total number of criteria.*
• *A set of criteria only applies to IT application development: these criteria represent about […]* of the total number of criteria.*
• *A set of criteria only applies to systems development: these criteria represent about […]* of the total number of criteria.*
• *Approximately […]* of the criteria apply to both IT application development and systems development, but with varying importance. The number of criteria more prevalent to systems development is slightly larger than the number of criteria more prevalent to IT applications development.*"
In the same document (page 7), IBM explained in relation to Requirements Management tools:
"• *A core set of criteria is equally important to IT application development and systems development: these criteria represent about […]* of the total number of criteria.*
• *A set of criteria mostly applies to IT application development: these criteria represent about […]* of the number of criteria.*
• *A set of criteria only applies to systems development: these criteria represent about […]* of the number of criteria.*
• *About […]* of the criteria apply to both IT application development and systems development, but with varying importance. The number of criteria that is more prevalent to systems development is larger than the number of criteria more prevalent to IT application development.*"

[100]   […]*, Annex 2, pages 1 and 2. Document submitted by IBM on 20 November 2007.

[101]   […]*, Annex 1, pages 2 and 4. Document submitted by IBM on 20 November 2007.

108. A comparison of these two lists reveals that IT development and systems development only share […]* of the "*highest-ranking attributes*" as regards Modelling tools ([…]*).

109. Reflecting these differences between IT and systems customers' needs, some Requirements Management and Modelling tools are clearly better suited for IT or for systems/embedded software development. As noted above (see paragraph 33), IBM explained that Telelogic's Requirements Management tool Doors is "*typically used by systems engineers*", whereas its own Requirements Management tool, RequisitePro, is an "*IT-focused tool*". Furthermore, Telelogic has recently launched a new lightweight Requirements Management tool, Doors FastTrack, targeting specifically the IT segment[102]. Conversely, IBM has launched a sub-set of its new Modelling tools RSA (called RSD) targeting the systems/embedded segment[103].

110. However, it is not necessary for the purpose of the present case to conclude on the existence of distinct product markets for software development tools used for IT and systems software development. Nevertheless, the elements mentioned above indicate that this distinction is an important element to be taken in consideration for the competitive assessment of the proposed transaction.

VI.1.3.5. Customer groups

111. Beyond the high-level distinction between IT and systems/technical software, the notifying party also contended in the notification that it is not meaningful to distinguish software development tools according to different customer groups. According to IBM this is because "*different types of customers (ISVs, SIs, and in-house enterprise developers) use the same software development tools. […]*. Equally, customers seek to maximize the value of their tools investment across all their development projects, regardless of their being 'high end' or 'low end projects'. Often the same tool can be used for different projects even if the tool's full functionality is not utilized*"[104].

112. Despite the above statement in the notification, IBM, in a document submitted in the course of the in-depth investigation, did not dispute that different industry verticals could be distinguished on the basis of the specificity of their needs in relation to both Modelling and Requirements Management tools.

113. In a document […]*, IBM explained[…]*: "*A distinct set of ranking was developed to highlight the relative weight of the criteria for […]* main industry categories:[…]*. As an example of diverging needs among different industries, support for the ADA programming language is desirable in the […]* but not for other industry sectors*"[105].

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[102] Doors FastTrack is promoted by Telelogic as "*the requirements definition and management solution that helps software development project*".
See http://www.telelogic.com/Products/doors/doorsfastrak/index.cfm

[103] RSD stands for Rational Systems Developer. It is promoted by IBM as a product which "*simplifies the complexity of systems delivery*".
See http://www.306.ibm.com/software/awdtools/developer/systemsdeveloper/index.html

[104] Notification, pages 34-35.

[105] […]*, page 4. Document submitted by IBM on 20 November 2007.

114. In this same document, IBM described in detail the differences between the […]* main customer groups for Modelling and Requirements Management tools ([…]*) in terms of product's features relative weight[106].

115. However, it is not necessary for the purpose of the present case to conclude on the existence of distinct software development tools product markets according to different customer groups or industry verticals. Nevertheless, the elements mentioned above indicate that customer group segmentation is an important element which has to be taken into consideration for the competitive assessment of the proposed transaction.

VI.1.3.6. Diversity of the products and customers' needs

116. Although Requirements Management and Modelling can clearly be identified as different stages throughout the software development process, and specific functionalities provided by point tools during that process, the exact boundaries of the relevant product markets for these two categories of tools are difficult to delineate for four main reasons.

117. Firstly, Requirements Management or Modelling capabilities are increasingly bundled with other functionalities supplied within integrated suite products. As noted above, the in-depth investigation revealed that some (but not all) of these suite products constitute credible alternatives to traditional Requirements Management and Modelling point products, for some categories of customers. Secondly, open-source Requirements Management and Modelling tools provide alternatives to commercial software at the low-end of the market, but not at the high-end of the market. Thirdly, as far as Modelling tools are concerned, UML tools compete with non-UML tools for some end-applications and for some customers, but not for all of them. Fourthly, even within narrowly defined product categories, a wide diversity of tool exist, as evidenced by the wide price differences between the various tools, ranging from virtually zero for an open-source tool, to several thousand euros for the license of an advanced tool. There are also very significant price differences between commercial tools.

118. For instance, with respect to Modelling tools, […]* explained that "*whilst a Rhapsody licence can cost up to[…]*, an equivalent product is available from Artisan for around […]* and from Borland for around […]*. […] NoMagic offers a competing product for around[…]*. Gentleware's Poseidon Community Edition is available for as little as[…]*. Sparx Systems[…]*, […] offers a full range of functionality for around […]*"[107].

119. As regards Requirements Management tools, […]* explained: "*MKS offers its Integrity floating licence for around […]* and IRaQ's floating licence costs around[…]*. In comparison, a DOORS floating licence can cost between […]* and[…]*. VersionOne's list price starts at […]* and it claims to supply 30 Fortune 100 companies. Collab.NET offers sophisticated products from […]*"[108].

120. In fact, the wide diversity of Requirements Management and Modelling tools reflects the heterogeneity of customer groups' needs in relation to these two categories of tools.

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[106]   […]*, Annex 1, pages 8-12, and Annex 2, pages 5-10. Document submitted by IBM on 20 November 2007.
[107]   […]*
[108]   […]*

Indeed, there are little common grounds between the needs of a small company developing a new IT business application, and those of a large aerospace company developing a sophisticated embedded software application for a new military aircraft. Whereas the former would typically need a "quick-to-learn and easy-to-use" tool, the latter would look for an advanced tool providing deep functionalities coupled with high-level maintenance and support services. Although the Modelling or Requirements Management tools used by these two types of companies would have a core set of common features, and could therefore be labelled as Modelling or Requirements Management tools, they cannot be considered as close substitutes.

121. Furthermore, as explained above, between these two ends of the spectrum, different customer groups have widely diverse needs in terms of product's features and these depend mainly on the industry in which they are active.

VI.1.4. *Conclusion on the definition of the relevant product market*

122. Although the identification of Requirements Management and Modelling tools as distinct product markets in the decision to initiate proceedings appears to be confirmed by the in-depth investigation, the exact boundaries of the relevant product markets (that is to say the products which are regarded as interchangeable by the consumers) are difficult to delineate. This is primarily due to the wide diversity of the Requirements Management and Modelling tools available in the market place, which in turn is a consequence of the heterogeneity of the customers' needs in relation to these tools.

123. In view of the foregoing, the product market definition in the present case can only provide a broad framework for the competitive assessment of the proposed transaction. Indeed, different software products falling within one product category, although providing similar core functionality from an abstract standpoint, may not be real substitutes from a customer's standpoint. In addition, different elements that may not point to the existence of distinct product markets must be taken into account in the framework of the competitive assessment. This concerns, in particular, elements such as product heterogeneity and differences in customers' needs.

VI.2. Relevant geographic market

124. The notifying party submits that the relevant geographic markets in the present case are worldwide. In a previous decision relating to software development tools, the Commission found that the geographic scope of the relevant markets was at least EEA-wide[109].

125. The in-depth investigation indicated that, apart from language customisation, suppliers offer the same Modelling and Requirements Management tools throughout the world[110], and customers tend to buy the same products for their different divisions or business units regardless of their geographic location[111]. Although it would appear that some price differences exist between the EU and the other main regions of the world, these

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[109]   Commission decision of 20 February 2003, Case COMP/M.3062 – *IBM/Rational*, para. 17, 21, 24, and 27.
[110]   See responses to questions 11 (Modelling tools) and 56 (Requirements Management tools) of the Commission request for information sent to competitors.
[111]   See responses to questions 6 (Modelling tools) and 53 (Modelling tools) of the Commission request for information sent to customers.

differences mainly reflect the difference in currency levels, which notably explain why prices in the US are somewhat lower than in the EU[112].

126. However, the exact definition of the relevant geographic markets can be left open in the present, as the conclusion of the competitive assessment remains unchanged under a world-wide or an EU-wide definition.

VII. COMPATIBILITY WITH THE COMMON MARKET AND THE EEA AGREEMENT

127. The decision to initiate proceedings identified the following three theories of harm:

    A. unilateral price increases;

    B. decreased incentives for innovation;

    C. decrease in interoperability of software tools.

VII.1. Unilateral price increase

VII.1.1. Market shares

128. Based on the market segmentation of Gartner, the merged entity will have high joint market shares in the Modelling and Requirements Management.

VII.1.1.1. Modelling

129. In the OOA&D category, the parties' combined "market share" reported by Gartner[113] amounts to 68 % worldwide (IBM: 48% and Telelogic: 20%), and 69% in Europe (IBM: 45% and Telelogic: 25%). The main competitors considered by Gartner are Borland, Sybase and Computer Associates.

130. IBM argues that Gartner's market shares do not accurately reflect the market power of the merged entity. The parties have therefore recalculated their market shares as well as the market shares of their competitors. According to corrected market share data submitted by IBM the merged entity would arrive at a joint world-wide market share in Modelling of[30-40]*%[114], expressed as value-based shares and[10-20]*%[115], expressed as volume-based shares. The reasons why the parties consider that Gartner's figures have significant shortcomings are as follows.

131. Firstly, by focusing on overall revenues (including maintenance and support revenues) rather than license revenues, Gartner would overstate the competitive position of the parties (given the legacy character of IBM Rational Rose products) and underestimates the competitive position of several important suppliers.

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[112]   See responses to questions 5-6 (Modelling tools) and 51-52 (Requirements Management tools) of the Commission request for information sent to customers, and responses to 9-10 (Modelling tools) and 54-55 (Requirements Management tools) of the Commission request for information sent to customers.

[113]   See *"Gartner Dataquest, Application Development and Project and Portfolio Management Software"* (2006), as reported by IBM in the notification (pages 56 and 57).

[114]   See the submission of IBM of 4 December 2007*([...]*)*, as corrected and recalculated by the submission of IBM of 21 December 2007.

[115]   See the submission of IBM of 4 December 2007 ([…]*), as corrected and recalculated by the submission of IBM of 21 December 2007.

132. In this regard, the figures provided by the parties show that, out of the 48% market share attributed by Gartner to IBM, approximately [20-30]*%[116] corresponds to IBM's legacy products. Table 2[117] shows the […]*decrease in IBM's licence revenues stemming from legacy products in the latest years (see in particular […]*).

Table 2

IBM	Licenses				
	2004	2005	2006	2007 (Jan/Sept)	2006/2004
Rose Enterprise	[…]*%	[…]*%	[…]*%	[…]*%	
Rose Modeler	[…]*%	[…]*%	[…]*%	[…]*%	
Rose TD	[…]*%	[…]*%	[…]*%	[…]*%	
Rose XDE	[…]*%	[…]*%	[…]*%	[…]*%	
Bundles/ Suites	[…]*%	[…]*%	[…]*%	[…]*%	
Discontinued	[…]*%	[…]*%	-[…]*%	[…]*%	
Total legacy	[…]*%	[…]*%	[…]*%	[…]*%	-[…]*%
	Figures in US$ million for worldwide sales				

133. Further, as can be observed in Table 3, most of the turnover achieved with IBM Rational Rose currently stems from maintenance and services from ongoing projects.

Table 3

Revenues	IBM legacy products		
	2004	2005	2006
licences	[…]*%	[…]*%	[…]*%
total	[…]*%	[…]*%	[…]*%
licences / total	[50-60]*%	[30-40]*%	[20-30]*%
	Figures in US$ million for worldwide sales		

134. Secondly, IBM claims that by focusing on revenue-based market shares rather than volume-based market shares (that is to say the number of licence seats representing actual tool usage), Gartner fails to reflect the importance of low-cost vendorssuch as Sparx Systems.

135. Although the in-depth investigation confirmed that some low-cost vendors are credible alternatives for Modelling and as such are to be considered when calculating market shares[118], value-based market shares still seem to better reflect market power than

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[116] See Table 2 of the LECG Memorandum submitted by IBM on 21 November 2007, in response to Question 4 of the Commission request for information of 9 November 2007.

[117] Figures extracted from table 2 of the LECG Memorandum submitted by IBM on 21 November 2007, in response to question 4 of the Commission request for information of 9 November 2007.

[118] Some customers (e.g. Infineon) use a new Modelling tool developed by a new entrant or by a small supplier. Other customers replied that they would use it (e.g. The Boeing Company, AT&T, CSC or

volume-based shares. In cases of differentiated products it is generally accepted that market shares in value reflect better the relative position and strength of each competitor[119].

136. Thirdly, IBM argues that Gartner's OOA&D category excludes several important tools for system Modelling (e.g. Artisan Studio, or The Mathworks Simulink).

137. Fourthly, IBM also argues that the Gartner data do not take into account the growing effect of "open-source" tools, such as [...]*, based on Linux or Eclipse.

138. Fifthly, IBM submits that even the corrected market share data that it submitted (combined world-wide market share in Modelling of [30-40]*%, expressed in value and [10-20]*%, expressed in volume) overstate the market power of the merged entity, since they do not take account of several significant competing products (e.g. Microsoft's Visio[120] and Visual Studio products).

139. While it seems clear that the Gartner market shares overstate the market power of the merged entity, IBM's corrected market share calculations would not appear to be entirely appropriate either. The parties' data may overestimate the share of competitors' revenue which is achieved with licensing income[121]. Secondly, IBM has also included vendors, which are not perceived as competitors by the respondents to the Commission in-depth investigation[122]. Thirdly, IBM would appear to overstate the market share of the category of *"Other vendors from Software Modelling"* ([10-20]*%) by assuming that their entire turnover is generated by licensing income. Finally, IBM may have underestimated its own market shares[123].

140. If the parties' figures are corrected according to the data provided by customers and competitors with respect to their own turnover, as well as according to the results of the in-depth investigation, the estimated world-wide combined market share of the parties would amount to [30-40]*%, as shown in Table 4[124]. The main competitors are The

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RBS). See responses by Infineon, AT&T and RBS of 2 November 2007, response by CSC of 5 November 2007 and response by The Boeing Company of 7 November 2007.

[119]   See Commission Notice on the definition of relevant market for the purposes of Community competition law, paragraph 55 (*Official Journal C 372, 09/12/1997 P. 0005 – 0013*). See also Commission Decision of 21 June 1994 in case IV/M.430 - *Procter & Gamble/VP Schickedanz* (II), paragraphs 112 to 117 (*Official Journal L 354 , 31/12/1994 P. 0032 – 0065).*

[120]   36% of the respondents to a competitive analysis carried out by VDC in 2005 on the usage of software Modelling tools used Visio (Microsoft), although VDC credits Visio with only 2% of embedded Modelling tools market share (*"The Embedded Market Software Intelligence Program"* – Volume IV, 2006, submitted by IBM on 11 September 2007).

[121]   E.g. IBM estimated that licence revenues represent 100% of total revenues for 5 competitors (Omondo, Gentelware Poseidon, NoMagic MagicDraw, Visual Paradigm and Sparx Systems). See the submission of IBM of 4 December 2007, as corrected and recalculated by IBM's submission of 21 December 2007.

[122]   E.g. Computer Associates, Embarcadero Technologies, IAR visualSTATE and Foresight. However, some other competitors that were mentioned by the customers who replied to the Commission in-depth investigation are not included in the IBM recalculated market shares (e.g. Core (Vitech/Sodius), IDS Scheer (ARIS), Casewise Corporate Modeller or Allfusion Data Modeller).

[123]   [...]* market share calculation only takes account of RSA and RSD revenues that IBM considers can properly be attributed to the Modelling functionalities [...]*. For RSA and RSD only 27% of IBM's revenues ([...]*) were included. Similarly, since no reliable revenue data is available, Microsoft's Visio was excluded. See IBM's submission of 4 December 2007 (*"Market share calculation – limitations of Gartner data"*).

[124]   Table 4 is based on the sales data as provided by IBM and corrected in accordance with the sales data obtained from competitors in the context of the in-depth investigation. Whereas the parties considered

Mathworks, Borland and Mentor Graphics, with market shares of [30-40]*%, [0-10]*% and [0-10]*%, respectively.

Table 4

Vendor/tool	UML compliant	License share by value
IBM RSA & RSD	Yes	[10-20]*%
IBM Rose, Rose Tech Developer	Yes	[0-10]*%
IBM RSM	Yes	[0-10]*%
IBM Total		*[20-30]*%*
Telelogic SDL Suite	No	[0-10]*%
Telelogic Tau	Yes	[0-10]*%
Telelogic Rhapsody	Yes	[0-10]*%
Telelogic Statemate	No	[0-10]*%
Telelogic Total		*[10-20]*%*
Parties' market share		***[30-40]*%***
Mathworks Simulink	No	[30-40]*%
Borland	Yes	[0-10]*%
Mentor Graphics' BridgePoint Builder	Yes	[0-10]*%
Esterel Scade	yes (*)	[0-10]*%
ETAS Ascet	No	[0-10]*%
dSpace SystemDesk	No	[0-10]*%
Visual Paradigm	Yes	[0-10]*%
NoMagic MagicDraw	Yes	[0-10]*%
Applied Dynamics International Beacon	No	[0-10]*%
ARTiSAN Studio	Yes	[0-10]*%
Sparx Systems	Yes	[0-10]*%
National Instruments Matrixx LabView	Yes	[0-10]*%
Omondo	Yes	[0-10]*%
Gentleware Poseidon	Yes	[0-10]*%
Sybase	Yes	[0-10]*%
Kennedy Carter iUML	Yes	[0-10]*%
Other Vendors from Software Modeling	-	[0-10]*%
Total		100%
(*) Although Esterel is based on a different language, it is UML compatible.		

141. If all non-UML compliant tools were to be excluded,[125] this would result in a combined market share of [50-60]*%. The main competitors would then be Borland and Mentor Graphics, with market shares of [10-20]*% and [0-10]*%, respectively.

VII.1.1.2.   Requirements Management

142. In Requirements Management, the combined "market share" of the parties reported by Gartner is 62% worldwide (IBM: 25% and Telelogic: 37%) and 65% in Europe (IBM: 22% and Telelogic: 43%)[126]. Competitors include Borland and Serena Software.

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that all sales off […]*, as well as of […]* should be considered as licensing income, in the table it is assumed that 50% of total sales is a more realistic approach. Further, the table includes all licensing income from IBM RSA and RSD […]* (IBM itself only includes 27%). The table does not include Microsoft tools (in the absence of any reliable turnover) or open-source tools.

[125]   Telelogic SDL Suite and Statemate, Mahtworks Simulink, ETAS Ascet, dSpace SystemDesk and Applied Dynamics International Beacon.

143. As for Modelling, IBM argues that Gartner's data have significant shortcomings and do not accurately reflect the market power of the merged entity. The parties have therefore recalculated their market shares as well as the market shares of their competitors. According to corrected market share data submitted by IBM, the merged entity would arrive at a joint world-wide market share in Requirements Management of [20-30]*%[127], expressed as value-based shares, and [10-20]*%[128], expressed as volume-based shares. The reasons why IBM considers that Gartner figures have significant shortcomings are as follows.

144. Firstly, Gartner's revenue-based market shares would underestimate the importance of suppliers whose business models involve selling large numbers of licenses at a low per unit cost, such as RallyDev or VersionOne and would not take into account open-source Requirement Management tools (e.g. Use Case Maker, Xplanner, Open Source Requirements Management Tool, myRMS).

145. As explained in relation to Modelling, value-based market shares still seem to better reflect market power than volume-based shares in cases of differentiated products.

146. Secondly, IBM argues that Gartner's market shares exclude a number of significant providers of Requirements Management tools (e.g. Compuware).

147. Thirdly, Gartner also excludes tools used in "Product Lifecycle Management" (PLM), such as Siemens UGS TeamCenter, which would clearly compete on the market for Requirements Management tools.

148. Finally, IBM submits that the actual market share of the merged entity would be even lower than its own estimates (combined world-wide market share in Requirements Management of [20-30]*%, expressed in value and [10-20]*%, expressed in volume), since it does not take into account the sales of general-purpose office tools (e.g. Microsoft Word, Excel or Power Point), which are used by some customers for Requirements Management tasks.

149. Similarly, as explained in relation to Modelling, Gartner's market shares appear to overestimate the market power of the merged entity, whereas the lower estimate of IBM would underestimate the market position of the merged entity.[129]

150. If the parties' figures are corrected according to the data provided by customers and competitors with respect to their own turnover, as well as according to the results of the in-depth investigation, the estimated world-wide combined market share of the parties

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[126] See *"Gartner Dataquest, Application Development and Project and Portfolio Management Software"* (2006), [...]*.

[127] See IBM's submission of 4 December 2007*([...]*)*, as corrected and recalculated by IBM's submission of 28 January 2008.

[128] See IBM's submission of 4 December 2007*([...]*)*, as corrected and recalculated by IBM's submission of 28 January 2008.

[129] IBM has included vendors, which are not perceived as competitors by the respondents to the Commission in-depth investigation (e.g. Microsoft Visual Studio Team System, Oracle/Agile, RallyDev, CollabNET and Atlassian JIRA). However, some other tools from competitors that were mentioned by the customers who replied to the Commission in-depth investigation are not included in the IBM recalculated market shares (e.g. Axosoft On Time, Mantis, EPDM Enovia MatrixOne, OmniTracker OmniNet or FORCE Ontopia). Furthermore, the market share of the category "Other PLM vendors" ([20-30]*%) seems too high.

would amount to [20-30]*%, as shown in Table 5.[130] The main competitors are Borland and UGS TeamCenter, with market shares of [0-10]*% and [0-10]*%, respectively.

Table 5

Vendor/tool	License share by value
IBM Requisite Pro only	[0-10]*%
IBM Requisite Pro in bundles	[0-10]*%
IBM Total	*[0-10]*%
Telelogic DOORS	[10-20]*%
Telelogic Total	*[10-20]*%
Parties' market share	***[20-30]*%**
Borland	[0-10]*%
Serena Software	[0-10]*%
Compuware OptimalTrace	[0-10]*%
MKS	[0-10]*%
Other Vendors RM point products	[10-20]*%
HP Quality Center	[0-10]*%
TNI Reqtify	[0-10]*%
3SL Cradle	[0-10]*%
UGS TeamCenter	[0-10]*%
Other PLM vendors	[20-30]*%
VersionOne	[0-10]*%
Atlassian JIRA	[0-10]*%
Other vendors with bundled RM	[0-10]*%
Total	100%

VII.1.1.3.   Conclusion

151. The in-depth investigation showed that, independent of the correctness of Gartner's approach to market definition, caution is required when using market shares as a direct proxy for market power in Modelling and in Requirements Management. The high degree of product heterogeneity reduces the substitutability of the individual Modelling and Requirements Management tools. Further, the in-depth investigation confirmed that Modelling or Requirements Management tools which are industry standards today may become a legacy product within less than five years. Competitors who do not regularly upgrade their products, or who do not introduce new products meeting increasing customers' requirements, will rapidly lose out. The decline in sales of IBM's Rational Rose Modelling tools is a good example hereof.

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[130]   This table is based on the sales data as provided by IBM and corrected in accordance with the sales data obtained from competitors in the context of the in-depth investigation. However, it is important to bear in mind that the high market share of other PLM vendors has not been corrected, in the absence of relevant results from the in-depth investigation.

VII.1.2. Closeness of substitution

152. As market shares may not be an exact indicator of market power in the present case, the potential anti-competitive effects of the merger have primarily been assessed on the basis of an analysis of closeness of substitution.

153. The notifying party submitted that IBM's and Telelogic's Modelling and Requirement Management tools are far from close substitutes, as they are highly differentiated and diverge significantly with respect to key functionalities, targeting different sets of customer needs. In particular, emphasis is put on the difference in customer needs between customers which use Modelling and Requirements Management tools for IT applications and other customers who use these tools for system development. Whereas IBM's tools are more focused on IT applications, Telelogic's tools are more focused on system development.

154. Closeness of substitution can be assessed by analysing and drawing conclusions from the selection of the group of products which a customer considers prior to a procurement decision. All products which are considered by the customer in the procurement process are potential "close substitutes" to the product eventually selected. However, the inclusion of a particular Modelling or Requirements Management tool on a long list or short list does not necessarily mean that it is a close substitute to all other tools listed, or to the tool eventually selected by the customer. In view of the high degree of heterogeneity of the individual tools, and of the limited knowledge customers may have, in particular at the start of the evaluation process, of the tools characteristics' and its performance in practice, it is necessary to be cautious in drawing conclusions from the simple fact that a specific tool is mentioned on a long list or even on a short list[131]. As set out in the chapter on the procurement process, the customer will often only know whether the long- and even the short-listed products were realistic substitutes to the tool eventually chosen by the end of the procurement process. The in-depth investigation has provided clear examples of this.[132]

155. In the context of the in-depth investigation, a qualitative analysis has been made of the closeness of substitution issue. This analysis has been supplemented by a quantitative analysis, to the extent that the quality of the underlying data allowed such an analysis. The qualitative analysis has been based on the responses by customers and competitors to three rounds of detailed requests for information by the Commission. A number of

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[131]   Many customers use the services of business analysts and consultants such as Gartner, or Ovum to assist them in the identification of potentially suitable tools. See e.g. the response by the Dutch Tax authority of 1 November 2007 to question 2 of the Commission request for information. In addition, in the case of Modelling tools customers knowledge of new generation products may be low, since, until recently, IBM's Rational Rose's Modelling tool has been the *de facto* industry standard for systems customers.

[132]   See e.g. the minutes of the interview with Lockheed Martin of 30 November 2007. *"Lockheed Martin 's evaluation process was split in two phases. In a first phase, Lockheed Martin evaluated a long list of 17 tools which were selected on the basis of their characteristics as publicly presented by the suppliers. On the basis of this first evaluation, four tools were identified as clearly superior. In a second phase, a detailed review of these products was carried out, which included demos by the suppliers. At the end of the process, X was selected as Lockheed Martin's sole recommended Modelling tool, as it ranked first for all types of applications. Product Y in itself did not meet all Lockheed Martin's minimum requirements. It was nevertheless included in the evaluation process (and subsequently in the short list)".*

interviews were held with a selected group of important customers and competitors[133], in order to obtain additional clarifications. The subsequent quantitative analysis was based on an analysis of win/loss data.

156. One third party (Microsoft) submitted an alternative qualitative market analysis. This market analysis concludes that the transaction would significantly impede effective competition in the common market[134]. It appears however that the survey methodology on which this analysis is based is seriously flawed[135]. In view of this, and taking into account that the survey on which the report is based does not fully support its own conclusions, the Commission primarily relies on the results of its own in-depth investigation.

VII.1.2.1.   Modelling tools

157. As explained in the chapter on software development tool vendors, IBM has several Modelling tools[136].   RSA is, in particular, aimed at addressing all IT application development needs. IBM RSM is specifically targeted at IT analysts, and features the relevant subset of RSA's functionality at a lower price point. IBM RSD provides similar features to those found in RSA. It is however less well suited to general IT application development, as most mainstream IT programming is done using J2EE, C# and VisualBasic.NET. Although all the non-legacy Modelling tools of IBM are UML 2.0 compliant they do not support SysML, nor generate C code[137]. In addition to these non-legacy Modelling tools, IBM has a number of legacy Modelling tools, that is to say the Rational Rose line of products. Reflecting their legacy nature they neither support UML 2.0 nor SysML.

158. Telelogic has essentially two Modelling tools: Rhapsody and TAU[138]. Both tools focus on complex (embedded) systems. They are used to break down the analysis of large

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[133]   The group of interviewed companies included Microsoft, Lockheed Martin, EADS, Siemens (UGS) and Infovista.

[134]   See the submission of Microsoft of 14 January of a report by Frontier Economics. The market survey on which the report is based has been conducted by a professional services firm which preferred to remain anonymous.

[135]   The survey complements earlier submissions by Microsoft (in particular its submission of 23 November 2007). The methodology used in the survey contains the following flaws which seriously affect its relevance. The survey is based on an extremely small sample size (16 interviews in total), which does not permit any statistically meaningful conclusions. The survey itself recognises that "*given the small size of the survey, these findings are not necessarily representative of the market as a whole, and the survey firm has made no representation as such*". Neither the identity of the company which conducted the survey, nor the identity of the respondent companies have been disclosed. The Commission is therefore not in a position to verify the outcome of the survey. Moreover, the report does not disclose the full set of raw data on which the survey is based. It only provides a selection of quotations from anonymous respondents. In addition, the conclusions which are drawn from the survey do not correctly reflect the results of the survey. For instance, the listed quotations rather seem to emphasize the differences between Telelogic's Requirements Management tool DOORS and IBM's Requisite Pro than their similarities. The survey is silent on the issue of IBM's and Telelogic's Modelling tools. On the issue of switching costs, the survey results are contradicting. Finally, even on the issue of "*the impact of the merger on customers*" the outcome of the survey was mixed, as a number of customers expressed that the transaction would have a positive impact for them. In any event, the survey does not provide convincing support for the overall conclusion that the transaction would significantly impede effective competition.

[136]   See the submission of IBM of 21 November 2007 which provides a description of its Modelling tools.

[137]   For instance, although IBM RSD generates C++, it does not generate C.

[138]   Telelogic also markets three other Modelling tools. System Architect, which is more an enterprise architecture tool (see the submission of IBM of 25 September 2007) than a Modelling tool. It appears in

systems into various levels of subsystems and to formalize/model the interactions between them. Rhapsody and TAU are UML-compliant products. In particular, Rhapsody and TAU support the latest UML 2.1 executable models, offering roundtrip engineering between model and generated code.[139]

159. An analysis of the functionalities of the respective Telelogic's and IBM's Modelling tools confirms that significant differences exist between the Modelling tools of both companies. The most important differences between Telelogic's and non-legacy IBM's Modelling tools include the ability of Telelogic's tools to use the SysML Modelling language, its full compliance with DoDAF/MoDAF[140] requirements, the ability to verify and validate the model, the support for the programming languages C and Ada, its superiority in code generation and support for embedded applications (often running on RTOS)[141]. These functionalities are of particular interest for systems customers and the absence of some of them makes IBM's Modelling tools significantly less suitable for use by systems customers. Finally, a price comparison shows that prices for Telelogic's Modelling tools are significantly higher than those for IBM's Modelling tools.[142]

160. On the other hand, a comparison of the functionalities which are of particular interest to IT developers shows that, in particular, IBM RSA has richer features than Telelogic's Modelling tools, e.g.[…]*.[143]

161. The differences in functionalities and commercial focus between Telelogic's and IBM's Modelling tools are reflected in the type of customers each of these companies serve. Telelogic's Modelling customers are primarily active in those industries that use Modelling tools for the development of complex (in particular, embedded) systems, that is to say aerospace and defence (45% of Telelogic's turnover) and to a lesser degree,

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Gartner's classification in three different categories, that is to say OOA&D, other application development software and database design tools. Further there are two Telelogic legacy Modelling tools that is to say SDL Suite (non-UML-based) and Statemate. Both products represent however a declining part of Telelogic's turnover for Modelling tools, see the submission of IBM of 8 November 2007. Whereas Statemate targets the automotive market (see the internal IBM's document "*[...]*" of 15 March 2007, Annex 5.4 exhibit 4(c) 5 to the notification; […]*), SDL Suite is more suited for use in the communications sector where the SDL programming language has strongest support.

[139]   See the publication of the Butler Group of June 2007, *Model Driven Development*.

[140]   That is to say Department of Defence Architecture Framework developed by the US authorities. It defines a standard way to organize an enterprise architecture ("EA") or systems architecture into complementary and consistent views. All major U.S. Government Department of Defence ("DoD") weapons and information technology system procurements are required to develop and document an EA using the views prescribed in the DoDAF. While it is clearly aimed at military systems, DoDAF has broad applicability across the private, public and voluntary sectors around the world, and represents only one of a large number of systems architecture frameworks. It is especially suited to large systems with complex integration and interoperability challenges, and is apparently unique in its use of "operational views" detailing the external customer's operating domain in which the developing system will operate. The UK Ministry of Defence Architectural Framework (MODAF) defines a standardised way of conducting Enterprise Architecture and provides a means to model, understand, analyze and specify Capabilities, Systems, Systems of Systems, and Business Processes.

[141]   A comparison between the Telelogic's Modelling tools and the most advanced IBM's legacy Modelling tool, that is to say Rational Rose Technical Developer, shows that the latter lacks important features such as DoDAF, MoDAF, SysML and UML 2.0.

[142]   The price list for floating licences for Telelogic Modelling tools in 2006 was as follows: Rhapsody […]*, Tau […]*, Statemate […]*, SDL Suite […]*. The price list for a floating licence for IBM's non-legacy Modelling tools in 2006 was as follows: RSA […]*, RSD […]*, Rational Systems Modeler […]*. See the Submission of IBM of 5 November 2007.

[143]   See the submission of IBM of 21 November 2007.

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communications (11%) and automotive (5%)[144]. Telelogic's largest customers include Lockheed Martin, Ericsson, Thales, Nokia, Raytheon, Boeing, General Dynamics, Northrop Grumman, Siemens and EADS. IBM's customers for Modelling tools are more concentrated in the IT development sector, the financial sector and in public administration. IBM's customers in public administrations account for [40-50]*%, while customers in the IT sector account for [10-20]*% of its sales. Sales to customers in the aerospace and defence sectors represent only [0-10]*%[145]. The largest part of IBM's sales in the aerospace and defence sector and other system development sectors is achieved by its […]* Modelling tools[146].

162. An analysis of the IBM shows […]* the limited suitability of their Modelling tools for use in the system development segment, and in particular in the segment for complex (in particular embedded) systems, as can be found primarily in the aerospace and defence sector[147].

163. An analysis of the product road maps of IBM shows that a significant tool upgrade was foreseen in relation to IBM's […]* tool, […]*[148]. Such an upgrade was considered necessary to maintain or increase IBM's presence in the (financially important) system segment.

164. The roadmap indicates however, that the upgraded IBM tool still lacks a number of key functionalities in comparison with the current versions of Telelogic's Modelling tools ([…]*)[149].

165. In addition, a pure increase of the number of functionalities may not suffice to make IBM's Modelling tools a close substitute for the Telelogic's Modelling tools. The results of the in-depth investigation confirmed that for customers the quality of the available Modelling functionalities is equally as important as the quantity thereof. Customers in the system segment generally consider the Telelogic tools to be superior to the IBM tools both in quantity and in quality/depth[150].

166. Furthermore, the in-depth investigation confirmed that all suppliers of Modelling tools continuously upgrade their tools. This process is stimulated by customer demands for

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[144] See the LECG study on "*[…]*" submitted by IBM on 4 December 2007.
[145] See the LECG study on "*[…]*" submitted by IBM on 4 December 2007.
[146] See the LECG study on "*[…]*" submitted by IBM on 4 December 2007.
[147] […]*.
[148] […]*.
[149] See the IBM Rational 2007 product roadmap charts of 23 August 2007.
[150] As part of the Commission in-depth investigation customers were asked to provide internal evaluations of the different Modelling tools they considered. These internal evaluations often use weighted criteria, reflecting the relative importance of each criterion. Each Modelling tool is allocated a score per criterion, showing how it performs. See e.g. the response by Elbit of 2 November to question 8 of the Commission request for information. Another example hereof can be found in the response by Lockheed Martin of 8 November 2007 to question 11 of the Commission request for information. Lists of criteria may, especially in the case of customers using complex systems, comprise 500 or more individual criteria. These tool evaluations indicate that in particular for customers in the system segment the Telelogic's tools score significantly better on many functionalities which are important for systems customers than the IBM's tools. See also the study from the Butler Group of June 2007, *Model Driven Development*, which concludes that "*In Butler Group's opinion, the offering from Telelogic is one of the most powerful on the market and should be considered by developers wanting to improve quality and reduce time-to market of large and/or complex software systems and applications*".

better and more advanced Modelling tools. For instance, Telelogic foresees significant upgrades for its […]* tools in 2007 and 2008.[151]

167. However, even if the gap between the Modelling tools of Telelogic and IBM were to be narrowed, the continued existence of a gap of any size may be important enough to affect the purchase decision of customers in the system segment. The in-depth investigation showed that customers in the system sector and, in particular, in the aerospace and defence segment, generally look for the best available Modelling tool, as their needs in terms of quantity and quality of functionalities routinely exceed what any current product offers.[152]

168. In the end, the marketing departments of IBM recognise that the upgrade of their Modelling tools is unlikely to turn their tools into close substitutes to Telelogic's Modelling tools: "[…]* is lacking an attractive end-to-end solution for Systems customers" and *"Organic investment will not be sufficient to close the gap with customer expectations".*[153]

Industry-by-industry analysis

169. The in-depth investigation confirmed that customers in different sectors of industry have different needs for Modelling software. Generally, a distinction can be made between customers using Modelling tools for system development, those who use Modelling tools for IT applications and those who have both system development and IT needs. The latter customer group tends to purchase different Modelling tools to satisfy different needs.

170. Although customers in the system sector have in common that they have complex requirements,[154] differences in requirements may still exist between individual customer groups in the system sector, which affect their choice for a particular Modelling tool (e.g. large/small systems, continuous/reactive, real-time, safety critical, hardware dependent etc).

171. Modelling tools can be used to create systems' specifications which are used by teams (sometimes across organisational boundaries) to agree on a set of objectives. This further drives the customer's needs for features aimed at supporting systems specifications (e.g. SysML support, functional Modelling). Similarly, systems are

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[151] See the submission of IBM of 12 December 2007, on the product roadmaps for Telelogic's Modelling and Requirements Management tools. See also IBM's reply of 5 November 2007 to the Commission request for information.[…]*.

[152] See the minutes of the interview with Lockheed Martin of 27 November 2007: "*Although ranked first, [CONFIDENTIAL] is far from being the "perfect" tool for Lockheed Martin, as it was allocated 92.6 points on a maximum of 200. This shows that Lockheed Martin's ultimate needs exceed by far the performance of the Modelling tools currently on the market leaving sufficient scope for future product upgrades.*"

[153] *[…]*, 7 August 2006, p.12. Document submitted in Annex 8 to IBM's response of 5 November 2007 to the Commission request for information.

[154] Complex systems involve the interplay of hardware and software, often with multiple devices and subsystems. At the small physical scale, a good example is a cell phone, which is a system in itself, often including a camera, a gaming engine, an mp3 player, motion and light sensors to adjust to environment, as well as functional connectivity to various devices and interacting with a much larger telecom backend. At a larger physical scale, a combat system comprising missile launch pads, observation satellites command and control centres deployed across the world on warships, is a complex system made up of many subsystems. See the submission of IBM of 25 September 2007.

generally built using the C, C++ or Ada programming languages running on real-time Operating Systems. Accordingly, for customers looking to use their Modelling tools as part of their source code development, support for code generation and reverse engineering of these programming languages is key. Finally, complex software such as that found in embedded devices (for example in cell phones, fuel injection systems, anti-locking braking systems, landing systems, etc.) often requires very thorough validation and testing. For this reason, Modelling simulation, debugging and formal validation are generally key criteria for these development efforts[155].

Aerospace and defence industries

172. The vast majority of the respondents to the in-depth investigation in the aerospace and defence industries use the UML-based Telelogic's Rhapsody or TAU Modelling tools[156]. Artisan's[157] is the only UML-based Modelling tool that is considered as a close substitute to the Telelogic Modelling tools. In practice however, only a limited group of customers actually use it.

173. To the extent that the respondents in this sector still use IBM's Modelling tools these are IBM's legacy Rose Modelling tools. The sale of new licenses for these tools, however, is in […]* decline. The reason why a number of customers in this sector as well as in the other systems sectors described hereafter still use these legacy tools is linked to the fact that customers tend to stick to the Modelling tools which they selected at the start of a project. Changing Modelling tools during an ongoing project creates significant switching costs.

174. The in-depth investigation confirmed that for new projects, switching costs are no impediment to switching. In particular, the switching costs involved in a switch from IBM's legacy Modelling tools to IBM's non-legacy Modelling tools are not significantly higher than in case of a switch to Telelogic's Modelling tools[158]. Customers who use IBM's legacy Modelling tools for on-going projects tend to switch to Telelogic's Modelling tools in relation to new projects[159]. Respondents to the in-depth investigation reported that the use of IBM's current Modelling tools for new projects is rare and seem to cover different Modelling needs than the ones addressed by the Telelogic Tools.[160]

175. From time to time, customers in the aerospace and defence sector complement Telelogic's Modelling products with non-UML-compliant products. These products (such as those offered by Mathworks and Esterel) are specialised "niche" products

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[155]   See the submission of IBM of 21 November 2007.

[156]   See for instance the responses of BAE of 23 November 2007, of Boeing of 7 November 2007, of Rolls-Royce of 26 November 2007, Northrop Grumman of 15 January 2007, Qinetiq of 2 November 2007, Safran of 31 October 2007, Honeywell of 26 November 2007 and Elbit of 2 November 2007 to question 7 of the Commission request for information.

[157]   See e.g. the response by Boeing of 7 November 2007 to questions 7 and 9 of the Commission request for information. Although it does not use Artisan itself it refers to it as a "*very close competitor for full –functioning UML Modelling tools*". See also the response by Qinetiq of 2 November 2007 to question 7 of the Commission request for information. Qinetiq uses, amongst others, Modelling tools from Artisan.

[158]   See the minutes of the interview with Lockheed Martin of 30 November 2007.

[159]   See for e.g. the minutes of the interview with Lockheed Martin of 30 November 2007.

[160]   See e.g. the response by Thales of 8 November 2007 to question 12 of the Commission request for information: "*We use Rhapsody for real-time systems, and RSA for IT & non real-time systems*".

which focus on a particular area of Modelling[161] and do not have the same, broad application as Telelogic's Modelling tools. The use of open-source Modelling tools in this sector in very rare. The in-depth investigation showed that, in particular, safety concerns prevent customers from using these tools.

176. The strong preference by customers in the aerospace and defence industry for Telelogic's Modelling tools can be explained by the fact that these tools best serve their Modelling needs for large and complex systems. SysML support and functional and structural Modelling are key criteria along with MoDAF and DoDAF support for defence systems. Furthermore, customers in these industry sectors often rely on more specialised Modelling solutions to develop software source code. Depending on the nature of the system, they place particular emphasis on formal validation of the model (for example for safety-critical systems) or they may look for Modelling tools that provide good support for the target programming languages (mostly languages such as Ada, C, and C++)[162]. The IBM Modelling tools either lack these functionalities or score considerably less with respect to the quality and depth of such functions.

177. As most of the Modelling needs in this sector concern complex systems, the proportion of Modelling needs for which other Modelling tools are better placed (that is to say IT projects or smaller less complex system development projects) is relatively small.

Automotive and communications industries

178. The in-depth investigation confirmed that in relation to the automotive and communications sector - which together with the aerospace and defence sector represents around 80%[163] of the customers for system (embedded) development Modelling tools - customers generally express a similar preference for Telelogic's Modelling tools as in the aerospace and defence sector.

179. Modelling needs for the communications sector are somewhat similar to those for systems development, but they also share some attributes with IT application development[164]. Accordingly, features such as J2EE or .NET support are relevant here. A difference with other sectors of industry which use Modelling software for system applications, is the use of SDL as modelling language, in parallel with UML. SDL is a modelling language specified by ETSI[165], which was designed for the telecommunications sector. Telelogic is the main provider of tools which support ETSI/ITU standards (that is to say Telelogic's SDL Suite)[166]. Another key difference with systems development more generally is the level of depth of the Modelling that is performed. While some complex software components may be modelled in great detail

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[161]   See e.g. the responses by Boeing of 7 November 2007 and Safran of 31 October 2007 to question 7 of the Commission request for information.
[162]   See the submission of IBM of 20 November 2007.
[163]   See the VDC *Report on the embedded software market intelligence program*, 2006 service year, p. 33, as submitted to the Commission by IBM on 11 September 2007
[164]   See the submission of IBM of 20 November 2007.
[165]   The European Telecommunications Standards Institute (ETSI) is an independent, non-for-profit, standardization organization of the telecommunications industry (equipment makers and network operators) in Europe, with worldwide projection. ETSI has been successful in standardizing the GSM cell phone system and the TETRA professional mobile radio system.
[166]   See the response by Alcatel/Lucent of 7 November 2007 to question 15 of the Commission request for information. *"UML tools are better suited for all end-applications except for protocols for which SDL is more suitable"*.

(that is to say with full behavioural Modelling), Modelling for larger systems is generally done only at a high (structural) level. For this reason, in the communications sector, the need for behavioural Modelling, simulating, testing, and complete source code generation support is lower compared to other manufacturing industries such as automotive.

180. Modelling needs for the automotive sector are very much a subset of systems development. The automotive industry is characterised by customers who typically have less complex requirements with respect to software development. Their systems tend not to be as large as those in the aerospace sector and telecommunications sectors with software heavily intertwined with hardware[167]. Accordingly, their systems specifications or their structural Modelling is less complex. Instead, automotive customers place more emphasis on the ability to model hardware and software in every detail, and to use simulation mechanisms to verify the functionality, the performance, and the safety of the system prior to the hardware being available. Unlike systems development more generally, automotive customers mostly use the C programming language (due to performance constraints) and consequently other programming languages are less relevant. This by itself significantly reduces the use of the IBM's Modelling tools in the automotive sector as they do not generate C code[168].

181. In order to address their different needs, customers in the communications and automotive sectors use different tools for different Modelling tasks[169]. For their IT needs, or less demanding system development tasks, customers tend to choose from a large group of alternative Modelling tools, including the IBM's Modelling tools and others such as Borland, Sparx, Microsoft Visio, Artisan and Mentor Graphics. Occasionally, customers use Telelogic's Modelling tools for these tasks. However, as they are more expensive than the less advanced Modelling tools of other suppliers and more complex to use, customers in these sectors would generally limit their use of Telelogic's tools to the Modelling of complex embedded systems within their organisation. For these applications, the IBM's tools are no close substitute to Telelogic's tools.

IT Applications

182. At the other end of the spectrum, there are customers who use Modelling tools for IT applications. These customers include not only IT companies, but also financial institutions and public administrations. Modelling needs for IT application development are driven by the target runtime platforms and their corresponding programming languages. Specifically, IT applications can run on operating systems such as Microsoft Windows or Linux, but modern enterprise applications are often created to run on top of middleware, such as J2EE or .NET application servers (e.g. IBM Websphere, BEA Weblogic, Microsoft IIS) or web servers (e.g. Apache), or business process execution engines. Accordingly, support for Modelling web services, J2EE domain-specific items, generating source code frames, or reverse engineering of programming code that runs on

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[167]   See the submission of IBM of 20 November 2007.

[168]   See e.g. the response by General Motors of 8 November 2007 to question 12 of the Commission request for information. General Motors confirmed that:" *Main tool for UML Modelling in GM is Rhapsody. RoseRT is used for projects with other OEMs*".

[169]   See e.g. the response by Motorola of 8 November 2007 to question 12 of the Commission request for information.

middleware such as J2EE (written in Java) and .NET (e.g. written in C# or VB.NET) are very relevant to IT application developers.[170]

183. The Modelling needs of financial institutions are similar to those of IT application development. Because banking/finance/insurance applications are often database oriented, criteria such as data Modelling or DDL ("Data Design Language") code generation are more important. Similarly, a number of banking, finance/insurance applications are still based on desktop applications written in Java or using technologies such as Corba (client/server communication). Accordingly these features are ranked slightly higher for this industry segment.

184. The in-depth investigation confirmed that customers in these sectors seldom consider Telelogic's Modelling products as close substitute for IBM's product offerings as they are less adapted to the specific IT needs these customers have. In contrast with many customers in the system segment (and in particular in the aerospace and defence sector), customers in these sectors attach a greater importance to the price of the tools[171]. The higher price and sophistication of e.g. Telelogic's Rhapsody would, by itself be an obstacle to its widespread use in this sector. In addition, the complexity of the Telelogic's tools is generally of little use in the IT sector. The in-depth investigation confirmed that in this sector few customers would consider Telelogic's Modelling tools[172]. Instead, customers use IBM's tools and a wide range of other Modelling tools (e.g. Oracle JDeveloper and Computer Associates).

Win/loss analysis

185. In order to complement the documents and opinions provided by the market participants, the Commission requested the parties to provide a complete set of "win/loss data" in relation to Modelling and Requirements Management tools since October 2005.

186. "Win/loss" data describe instances where each Party won a new contract (e.g. contract with a firm that was not yet a customer, new project of an existing customer) as well as instances where each Party lost a potential contract (e.g. renewal of an already existing contract, extension of an already existing contract, new potential business opportunity). The purpose of such a quantitative analysis is to assist in the assessment of closeness of substitution between each Party's products, e.g. by measuring "meeting" frequencies of each Party's products in customers' procurement processes and by measuring whether the presence of each Party's offering has an influence on the outcome of customers' procurement processes.

187. In the present case, the details to be provided[173] by the parties related, firstly, to the identification of the customer: customer's name, name of the group the customer belongs to (if relevant), customer's country, economic sector in which the customer is active;

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[170]   See the submission of IBM of 20 November 2007.

[171]   See e.g. the response by UBS of 1 November 2007 to question 8 of the Commission request for information: "*our main criterion is whether the tools are fit for the specific need we are attempting to address at a reasonable price*".

[172]   See for instance the responses by UBS of 1 November 2007, ABNAMRO of 2 November 2007, Texas Instruments of 8 November 2007, and Unisys of 7 November 2007 to question 7 of the Commission request for information. All these companies use IBM's Modelling tools alone, or in parallel with other Modelling tools. None of these companies use Modelling tools from Telelogic.

[173]   The list of elements to be provided has been expanded in the course of the procedure. The details listed in the text correspond to the final list.

secondly, to the identification of the project: year, region covered, new or existing project, main features of customer's needs/project, total value of the project, number of licences of the project; and thirdly to the identification of actual or perceived suppliers involved: names of the previous products and their suppliers (if relevant), names of the actual or perceived competing products and their suppliers that have been short listed by the customer (if any), name of the selected product for the contract (if any).

188. […]*. The Commission therefore relied mainly on the analysis of Telelogic's response. Telelogic maintains a database, in which it typically records a "business opportunity" when there is more than a […]*% chance that it will make a sale to a customer.[174]

189. The Commission has partially corrected Telelogic's win/loss dataset for Modelling tools by checking with some customers the accuracy of the information provided by Telelogic, especially regarding the number and identity of the competing products Telelogic was confronted with.[175]

190. For the years 2006 and 2007, the final dataset contains information on […]* win/loss instances of Telelogic ([…]* won instances and […]* lost instances), representing a value (either contracted or expected) of around USD […]* million (USD […]* million for won instances and USD […]* million for lost instances)[176].

191. An actual or perceived competitor is mentioned in […]* of the recorded business opportunities ([…]* wins and […]* losses). In theory, business opportunities for which no actual or perceived competitors are mentioned correspond either to add-ons and renewals, or to new projects. In the former case, the incumbent (Telelogic) typically does not face competition, the only uncertainty being whether or not the customer is willing to buy further licences for Telelogic products, this almost irrespectively of other competitors' offering. These business opportunities are not informative of the interplay between the parties. In the latter case, the customer is likely to consult several suppliers in order to select a product. In such case, the sample would underestimate the number of business opportunities where Telelogic faced alternative suppliers and, thus, the win/loss database would not completely reflect the correct interactions between competitors.

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[174]   *"This includes a wide range of commercial situations, ranging from formal "requests for proposals" ("RFPs") to ad hoc customer requests for product "add-ons" or even situations where the customer did not set out to acquire a Modelling [...] tool (this may involve cold calls or attempts to upsell a [...] tool where the customer was initially seeking proposals for a different tool)"*. See LECG's report entitled "*Telelogic's win/loss data: description and limitations*", of 27 November 2007, pages 2-3. Telelogic also collects "win flash" memoranda. These reports are sometimes produced when Telelogic's sales personnel achieve a significant commercial win. Unfortunately, most "win flashes" date from 2004 ([…]*), and only […]* per year are available for the following years. […]*. As a consequence, the win flashes have not been taken into account in the analysis.

[175]   These checks have been performed through interviews with customers. Given the time constraint, the customer list has been restricted to those customers where Telelogic identified as competing products either IBM legacy products were identified, or IBM products were identified without detail.

[176]   Because of the nature of Telelogic's "opportunity database", this set of opportunities might not fully represent and describe all procurement processes in which Telelogic has participated. In particular, Telelogic observes that "*[...]*.*" See LECG's report entitled *"Telelogic's win/loss data: description and limitations*", of 27 November 2007.

192. In order to assess the representativeness of the win/loss dataset, the Commission performed several tests[177]. In spite of a number of imperfections, the coverage of the win/loss database seems to be sufficiently large to allow some degree of analysis.

193. Moreover, LECG[178] has compared the revenue distribution by industry of both sources (won instances from the win/loss database on the one hand, and revenue figures on the other hand) and found that they were consistent. This element gives some credit to the analysis of the win/loss data.

194. As shown in Table 6 below, there are few business opportunities where IBM non legacy products compete with Telelogic products: between […]* and […]* instances out of […]* instances where a competitor has been identified (that is to say[…]*–[…]*). The same level of ratio (namely[…]*–[…]*) equally applies to the cumulated value of the opportunities where IBM non-legacy products compete with Telelogic products and the cumulated value of business opportunities where a competitor has been identified.

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[177]   On the basis of revenues data submitted by the parties, Telelogic's licence revenues during 2006-3Q2007 related to Telelogic's Modelling products listed in the opportunity database for that same period, namely Rhapsody, TAU and SDL, amount to USD […]* million. Telelogic's corresponding total revenues (licence, maintenance and services) amount to USD […]* million. Revenues from the win instances of the win/loss database amount to USD […]* million, that is to say […]* of 2006-3Q2007 Telelogic's licence revenues and […]* of 2006-3Q2007 Telelogic's total revenues. The comparison of these figures is not straightforward as the expected value reported in the win/loss reports can be spread over several annual revenues whereas revenues data might include revenue streams from different contracts as well as elements not covered by the initial contracts (e.g. unscheduled maintenance or services).

[178]   Expert services firm hired by IBM.

Table 6 : Frequency of interaction between Telelogic and IBM Modelling products (number of business opportunities)

Were IBM's products considered?	Rhapsody		SDL		TAU		Total
	Win	Loss	Win	Loss	Win	Loss	*Total*
IBM's product (without specific detail) was considered, and no other competitor was				[…]*	[…]*	[…]*	[…]*
IBM's product (without specific detail) was considered, along with 2 other competitors				[…]*		[…]*	[…]*
IBM's *legacy* product was considered	[…]*	[…]*			[…]*	[…]*	[…]*
IBM's *non-legacy* product was considered, but no other competitor was	[…]*	[…]*				[…]*	[…]*
IBM's *non-legacy* product was considered, along with 1 other competitor	[…]*					[…]*	[…]*
IBM's product was not considered	[…]*	[…]*	[…]*		[…]*	[…]*	[…]*
No competitor was identified	[…]*	[…]*			[…]*	[…]*	[…]*
Total	[…]*	[…]*	[…]*	[…]*	[…]*	[…]*	[…]*

Source: *Commission's market investigation and analysis*

Notes: *(1) IBM legacy products include Rose products, that is to say Rose Enterprise, Rose Modeler, Rose RT and Rose XDE*
(2) IBM non-legacy products include RSA, RSD and RSM products
(3) IBM products without specific details can be either IBM legacy products or IBM non legacy products

195. Table 7 below shows how frequently Telelogic met its main competitors. Over the […]* instances where a competitor has been identified, Telelogic and IBM non-legacy products met […]* times, whereas Telelogic met Artisan […]* times, Sparx […]* times and Mathworks […]* times. Moreover, segmentation by the size of the project, the industry or the region of the customer does not seem to exhibit higher levels of interactions between the parties than between Telelogic and its main competitors.[179]

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[179] For some sub-segments, e.g. a specific industry or in a specific region, the database can contain very few business opportunities where the merged parties meet, e.g. only one. In such circumstances, comparing the frequency of interaction between the merged parties on the one hand and Telelogic and other competitors on the other hand is not informative.

Table 7: Frequency of interaction between Telelogic's and some of its competitors in Modelling (number of business opportunities)

Number of times facing competition from	Rhapsody		SDL		TAU		Total
	Win	Loss	Win	Loss	Win	Loss	*Total*
IBM's legacy products	[…]*	[…]*			[…]*	[…]*	[…]*
IBM's non-legacy products	[…]*	[…]*			[…]*	[…]*	
IBM's unidentified products			[…]*	[…]*	[…]*	[…]*	
Artisan	[…]*	[…]*			[…]*	[…]*	[…]*
Borland		[…]*	[…]*		[…]*	[…]*	[…]*
Mathworks	[…]*	[…]*			[…]*	[…]*	
Microsoft	[…]*				[…]*	[…]*	
Sparx	[…]*	[…]*			[…]*	[…]*	
Total	[…]*	[…]*	[…]*	[…]*	[…]*	[…]*	[…]*

Source: Commission's market investigation and analysis

Notes: (1) IBM legacy products include Rose products, that is to say Rose Enterprise, Rose Modeler, RoseRT and RoseXDE
(2) IBM non-legacy products include RSA, RSD and RSM products
(3) IBM products without specific details can be either IBM legacy products or IBM non legacy products
(4) More than one competitor may have been present in the same opportunity; thus despite the existence of 181 opportunities in the win/loss database with identified competitors, the total number of interactions between suppliers pairs listed here amounts for 187

196. In conclusion, despite its inevitable caveats, described above, the win/loss analysis tends to confirm that the merging parties are not close substitutes in the market for the supply of Modelling tools.

Conclusion on closeness of substitution

197. On the basis of the above qualitative and quantitative assessment, it appears that Telelogic's Modelling tools cannot be considered as close substitutes to IBM's Modelling tools. For the development of the most complex systems in the aerospace and defence sector, the only genuine alternative for Telelogic's Modelling tools is the UML-tool Artisan Studio, although its use is limited in practice. The other systems development customers in the automotive and telecommunications sectors have a similarly strong preference for Telelogic's products for the development of complex systems.

198. Systems customers use alternative Modelling tools (e.g. Borland, Sparx and NoMagic) for their other modelling needs (e.g. in relation to small less complex system development projects and IT development projects). The proportion of these "other" projects tends to be higher in the automotive and communications sector than in the aerospace and defence sector.

199. In the IT, public administration and financial sectors, the use of Telelogic's Modelling tools is very limited, whereas IBM has a stronger presence. This finding is in line with the described differences in functionalities between IBM's and Telelogic's Modelling tools. In these sectors a long list of alternative Modelling tools is available for users of IBM's Modelling tools.

200. However, even if some customers of Modelling tools would consider Telelogic's and IBM's offerings as close substitutes for certain uses, this limited number of occasions in which this would be the case would not allow the merged entity to increase prices post merger. There is a sufficiently large group of suppliers of Modelling tools with features comparable to IBM's tools, which would render such a price increase unprofitable. The circumstance that a procurement decision (especially for large orders) is often taken on the basis of a tender-like procurement process implies that in such cases market shares of IBM and Telelogic play a less important role.

VII.1.2.2.   Requirements Management tools

201. IBM has one Requirements Management tool[180]. It is called RequisitePro tool and it is primarily aimed at IT business analysts and business users creating IT applications for business processes (e.g. sales tracking, billing).

202. Telelogic has essentially three Requirements Management tools, DOORS, Focal Point and DOORS Fastrak. DOORS is designed for system engineers managing requirements for system development. Focal Point is actually more a product portfolio management tool[181] than a Requirements Management tool. DOORS Fastrak is a light and more user-friendly version of Focal Point which was introduced in April 2007[182]. It is considered an "out-of-the-box"[183] solution for Requirements Management for fast-paced software development projects[184]. Both Telelogic's DOORS Fastrack and Focal Point generate very modest sales compared to DOORS which is the best selling Requirements Management tool in the industry.

203. An analysis of the functionalities of Telelogic's and IBM's Requirements Management tools confirms that significant functional differences exist between these tools. IBM's RequisitePro is a document-centric, lightweight, IT focused tool, typically used by business analysts[185]. It is designed for use with Microsoft Word to simplify the user's experience. In RequisitePro, requirement definition is simple: basic narrative, priority

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[180]   See the submission of IBM of 21 November 2007 which provides a description of its Requirements Management Tool.

[181]   See the submission of IBM of 21 November 2007.

[182]   DOORS Fastrak's license limits the functionality that can be used in Focal Point, see the submission of IBM of 12 December 2007.

[183]   "*Out of the Box*" in the software industry normally refers to software that is easily installed, needs no further customisation and simply works.

[184]   See the submission of IBM of 12 December 2007.

[185]   See the submission of IBM of 24 September 2007.

(high, medium, low), cost (high, medium, low). RequisitePro users track on average 500-1,000 requirements, while the tool can handle a maximum of 50 000 requirements.

204. Telelogic's DOORS is a database-centric advanced tool geared towards complex projects with mature, high-structured processes that involve a high number of requirements with a rigorous process for requirements analysis[186]. It is designed for sophisticated users and has a complex user interface. It allows for extensive reporting and analysis of requirements to determine gaps, change impact and metrics. DOORS users track on average around 100 000 requirements or more, with a maximum of up to 10 million requirements.

205. A comparison of both tools shows that DOORS is the more powerful and sophisticated of the two. This is a particular advantage in the systems development sector. In comparison to DOORS, Requisite Pro lacks the following key attributes which are important for system development customers:[…]*[187]

206. On the other hand, Telelogic's DOORS is weak on a number of key attributes for IT development: it lacks the […]*[188]. Telelogic recently introduced a "light" version of Focal Point, Telelogic DOORS Fastrak. Although DOORS Fastrak is lower in price and easier to use than DOORS, it still lacks […]*[189]. Telelogic's Focal Point is not an attractive product for IT customers. It is positioned more as a product portfolio management tool[190] than a Requirements Management tool and scores low on […]*.

207. IBM's internal documents confirm the superiority of Telelogic DOORS in the system development segment. The notifying party anticipates that DOORS will fill a gap in IBM's product portfolio and provide it with access to customers (e.g. in the […]* industry) which it could otherwise not reach[191].

208. The difference in functionalities and focus between Telelogic's DOORS and IBM's RequisitePro is also reflected in the type of customers they serve. IBM's Requisite Pro customers can be found primarily in public administrations ([…]*) and financial institutions ([…]*) and only to a limited extent in typical systems sectors, such as aerospace and defence ([…]*), automotive ([…]*) and communications ([…]*)[192]. Telelogic's Requirements Management customers on the other hand can be primarily found in aerospace and defence ([…]*), automotive ([…]*) and communications ([…]*).

209. An analysis of the product roadmap of IBM confirms that a number of functionalities of Requisite Pro will be upgraded (e.g.[…]*). However, the planned upgrades do not concern "key attributes" which would close or narrow the gap between the IBM's and Telelogic's Requirements Management tools[193]. As explained in relation to Modelling

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[186]   See the submission of IBM of 24 September 2007.
[187]   See […]* submission of IBM of 21 November 2007.
[188]   E.g. SDL (Specification and Description Language) used in the telecom industry, UPDM used in the aerospace and defence industry, AADL (Architecture and Analysis Design Language) used in the automotive industry, BPMN (Business process Modelling Notation) and BRM (Business Rules Management) used for IT software development.
[189]   See the […]* submission of IBM of 21 November 2007.
[190]   See the […]* submission of IBM of 21 November 2007.
[191]   […]*.
[192]   See the submission of IBM of 4 December 2007 containing an LECG study analysing the parties' revenue distribution by industry category.
[193]   See the submission of IBM of 23 August 2007 discussing and analysing the product roadmap for […]*.

tools, IBM itself recognises that the upgrade of its tools (that is to say both its Modelling and Requirements Management tools) is unlikely to make them close substitutes to Telelogic's Modelling tools: [...]* and "*Organic investment will not be sufficient to close the gap with customer expectations*"[194].

Industry-by-industry analysis

210. Similar to Modelling, the in-depth investigation confirmed in relation to Requirements Management tools that customers in different sectors of industry have different product needs. The distinction between system development customers and IT application customers is also relevant in relation to Requirements Management tools.

211. Requirements Management needs for systems development are driven by the fact that projects tend to have a longer lifespan, while teams tend to be larger and more distributed (within and across organisations). For these reasons, a number of features related to users' scalability (e.g. change proposal system, workflow support, audit trails, security/access control) as well as requirements scalability (e.g. impact analysis, orphan analysis) are more relevant than for other applications. Similarly, because systems development tracks both hardware and software requirements, integrations with Product Lifecycle Management Tools such as CAD (Computer Aided Design) or EDA (Electronic Design Automation) are more relevant.

212. Within the group of systems customers, differences in needs can be identified. They reflect the specificities of the industry segment and the related preference for specific Requirements Management tools.

<u>Aerospace and defence</u>

213. Requirements Management needs for the aerospace and defence sector are consistent with those of systems development more generally. This sector is characterised by long-term projects and complex primary contractor and sub-contractor relationships. Because of the size of the projects, criteria related to planning and estimation are generally not relevant as they are addressed by more capable special-purpose tools (e.g. Primavera). Conversely, criteria related to users and the scalability of their requirements are given greater weight (e.g. workflow support, change proposal system, versioning of requirements, orphan/completeness analysis).

214. The results of the in-depth investigation confirm that IBM's and Telelogic's Requirements Management tools are not in close competition. Customers in the aerospace and defence sector, which need Requirements Management tools primarily in relation to large systems, have a strong preference for Telelogic's DOORS[195]. There is a

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[194]   "[...]*", of 7 August 2006, p.12. Document submitted in Annex 8 to IBM's response of 5 November 2007 to the Commission request for information.

[195]   See the response by Safran of 31 October 2007 to question 59 of the Commission request for information. Safran considers that "*Doors is a universal tool in the aerospaceal community*". See also the response by Elbit of 2 November 2007 to question 59 of the Commission request for information: "*We use Requisite Pro for some of our legacy projects. We found Requisite Pro as incompatible for large scale projects and up today Doors is a standard RM tool. Right now I do not see a good alternative for Doors*".

number of customers within this category which consider that there is no alternative to DOORS for dealing with complex systems[196].

215. However, there are also customers in this category who use both Telelogic's DOORS and IBM's Requisite Pro. In many of these cases it appears, however, that each of these tools is used for a different purpose, that is to say DOORS is used to cover the companies' system needs, whereas RequisitePro is chosen if the project is largely focussed on software development[197].

<u>Automotive and communications industries</u>

216. Requirements Management needs for the automotive sector are consistent with those of systems development more generally. The automotive industry is characterised by customers that are less demanding with respect to software development, and in general more sensitive to pricing and tool complexity. Also, their development teams tend to be smaller than those found in aerospace and defence or communications and development cycles. For these reasons, team scalability features such as web-based access, security/team access control are less relevant but price, ease of use, integration with PLM tools, or planning support are given greater weight.

217. The in-depth investigation showed that in the automotive sector DOORS is generally considered as the Requirements Management standard[198]. Customers either choose DOORS because they consider it is the tool with the best features, or because it facilitates interactions with suppliers, sub-contractors etc.[199]. Occasionally customers are also obliged by contract to use DOORS. Respondents to the in-depth investigation do refer to potential alternatives to DOORS, such as MKS, Borland Caliber, IRQA,

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[196]   See e.g. the response by Thales of 8 November 2007 to question 57 of the Commission request for information. Thales states in relation to Telelogic Doors: "*There are alternative vendors (IBM, Borland, Serena,...). But their products do not bring the same level of functionalities and performance as Doors*".

[197]   See e.g. the response by Safran of 31 October 2007 to question 54 of the Commission request for information. Safran uses Doors for system and product Requirements Management, whereas it uses Requisite Pro for software Requirements Management. Further, also see the response by Northrop Grumman of 15 January 2008 to question 59 of the Commission request for information: "*The choice between the two Requirements Management products depends on the type of development effort undertaken. If chosen in the context of a suite, and the project scope is largely software development oriented, the IBM-Rational tool-suite is often chosen to integrate with other software management "Computer Aided Software Engineering" (CASE) tools in the Rational Suite [...]. If the project scope is a combination of system and software development, or mainly system / component development, Telelogic DOORS is often chosen for its integration with both Telelogic System Architect and Telelogic TAU*".

[198]   See the response by Audi of 8 November 2007 to question 55 of the Commission request for information, which states that Doors is the *de facto* automotive industry Requirements Management tool standard. See also the response by Daimler of 8 November 2007 to question 55 of the Commission request for information. "*Telelogic Doors is the most important tool suite for Requirements Management. Because Doors is used in many projects, a lot of other projects will follow this quasi standard*".

[199]   See e.g. the response by Conti of 22 November 2007 to question 59 of the Commission request for information. "*We are using Doors as our customers are using Doors and currently the alternatives on the market are very week*". See also the response by HD Leopold Kostal of 31 October 2007 to question 59 of the Commission request for information: "*Some Requirements Management Tools could constitute an alternative for Telelogic Doors, if it were not for the fact that many car manufacturers use Doors, which would complicate the data exchange*".

Polarion ALM, Reqtify and Siemens UGS TeamCenter[200]. Generally, however, IBM's RequisitePro is not listed as a potential substitute.[201]

218. Requirements Management needs for the communications sector are generally similar to those of systems development, but they also share some attributes with IT application development. It is common for communications systems to include or to connect to IT applications. Accordingly, features such as storyboarding[202] also apply here. Similar to the automotive and communications sectors, systems development is driven by shorter development cycles but with larger development teams. For this reason, planning and estimation features are more relevant, as well as a users scalability features. Finally, communications development teams are generally also users of various PLM tools, such as Product Data Management (tracking bill of materials of hardware components) and Configuration Management tools (tracking both software and hardware components versions). As a result, integration with PLM tools is more relevant.

219. The in-depth investigation confirmed that in the telecom sector, customers generally choose from a large number of suppliers which includes DOORS, Requisite Pro, Borland Caliber, Serena RTM, 3SL Cradle, Siemens UGS TeamCenter Systems Engineering, IRQA, Speedreq, Ontopia Force, Omninet Omni Tracker, Enovia Matrix One, or they use (depending on the project at hand) relatively simple tools for Requirements Management purposes such as Microsoft Word and Excel[203]. The in-depth investigation confirmed, however, that for many customers DOORS remains the preferred tool of use.[204]

IT applications

220. Requirements Management needs for IT applications are driven by the need to capture, prioritize and track features that become part of the IT system's application's functionality and user interface[205]. Because the primary users of Requirements Management tools for IT application development are business users, ease of use, integration with Microsoft Office tools and price are all key criteria. Other important

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[200]   See e.g. the response by Conti of 22 November 2007 to question 56 of the Commission request for information. Conti refers to Requirements Management tools of Borland Caliber and MKS RM (no reference to IBM's tools).

[201]   See e.g. the response by Daimler of 8 November 2007 to question 59 of the Commission request for information on the issue of the closeness of substitution of the Requirements Management tools of IBM and Telelogic. "*We have not observed competition between IBM and Telelogic until now.[...] IBM tool suites are used for other purposes*". See also the responses by Conti and Audi, referred to in the previous three footnotes and the responses by Porsche of 30 October 2007 and HD Leopold Kostal of 31 October 2007 to question 54 of the Commission request for information.

[202]   Storyboards are graphic organizers such as a series of illustrations or images displayed in sequence for the purpose of previsualizing a motion graphic or interactive media sequence, including website interactivity.

[203]   See e.g. the response by AT&T of 2 November to question 60 of the Commission request for information. "*The majority of our development groups use MS/Excel or MS/Word to document, track and trace requirements*".

[204]   See e.g. the response by Motorola of 8 November 2007 to questions 59 and 62 of the Commission request for information: "*Doors from Telelogic is our preferred RM tool product. The Doors product is widely used in Motorola*". To a certain extent IBM's Requisitie Pro is also used: "*Requisite Pro has been selected [...] by acquired companies where this is a legacy product and conversion was considered too disruptive to the business. Generally speaking, users select Requisite Pro only, if they value the suite capabilities with other Rational Products. As a stand-alone product, Doors is superior and is our recommended RM solution.*"

[205]   See the submission of IBM of 20 November 2007.

criteria include support for Visual Storyboard (which gives the ability to create screen mock-ups to display user interface content and flow) and Storyboard simulation.

221. Requirements Management needs for the financial sector are somewhat similar to those of IT development. Compared to IT development done in other industry verticals, the financial sector is characterised by a high number of small, short-term projects. For this reason, scalability either in the number of users or requirements, or advanced features, such as requirements versioning or impact analysis, are less important. Conversely, storyboarding capabilities are more important as customers will often seek to validate the proposed new features with end-users prior to starting development.

222. In line with the specific characteristics of the market segments described above, the in-depth investigation showed a different product preference from the one described in relation to the system segment. Customers generally have a preference for IBM's Requisite Pro, while on many occasions they use other alternatives in parallel. These alternatives often do not include Telelogic's Requirements Management tools[206]. The in-depth investigation confirmed that even the use of relatively simple tools like Microsoft Excel and Word is common ground[207]. When both IBM's and Telelogic's Requirements Management tools are used in parallel, they tend however to be used for different purposes.[208]

223. In the light of the above, one can conclude that the in-depth investigation largely confirmed that the Requirements Management tools of IBM and Telelogic do not constitute close substitutes. In any event, even in those cases where some customers considered tools from both suppliers, the in-depth investigation showed that the risk of price increases by the merged entity post merger would be small as there is a sufficiently large group of other suppliers of Requirements Management tools with features similar to those of Requisite Pro on the market which would render such a price increase unprofitable.

Win/loss analysis for Requirement Management tools

224. The parties have also provided win/loss data regarding the supply of Requirement Management tools.[…]*. Therefore, the Commission relied on the information concerning Telelogic.

225. Unfortunately, the opportunity database concerning Telelogic for Requirement Management tools has too many caveats to allow an informative analysis. First, only […]* out of […]* opportunities, that is to say […]*, provide information on the actual or perceived competitors. Moreover, LECG has compared the industry distribution of the revenue corresponding to Telelogic's won instances in the win/loss database with the

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[206] See e.g. the response by ABNAMRO of 2 November 2007 to questions 54 and 59 of the Commission request for information and the response by the Dutch Tax authority of 1 November 2007 to questions 17, 54 and 56 of the Commission request for information,

[207] See the response by the Dutch Tax Authority of 1 November 2007 to question 17 of the Commission request for information. "*A lot of projects still capture their requirements using Word or Excel.*"

[208] See the response by Unisys of 7 November 2007 to question 58 of the Commission request for information: "*Rational Requisite Pro as part of the Rational Suite is used on engagements that involve a co-located team that is performing Application development. […] Telelogic's Doors is used on projects in an identical way to Requisite Pro however, it is brought into play with large distributed teams. In the development environment, Telelogic Doors is used exclusively to manage requirements across a portfolio of software, hardware, and system products developed by distributed teams.*"

industry distribution of Telelogic's overall Requirement Management revenues. The two sets of data look radically different.

226. In conclusion, the win/loss database for Requirement Management tools cannot be used to infer meaningful conclusions regarding the competitive constraint exerted by each party on the other.

Conclusion on closeness of substitution

227. On the basis of the primarily qualitative assessment above, it would appear that Telelogic's Requirements Management tools cannot be considered as close substitutes to IBM's Requirements Management tool Requisite Pro. For many systems development oriented sectors of industry, Telelogic's DOORS is close to an industry standard (e.g. aerospace and defence and automotive) for which there is no realistic alternative in terms of functionalities and overall performance. The other Telelogic's Requirements Management tools, are either not a genuine Requirements Management tool (Focal Point) or they lack functionalities (DOORS Fastrak). As a result, they are not close substitutes either.

228. In those cases where systems customers consider that realistic alternatives to Telelogic's DOORS exist, not only IBM's Requisite Pro, but also a variety of other tools are considered (e.g. Borland Together, Serena RTM, Siemens UGS TeamCenter), including basic general-purpose productivity tools such as Microsoft Word and Excel, as well as tools from relatively small companies. The use of Microsoft's products and other relatively simple tools is more common with Requirements Management tools' users than with users of Modelling tools.[209]

229. In the IT and financial sectors the use of Telelogic's Requirements Management tools is very limited especially as DOORS is considered too complex and too expensive. In these sectors, price plays a more important role than in the systems sector. In the IT and financial sectors customers have a strong preference for IBM's Requisite Pro and a large number of alternative suppliers of Requirements Management tools.

230. Even in those cases where customers consider that the Requirements Management tools of Telelogic and IBM are close substitutes, this would not allow the merged entity to increase prices post merger.

VII.2. Decreased incentives for innovation

231. In the decision to initiate proceedings, it was noted that some customers voiced concerns that there would be less innovation as a direct consequence of the lack of effective competition in Requirements Management and Modelling tools after the proposed concentration. Therefore, in the course of the in-depth investigation, the Commission has examined whether or not the merged IBM/Telelogic would have reduced incentives to innovate in comparison to the incentives of IBM and Telelogic separately (that is to say in the absence of the notified transaction).

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[209]   This can be explained by the fact, that depending on the level at which a company wishes to trace and follow up its requirements, the activity itself is relatively simple and therefore does not necessarily require the use of complex tools.

232. The notifying party claims that customer needs, rather than the competition between IBM and Telelogic, has been, and will continue to be, the most important driver for innovation in the software development tools area.

233. In this respect, the notifying party explains that the evolution of IBM's and Telelogic's tools in the recent years has followed different paths. While IBM has focused its investment towards the development of Modelling tools for IT software development (e.g.[…]*), Telelogic's investment in Modelling has focused on the development of tools for systems software development (e.g.[…]*). IBM also submits that Telelogic's most important innovations in recent years have been the result of consultations with customers.

234. The notifying party therefore explained that it expects to increase its efforts with regard to innovation in the near future. In this regard, IBM stated that it *"has already planned to increase the R&D spending for Telelogic's products following the acquisition. Indeed, Telelogic's 2006 R&D expenditures amounted to around US$ […]* million, while the business case for the acquisition forecasts an increase in R&D spending up to US$ […]* million in 2008, and up to US$ […]* million by 2012".*[210]

235. Furthermore, IBM argues that open-source tools (e.g. CVS, Subversion, Bugzilla, JIRA or Trac) are increasingly being used by small and medium business development teams, including autonomous small teams within large enterprises.

236. Finally, IBM contends that innovation is necessary to survive in the rapidly changing software sector and that this will continue to be the case following the transaction[211]. The example of IBM's Rose products indicates that even a leading tool's sales may decrease […]* in a relatively short period of time if it does not fulfil the customers' new needs.

237. The in-depth investigation first confirmed that competition between IBM and Telelogic has not been a major driver for innovation in the recent past. Although some customers mentioned that competition between IBM and Telelogic has been positive for innovation, a large majority of the respondents to the market investigation explained that innovation in the software development industry has been spurred by the evolution of Modelling languages (in particular the creation of the standardised UML language) and the ever increasing needs of customers[212], notably those focusing on systems software development.

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[210] See the submission of IBM of 24 September 2007 on concerns expressed by customers during the market test relating to IBM's management of Rational.

[211] For example, as regards Modelling, IBM submitted that […]* has developed better […]* support than[…]*; that […]* has made much better use of internet technology than[…]*; and that TNI has developed a very successful gateway product to migrate information between different products. With respect to Requirements Management IBM submitted that MKS and IRqA are examples of companies who have successfully increased their presence by developing state-of-the-art user interfaces.

[212] For instance Siemens, in its response of 2 November 2007 to question 82 of the Commission request for information to customers, asserted that *"The innovation was more driven by the demands of the market then by the competition between IBM and Telelogic. Neither of them can currently completely fulfil the demands yet. IBM was more focused on the web application market and Telelogic more on the system development market. Since we offer products in both markets we are hoping that a combined effort will match our expectations better than a separate offering".*

238. In this regard, customers specialised both in IT software and in systems software confirmed that competition is mainly driven by customers' needs. Boeing, which focuses on systems software development, submitted that it *"does not believe the competition between these companies has necessarily driven innovation with respect to Modelling. Competition has been driven by customer needs as well as by improved standards for UML"*[213]. As regards Requirements Management tools, Boeing also submitted that competition between the parties was not a significant driver for competition.[214]

239. CSC, which focuses on IT software development, explained with respect to Modelling tools that *"neither IBM or Telelogic have dominated the Modelling tools market and both have had to innovate in respect to competition from other vendors in the market place. To the best of CSC knowledge based on current indications, there seems to be no sign that the acquisition of Telelogic by IBM will extinguish innovation within the marketplace due to the number of suppliers"*[215]. CSC submitted a similar reply as regards Requirements Management tools. Other customers active in telecoms[216], electronics[217], energy[218], banking[219] and IT consultancy[220] confirmed that competition between IBM and Telelogic has not been a significant driver for innovation in the past.

240. The in-depth investigation also revealed that although open-source products do not seem to directly compete with IBM's and Telelogic's Modelling and Requirements Management tools, further development of open-source offerings for these two categories of tools is expected in the near future. This should directly contribute to more innovation in the coming years, as suppliers of commercial software would need to add new features to their products in order to justify the price differences between their products and the open-source products.

241. According to a study commissioned by the European Commission,[221] open-source software *"potentially saves industry over 36% in software R&D investment that can*

[213] See for instance the response by The Boeing Company of 7 November 2007 to question 49 of the Commission request for information to customers.

[214] *"Boeing has not seen this competition as a main driver for innovation in these suppliers' Requirements Management products"* (response by The Boeing Company of 7 November 2007 to question 83 of the Commission request for information to customers).

[215] See for instance the response by CSC Computer Sciences of 5 November 2007 to question 49 of the Commission request for information to customers.

[216] See for instance Siemens and Infineon (response of 2 November to questions 49 and 83 of the Commission request for information to customers).

[217] For instance Texas Instruments manifested that it *"is unaware of any instance or example of competition between IBM and Telelogic being an important driver for innovation with respect to Requirements Management tools in the past 3 years."* (Response of 8 November to question 83 of the Commission request for information to customers).

[218] For instance AREVA T&D Automation answered that *"I believe that IBM has become less competitive in the area of Modelling tools and Telelogic have been pushed by other vendors to enhance their products"* (Response of 16 November to question 49 of the Commission request for information to customers).

[219] For instance RBS stated *"We have no reason to suspect that the competition between IBM and Telelogic has been a significant driver for innovation"*, both for Modelling and Requirements Management (response of 2 November to questions 49 and 83 of the Commission request for information to customers).

[220] For instance UNYSIS Corp. answered *"We do not believe this competition has been a driver for innovation at all."* (Modelling) and *"We are not aware that this competition has spurred innovation"* (Requirements Management). Response of 7 November to questions 49 and 83 of the Commission request for information to customers.

[221] *"Study on the: Economic impact of open source software on innovation and the competitiveness of the Information and Communication Technologies (ICT) sector in the EU (Final report)"*. Prepared by

result in increased profits or be more usefully spent in further innovation". The study highlights the considerable evidence on the relationship between open-source software development, innovation and the ICT industry and concludes that open-source software *"provides far more diffusion of technology than proprietary software, especially to potential future innovators who are not faced with the search costs of locating sources of new innovation buried within proprietary software"*.

242. Finally, as has been demonstrated above, both with respect to Modelling and with respect to Requirements Management tools, IBM's and Telelogic's products are not close substitutes in terms of the functionalities that they provide and the customer groups they primarily target. This is notably due to the fact that IBM's focus is on IT applications, whereas Telelogic's focus is on systems software development customers. Therefore, the products of IBM and Telelogic generally address different types of customers, or different types of needs.

243. In view of the foregoing, it can be concluded that the proposed transaction is unlikely to diminish the pace of innovation in the markets for Requirements Management and Modelling tools in the near future.

VII.3.   Decrease in interoperability of software tools

VII.3.1. *Non-horizontal non-coordinated effects: Foreclosure through decrease in interoperability of software tools*

244. The decision to initiate proceedings preliminary concluded that the proposed transaction raised serious doubts as to its compatibility with the common market notably because the merged entity would have less incentive to provide open interfaces that allow integration with third parties' software development tools. IBM would find less need to "complement" its own software development tools offering with compatible offerings from third party vendors, and would therefore have less incentive to provide access to its software interfaces to third party vendors.

245. In particular, one competitor of the parties (Microsoft) advanced the argument that the merged entity would have the ability and the incentive to foreclose its competitors on the markets (or market segments) for IDEs, SCCM servers, and Application Server Software Platforms ("ASSP")[222].

246. More specifically, Microsoft argued that the merged entity would have the ability to withhold interoperability information for its Requirements Management and Modelling tools from competing vendors of SCCM, IDEs and ASSP products. This would amount to a technical tie of the merged entity's SCCM, IDE and ASPP products to its Requirements Management and Modelling tools. According to Microsoft, the merged entity would also have the incentive to do so because it would allow it to leverage its market power in the markets for Modelling and Requirements Management tools, brought into existence by the merger, into the adjacent markets for SCCM, IDE and ASSP.

Rishab Aiyer Ghosh (MERIT) on 20/11/2006. (http://ec.europa.eu/enterprise/ict/policy/ict/2006-11-20-lossimpact.pdf)

[222]   Microsoft's submissions of 26 October 2007, 23 November 2007 and 14 January 2008.

247. In accordance with the Guidelines on the assessment of non-horizontal mergers[223], the Commission has therefore firstly examined[224] whether the merged entity would, post-merger, have the ability to substantially foreclose access to the parties tools by withholding interoperability information for its Requirements Management and Modelling tools from competing vendors of SCCM, IDEs and ASSP products inputs. Second, the Commission has examined whether the parties would have the incentive to do so, and third, whether a foreclosure strategy would have a significant detrimental effect on competition.

VII.3.1.1.   Ability to foreclose

Technical tying

248. IDEs are used to produce code in a programming language that can later be compiled for the desired run-time platform, that is to say brought into a form that can be executed (or run) on the target computer system. In the context of the software development lifecycle, IDEs play a role after requirements have been fixed and the target software has been modelled. In a sense, programming just fleshes out the models created by Modelling tools.

249. In general terms, ASSP allow the hosting of applications that deliver services over networks. For example, online banking applications or e-commerce applications may be hosted on specialised application servers. Normally, such a server interacts with the user through components very similar to web servers. These use internet technology (such as the Hypertext Transfer Protocol, HTTP) to present a graphical interface of the application to the user and to receive input from the user. Prominent examples of application server platforms include IBM's WebSphere product and Sun's Java Enterprise Edition. ASSP are important close to the end of the software development lifecycle. Once application software for use over a network has been coded in an IDE and has successfully passed all tests to establish its compliance with all applicable requirements, it has to be deployed, that is to say put into production on an ASSP. It is important to note that only a fraction of all software that is developed will need an ASSP to be deployed. Much software is either intended to be run directly on a user's computer, that is to say without the need for a network link between the user and the application. Other software runs directly on specialised hardware and does not require being accessible through general-purpose networks such as the internet, e.g. software that can be found in missiles, satellites, on-board computers in cars, etc.

250. SCCM servers allow teams of developers to collaborate simultaneously on different phases of the software development lifecycle. For example, programming code produced in an IDE is "checked into" a database that keeps track of different versions and ensures that a programmer who wants to work on a specific section of the code receives the most up-to-date version of this section. The server also ensures that several people do not check in conflicting versions of the same section of software code. SCCM servers can also be used to store models created with Modelling tools. This allows the different members of the development team to collaborate on the models without the danger of creating diverting versions. In a similar manner SCCM servers can provide collaborative advantages for other tools used in the software development lifecycle.

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[223]   http://ec.europa.eu/comm/competition/mergers/legislation/nonhorizontalguidelines.pdf
[224]   In line with the Commission Guidelines on the assessment of non-horizontal mergers.

251. Software development is made easier if IDEs can directly access models created with Modelling tools and extract information from them. ASSP obviously are only useful if they can run the code produced in IDEs. For SCCM servers to be useful, the server must be able to handle the different types of information involved and to have a certain degree of "knowledge" about their content. Requirements Management is much more powerful if a requirement can be directly linked to a specific part of a model and to a specific section in software code than if no technical, persistent link between the two could be established. All these examples show that a (varying) degree of interoperability[225] between the different tools that can be used during the software development lifecycle has many advantages for developers and is therefore very much in demand on the market for such tools.

252. The merged entity will offer products in all main market segments servicing the software development lifecycle. Microsoft alleges that the merged entity would have the ability to foreclose its competitors through a technical tie achieved by withholding information needed for interoperability from its competitors. For example, the merged entity would not tell competing vendors of SCCM, ASSP and IDE tools how their products could interact with the merged entity's offering of Requirements Management and Modelling tools.

253. Firstly, it should be observed that the degree of interoperability needed in relation to Modelling and Requirements Management tools varies depending on the type of tool that wants to interoperate with them. For example, hardly any interoperability is needed between Modelling and Requirements Management tools and ASSP. At best, therefore, the merged entity could achieve only an indirect effect on ASSP competitors even if it would succeed in largely preventing interoperability between Modelling and Requirements Management tools and SCCM and IDE which normally lie between the two from a flow of information perspective.

254. Depending on the sophistication of the employed tools, necessary interoperability between IDEs and SCCM on the one hand and Modelling and Requirements Management tools on the other hand can be quite basic. For example, it may suffice that SCCM servers just store, manage and distribute files containing information about models but would not need any knowledge about their internals. The same can be true for IDEs because each individual programmer only needs to know a very small part of an overall model and therefore might not require automatic extraction of information from models as his own ability to visibly inspect a model may be sufficient. Requirements Management tools typically come with their own server and database and thus do not have to rely on SCCM servers to allow collaborative work. There is also no indication that the direct linking of requirements to software code or model parts beyond a simple mapping of requirements to procedure names or file names is widespread in the industry. As the underlying database technology is largely standardised, there is thus not a lot of interoperability information that could possibly be withheld.

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[225]   "Interoperability" exists if complete and accurate specifications for all the technical means that are used to exchange information between different software products and to mutually use the information which has been exchanged are available. This concept can pertain to both communication protocols (answering the question "How is specific information communicated between different instances of software products?") and file formats (answering the question "How is specific information recorded in a computer file?").

255. To the extent that these considerations are taken into account, it can nevertheless be concluded that the merged entity would have the ability to withhold interoperability information for its Modelling and Requirements Management tools from competing vendors of SCCM, ASSP and IDE products. This is simply a technical observation because the merged entity, for example, could choose to introduce a proprietary, non-standardised and non-disclosed way of storing models in files or storing data in databases. Any software vendor whose product's output must somehow become the input for other software products in principle has this ability.

256. There are, however, certain characteristics of the implicated products that influence the impact that any such withholding of interoperability information could have. As has been shown above, Modelling and Requirements Management tools are very often employed on a project by project basis, that is to say it is very unusual that there is a switch in tools in the middle of a project. Naturally, any change regarding the interoperability properties of its Modelling and Requirements Management tools can only concern versions of this software sold in the future, that is to say for new projects. Typically, interoperability is one of the issues customers are very interested in, precisely because in software development different tools have to work together. As has been established above, there is a large number of competing Modelling and Requirements Management tools for most economic sectors. Therefore, the technical ability to withhold interoperability would be limited to new projects.

VII.3.1.2.   Incentive to foreclose

Markets of tying products

257. Microsoft's theory of harm could only be correct in the case where the merged entity enjoys market power with regard to the technically tying products which are in this case the Modelling and Requirements Management tools. As has been set out in previous parts of this decision, in view of the characteristics of competition on the affected markets, the merger would not increase the market power for the acquiring party. Thus, even if the merged entity would enjoy market power for these products, which is not the case, the same would be true for IBM alone. Consequently, even if the merged entity would have the incentive to engage in a foreclosure strategy, such an incentive would not have been brought about by the merger.

258. As has been established above, in many market segments the parties have several viable competitors. In other market segments Telelogic's tools are essentially a class of their own, that is to say they do not compete with IBM's offerings. Therefore the merger does not make success of the foreclosure strategy outlined by Microsoft more likely in that by removing two Modelling (Rhapsody and TAU) and one Requirements Management tool (Doors) to which customers might have switched in view of a lack of interoperability.

259. Telelogic itself is a rather small company but it has a significant market share in the market segments for Modelling and Requirements Management tools. Therefore, there is no reason to think that large companies with substantial profits, such as Microsoft itself, would not be able to bring to market replacements of the merged entity's tools, should the merged entity try to force its customers to abandon competing vendors' products in related market segments. This would profoundly change the structure of these markets. The in-depth investigation has not shown particular technical barriers to

entry into the markets for Modelling and Requirements Management tools[226]. This shows that engaging in the described foreclosure strategy could be a rather dangerous undertaking for the merged entity because it could prompt new competitors to enter the markets in which it is active.

260. A few very specific and specialised sectors exist, mostly in the automotive and aerospace and defence industries, where the number of viable competitors is smaller. Typically the projects in these sectors are very large projects in which the cost of software only plays a minor role. These projects also typically require software support spanning decades. Managers of such projects carefully select the software tools they want to use. They are also the most demanding customers, often requiring customisation of software to their specific needs. It is difficult to see how the merged entity under these circumstances could hope to sell a Modelling or Requirements Management tool that is not interoperable beyond the merged entity's own product portfolio. Even if the main functionality of these tools was to the satisfaction of the user, the purposeful and enforced lack (and potentially the denial) of interoperability could just be seen as missing critical functionality.

Markets of tied products

261. It also has to be borne in mind that the merged entity would have less than a 30% market share in the markets for both IDEs and ASSP products. There are similarly sized competitors on both markets. As regards SCCM products, IBM's market share alone is in the range of 45%, while Telelogic would only add a market share of less than 5%. Two other competitors have market shares in the range of 20%. Customers in these segments therefore have a sufficient choice from different vendors and there is no indication that they would be willing to switch products in strategic categories such as ASSP and abandon their previous choices only to be able to use a specific Modelling tool or a specific Requirements Management tool.

262. An additional factor supporting this finding is the fact that at least the markets for ASSP and IDEs are much larger than the Modelling and Requirements Management markets[227]. The merged entity's Modelling and Requirements Management tools would therefore have to be completely indispensable and non-substitutable even in the medium

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[226]   In this regard, in its response of 21 November 2007 to question 44 of the Commission request for information to competitors, Artisan replied that *"There are significant barriers to gaining necessary expertise, but no generic technical barriers for developing a new Modelling tool"*. Sybase, another competitor, in its response of 28 November 2007 to question 44 of the Commission request for information to competitors, replied that *"Sybase does not think there is any specific barrier outside of the R&D effort cost"*. Kennedy Carter, while recognising that *"There are few technical barriers to the development of a graphical Modelling tool"*, concluded that *"There are nevertheless a number of initiatives that are reducing the overall barriers to the development of new solutions. Eclipse provides access to a number of tools that could be used to build a complete solution around a Modelling tool. For example, a number of open source initiatives using Eclipse have started to make code generators available for "standard" UML Modelling tools. Similar benefits in using Eclipse-based tools could be achieved by tool vendors interested in developing non-UML Modelling tools"* (response of 2 November 2007 to question 44 of the Commission request for information to competitors).

[227]   Gartner estimates the value of the worldwide Modelling market at 245.7 US$M (Source: *"Gartner Dataquest, Application Development and Project and Portfolio Management Software"*, 2006) and the value of the worldwide Requirements Management market at 171.1 US$M (Source: *"Gartner Dataquest, Application Development and Project and Portfolio Management Software"*, 2006, […]*), in 2006. On the other hand, the market for ASSP accounts for 4,524.1 US$M (Annex I to Microsoft's submission of 23 November 2007).

term to force customers to switch products in other segments. For example, in most scenarios it would be much cheaper to rewrite existing interfaces to re-establish interoperability with the merged entity's products (assuming that such interoperability had previously been denied according to Microsoft's theory) than to perform a very costly switch. After all, such a switch, for example in the ASSP category is costly not only because new software products have to be procured, but also because of new training costs, disruption of service, incompatibilities with existing application software etc. On the other hand, the adaptation of interfaces, if it is possible at all, would require at most the work of a small number of engineers and would have no impact on others' work.

263. It also has to be pointed out that ASSP products, and, to a lesser extent, also IDE products, play a much smaller role in the market segment of the development of (especially embedded) systems than they do for the development of IT applications. The reason for this with regard to ASSP products is that an embedded system comes with its own platform and does not need a general purpose platform like WebSphere from IBM, or Microsoft's or Oracle's platforms to be deployed on. The reason for this with regard to IDEs is that embedded systems typically have no user-interface and are built on special purpose hardware that allows software Modelling to progress to a much more detailed level. As a result, automatically generated code only needs to be treated in a limited way which involves much less use, if any, of IDEs. Since Telelogic's products to a very large extent target this market segment for systems development, the proposed transaction will not significantly alter IBM's current ability to leverage its position in the Requirements Management and Modelling markets into the markets for ASSP and IDEs products.

Past behaviour

264. Given that IBM's IDE, Eclipse, is an open-source offering, it is difficult to see how IBM could be able to strictly enforce the use of its own Modelling and Requirements Management tools only with Eclipse but not with Microsoft's Visual Studio or other IDEs. It runs contrary to the whole idea of an open-source development platform, open for third parties to extend its functionality via "plug-ins", to require its use by technically tying it to proprietary, commercial software products. Eclipse and IBM's ASSP product, WebSphere, are currently based on open standards, largely Java, for which a plethora of tools on all stages of the software development lifecycle is available from other vendors. Facing new constraints or restrictions from the merged entity, its current customers would therefore have the ability to switch to other suppliers. Any hope of successfully implementing a foreclosure strategy implies a large-scale turn-around in IBM's business model with regard to the tools under discussion. There is no indication in the internal documents of the parties that such a strategy had even been remotely considered by IBM as a rationale for the acquisition of Telelogic.

265. Microsoft also mentions that it had plans to offer interoperability between Telelogic's Requirements Management product, Doors, and its own SCCM product, but that Telelogic had stopped the relevant talks shortly before IBM announced its takeover offer. Microsoft portrays this as a first indication that IBM is actually beginning to engage in a foreclosure strategy.

266. However, Microsoft's SCCM offering has a very small market share in the SCCM server market. It is therefore clear that it is hardly Telelogic's or even the merged entity's first priority to ensure that Doors also works with Microsoft's SCCM product. In this respect,

it is noteworthy that Microsoft does not allege that Doors is not interoperable with the much larger offerings from third parties on the SCCM market, e.g. those from Computer Associates or Serena.

VII.3.1.3.   Costs and benefits

267. The costs of engaging in such a strategy include (a) lost sales on the tying products when customers decide not to become locked in; (b) lost sales on the tying products when competitors decide to enter the markets to satisfy demand for interoperable high-end tools; (c) lost sales on the tied products (IDE, ASSP, SCCM) when customers decide to switch away from any of the merged entity's product for fear of becoming even more locked-in in the future; (d) a general loss of good-will, especially in view of IBM's past behaviour in the markets concerned that has been rather open to interoperability and open standards. Every single one of these four categories of costs is potentially substantial; none of them can be prevented from the outset.

268. Potential benefits, on the other hand, lie in increased sales of the tied products. These would come about if the foreclosure strategy would be effective and customers who would otherwise have used other companies' IDE, ASSP and SCCM offerings switch over to the merged entity's products in these categories in order to be able to (continue to) use the merged entity's Modelling and Requirements Management tools. As has been pointed out above, the group of customers who would most likely feel a need to continue to be able to use Doors or Rhapsody (instead of switching to competing Modelling or Requirements Management tools) are also the biggest customers with specialised requirements and extended service periods. They care less about the prices of the software they buy than about its functionality and usability. These customers are therefore best-placed to exert countervailing buyer power over the merged entity. As it happens, these customers, because they are largely concentrated in the area of systems development, are also the least likely to use general purpose IDEs (such as Eclipse) or to even need an ASSP product. Consequently, the potential benefit of a foreclosure strategy is rather limited and it is not at all clear whether such a benefit could be achieved at all.

VII.3.1.4.   Conclusion on interoperability

269. In light of the above arguments, an overall assessment of the likely impact on prices and choice of a hypothetic foreclosure strategy followed by the merged entity leads to a clear conclusion. The characteristics of the markets for Modelling and Requirements Management tools, especially for high-end tools in these two markets, rule out a successful foreclosure strategy. While it would not be a problem technically to obscure communication protocols and file formats to thwart interoperability, the merged entity would have no incentive to engage in such a strategy because the potential costs far outweigh the potential benefits.

VIII.   CONCLUSION

270. For the reasons set out above, it is concluded that the proposed concentration would not significantly impede effective competition in the common market or in a substantial part of it. The concentration should therefore be declared compatible with the common market and the EEA agreement,

HAS ADOPTED THIS DECISION:

Article 1

The notified concentration whereby International Business Machines Corporation acquires sole control within the meaning of Article 3(1)(b) of Regulation (EC) No 139/2004 of the undertaking Telelogic AB is hereby declared compatible with the common market and the EEA Agreement.

Article 2

This Decision is addressed to:

**International Business
Machines Corporation**
1 New Orchard Road
Armonk, NY 10504-1722
United States of America

Done at Brussels, 05/03/2008

       For the Commission
      Signed by
      Neelie KROES
      Member of the Commission