PATENTS ACT 1977

APPLICANT   Intel Corporation

ISSUE   Whether patent application number GB
0407203.9 complies with section 1(2)

HEARING OFFICER   P Marchant

DECISION

Introduction

1   Patent application number GB 0407203.9 entitled "Method and Apparatus for Performing Compiler Transformation of Software Code using Fastforward Regions and Value Specialization", was filed on 30 August 2002 in the name of Intel Corporation. The application claims priority from an earlier United States application with a date of 29 September 2001.

2   The application concerns a method and apparatus for processing software code to generate executable code. This is the operation generally known as compilation. The present invention is concerned with a particular method of compilation which results in more efficient executable code. In its broadest aspect it replaces a section of code with code defining the result of processing that section of code with specific values. So-called "value specialization". This approach is feasible when it is possible to predict that the section of code will return the specific value most of the time. This obviously results in faster code, but will not always produce the correct result. Some control action must be provided to put processing back on track when the specific value that has been selected turns out to have been wrong. The efficiency improvement lies in arranging that the increased overhead resulting from carrying out the control action is less than the gain in speed from value specialization.

3   In his examination reports of 31 January 2005 and 7 November 2005, the examiner objected that the subject matter of the application was unpatentable, being excluded by section 1(2)(c) of the Act because it relates to a method of performing a mental act, or to a computer program. The applicant's agent replied arguing to the contrary, that: "… the claimed invention does not relate to an abstract mental method or computer program but rather relates to the timing when value specialization is undertaken. The resultant increase in

efficiency with which the final program can be executed either gives rise to an increase in the speed of which a program is executed or alternatively reduces the overhead necessary for executing the program at runtime." The agent enlarged on this in a further letter of 28 February.

4   The difference of view between the examiner and the applicant remained unresolved, and the matter came before me at a hearing on 6 June 2006 at which the applicant was represented by Mr Keith Beresford, Mr Nicholas Fox and Mr Philip Walker, all of Beresford & Co. The case was presented primarily by Mr Fox, with Mr Beresford in addition making some key points.

The Invention

5   Claim 1 was amended during prosecution by the introduction of various clarifying amendments, and now reads:

> 1)   *A method of processing software code to generate executable code, said method comprising:*
>
> *processing software code to identify one or more sections of software code suitable for processing to determine values utilised when said sections of code are executed;*
>
> *selecting one or more of said identified sections of software code identified as being suitable processing to determine values utilised when said sections of code are executed;*
>
> *executing said software code to determine a value profile for each of said selected sections of software code comprising data defining values utilised by the section of software code when the section is executed;*
>
> *generating further software code in which one or more of said selected identified sections of software code are replaced with code defining the result of processing said sections utilising values from the value profiles determined for said sections; and*
>
> *generating executable code by compiling said generated further software code.*

6   Appendant claims 2 to 4 refer to particular methods of determining values to make the substitutions referred to in claim 1.

7   In a more detailed aspect of the invention, it is explained that two processing streams of code are produced; the value specialized code and checker code, and that the two streams are processed at the same time by separate processors in multi-threaded execution. Claim 5 relates to the production of checker code alongside the fast forward code for multi-threaded operation and claims 6 and 7 relate to "assert" and "abort" codes which are necessary to control multi-threaded operation.

8   Claim 8 is appendant to claims 1 to 4 and relates to a further method of generating fast forward code by creating biased branches. Claims 9 and 10 relate to the identification of sections of code for processing, and claim 11

relates to further optimisation of code by removal of redundant instructions. Claims 12 to 22 are apparatus claims corresponding to the method claims 1 to 11. Claim 23 relates to a computer program which operates in accordance with the method or apparatus of the previous claims.

9   The applicants have explained during the proceedings that the multi-threaded activity is similar to that which occurs in a "slipstream" processor. A slipstream processor uses multi-threaded operation to process already compiled code at run-time. It identifies areas of code which can be accelerated by eliminating redundant instructions and by making assumptions about the outcomes of branches in the program etc., and runs that code as an "advanced" stream on one processor core. It runs the unmodified version of the code on another processor core as a "redundant" stream. The redundant stream checks the results of the advanced stream and corrective action is initiated if it turns out that a false assumption has been made. The redundant stream uses results from the advanced stream to speed up its own operation.

10   The present invention provides a similar effect but operates on the code at compile-time rather than run-time. This is advantageous in that the time taken to carry out compilation is not critical and because the system can make use of information throughout the original code in carrying out the compilation. It can therefore perform more extensive optimisation than is possible at run-time.

11   The applicant had filed an explanation of the technology, prepared by a Professor Finkelstein. Mr Fox took me through it and I found it useful background, in particular the explanation of the difference between the present invention and slipstream processors.

The Law

12   The provisions in the Act relating to excluded matter are in section 1(2) which reads:

> *Section 1*
>   *(1) A patent may be granted only for an invention in respect of which the following conditions are satisfied, that is to say-*
>
>   *(a) the invention is new;*
>
>   *(b) it involves an inventive step;*
>
>   *(c) it is capable of industrial application;*
>
>   *(d) the grant of a patent for it is not excluded by subsections (2) and (3) or section 4A below;*
>
>   *………*

> *(2) It is hereby declared that the following (among other things) are not inventions for the purposes of this Act, that is to say, anything which consists of -*
>
> > *(a) a discovery, scientific theory or mathematical method;*
> >
> > *(b) a literary, dramatic, musical or artistic work or any other aesthetic creation whatsoever;*
> >
> > *(c) a scheme, rule or method for performing a mental act, playing a game or doing business, or a program for a computer;*
> >
> > *(d) the presentation of information;*
>
> *but the foregoing provision shall prevent anything from being treated as an invention for the purposes of this Act only to the extent that a patent or application for a patent relates to that thing as such.*

13   It is invariably emphasised in Patent Office decisions relating to patentability that these exclusions only apply to the excluded matter "as such" and that the provisions in the Patents Act are stated in section 130 to be formulated so as to have the same effect as the equivalent provisions of (inter alia) the European Patent Convention ("EPC"), that is to say, Article 52 paragraphs (1), (2) and (3) of the EPC; and I make the same observations here. However these aspects played a more forceful than usual part in the representations made to me at the hearing, and I consider those representations below.

European law

14   Mr Fox said that the law to be applied in cases of excluded matter was primarily the EPC as interpreted by the European Patent Office ("EPO") Boards of Appeal. He based this view on comments, such as those made by Nicholls LJ in *Gale's Application* [1991] RPC 305, as to the importance of harmonisation between the UK Courts and the European Patent Office in interpreting these exclusions. Nicholls LJ said:

> "…it is of the utmost importance that the interpretation given to section 1 of the Act by the courts in the United Kingdom, and the interpretation given to Article 52 of the European Patent Convention by the European Patent Office, should be the same. The intention of parliament was that there should be uniformity in this regard. What is more, any substantial divergence would be disastrous. It would be absurd if, on an issue of patentability, a patent application should suffer a different fate according to whether it was made in the United Kingdom under the Act or was made in Munich for a European Patent (UK) under the Convention. Likewise in respect of opposition proceedings."

15   Mr Fox made the point that 80% of the patents in force in the UK are ones that have been prosecuted through the European route rather than through the UK Patent Office. He urged me to pay heed to and follow the EPO Guidance for Examiners which he considered to be an authoritative statement of the current law under the EPC.

16   I think the proper position is that in assessing patentability, I must have regard primarily to the Patents Act, and to the precedents on its interpretation provided by judgments of the UK courts. By following the guidance in these judgments, I shall be taking into account EPO decisions to the extent intended and approved by the UK courts. Decisions of the EPO Boards of Appeal are of persuasive value and to the extent they are consistent with the interpretation applied by the UK courts, I can also take them into account directly. I do not think it is appropriate for me to step outside that framework and consider the EPO Guidance for Examiners as a source of the law to be applied in the present case. It is not, as is confirmed in paragraph 3.2 of its "General Part", viz: "It should be noted also that the Guidelines do not constitute legal provisions. For the ultimate authority on practice in the EPO, it is necessary to refer firstly to the European Patent Convention itself including the Implementing Regulations and the Rules relating to Fees, and secondly to the interpretation put upon the EPC by the Boards of Appeal and the Enlarged Board of Appeal." I will decline Mr Fox's invitation to take the EPO Guidance for Examiners into account.

Has the CFPH judgment changed the landscape?

17   Mr Fox based his presentation on the law primarily on the judgment in *CFPH*[1]. In that judgment, Mr Peter Prescott QC sitting as a deputy judge noted that different approaches had been used historically by the EPO and by the UK courts in making assessments of patentability, and that those approaches had varied from time to time. He evidently sought to suggest a more rigorous test than what was currently in place. In his judgment he said, from paragraph 94:

> "94. To that extent I believe the EPO is right no longer to apply the "technical contribution" test. Properly regarded, that was a two-stage test that identified what was new (not disclosed in the past) and then asked whether it was 'technical' (i.e. not excluded from patentability). But it cannot be right to stop there. The new advance also must not have been obvious to those skilled in the art and that too must be under the description 'technical' (i.e. not excluded from patentability). In practice it may not be useful to consider whether something is an 'invention' without considering whether it is new and non-obvious. Much the same thing was said by the House of Lords in *Biogen Inc v. Medeva plc* [1997] RPC 1, 42.
>
> 95. A patentable invention is new and non-obvious information about a thing or process that can be made or used in industry. What is new and not obvious can be ascertained by comparing what the inventor claims his invention to be with what was part of the state of the existing art. So the first step in the exercise should be to identify what it is the advance in the

1 *CFPH LLC's Application* [2005] EWHC 1589 (Pat)

art that is said to be new and non-obvious (and susceptible of industrial application). The second step is to determine whether it is both new and not obvious (and susceptible of industrial application) under the description 'an invention' (in the sense of Article 52). Of course if it is not new the application will fail and there is no need to decide whether it was obvious."

18   The two stage test proposed by Mr Prescott has been adopted by the Patent Office for the purposes of examiner assessments of patentability, as was explained in the Patent Office Notice: "Patents Act 1977: Examining for Patentability" issued in July 2005. It was employed by the examiner in the present case.

19   Mr Fox was concerned that the comments of the deputy judge should be interpreted correctly and should be placed in the appropriate historical context. He had 3 main issues to canvass. Firstly that the test introduced in *CFPH* did not replace the technical contribution assessment, but provided a new formulation for it. Secondly that the exclusions only applied to the excluded matter "as such" and that the criterion for assessing whether an invention relates to excluded matter as such or to something extra, is the existence of a technical effect. That was the position before *CFPH* and Mr Fox's view was that it remains unchanged after *CFPH*. Thirdly, what is to be understood by "as such", and "technical effect".

20   To set the *CFPH* judgment in context, Mr Fox took me to the *Merrill Lynch*[2,] *Vicom*[3] and *Fujitsu*[4] judgments in which the "technical contribution" test had been developed, including the consideration that a technical effect is required to save an invention which lies in an excluded area from being unpatentable. He then considered a number of recent cases; *Halliburton*[5], *Shopalotto*[6], *Crawford*[7], *RIM v Inpro*[8] and *Sun Systems*[9], to demonstrate his contention that the *CFPH* test had not swept the previous case law aside.

21   Leaving aside the *Sun* case which is a decision by a hearing officer in the Patent Office and creates no precedent, in these judgments a number of High Court judges have considered the matter and have made it clear that the *CFPH* approach is consistent with the previous one. In the *Halliburton* judgment, which was handed down on the same day as *CFPH*, Pumfrey J said in paragraph 213:

> "…The majority of the English decisions (in particular …" (and he lists *Merrill Lynch*, *Fujitsu*, and *Gale*) "..along with EPO decisions such as …" (*Vicom*) "…support a "contribution" approach. What has the inventor contributed to the art as a matter of substance? Does it lie in excluded matter, or does it amount to a "technical" contribution or effect?

2 *Merrill Lynch's Application* [1989] RPC 561
3 *Vicom / ComputerRrelated Invention* T208/84
4 *Fujitsu Limited's Application* [1997] RPC 608
5 *Halliburton Energy Sevices, Inc v Smith International* [2006] RPC 2
6 *Shopalotto Ltd's Application* [2006] RPC 7
7 *Crawford's Application* [2006] RPC 11,
8 *Research in Motion UK Ltd v Inpro Licensing* [2006] EWHC 70
9 *Sun Microsystems Inc's Application* BL O/057/06

And later in paragraph 215:

> "…I think the law is, as I have indicated, clear, albeit difficult to apply: the contribution the inventor makes must lie in a technical effect, and not merely in excluded subject matter."

22   In *Crawford's Application*, as Mr Fox pointed out, Kitchin J said in paragraph 11:

> "Mr Tappin, who appeared on behalf of the Comptroller, told me that the UK Patent Office intends to follow the approach in *CFPH's Applications* in the future. For my part I do not detect any difference in substance between this approach and the conclusion expressed by Pumfrey J in *Halliburton*.   Nor do I believe it to be inconsistent with the decision of the Court of Appeal in *Fujitsu*.   At the heart of all these decisions is the consistent principle that an inventor must make a contribution to the art (that is to say the invention must be new and not obvious) and that contribution must be of a technical nature (susceptible of industrial application and not within one of the areas excluded by Art 52 (2))"

23   In *Shopalotto Ltd's Application*, Pumfrey J said, in the sentences bridging paragraphs 9 and 10:

> "… there has developed an approach that I consider to be well established on the authorities, which is to take the claimed programmed computer, and ask what it contributes to the art over and above the fact that it covers a programmed computer. If there is a contribution outside the list of excluded matter, then the invention is patentable, but if the only contribution to the art lies in excluded subject matter, it is not patentable.
>
> 10. The majority of the English decisions (in particular …" (and he lists *Merrill Lynch*, *Fujitsu*, and *Gale*) "... along with EPO decisions such as …" (*Vicom*) "… support this approach."

24   And the final case I will comment on is *RIM v Inpro*, in which Pumfrey J said, from paragraph 185:

> "There has been a flurry of cases on this provision recently, all of which have been concerned with the exclusions relating to methods of performing mental acts, or doing business, playing games and programs for computers:…" (he lists *Fujitsu, Halliburton, Crawford, CFPH* and *Shopalotto* and continues in paragraph 186) "…It is now settled, at least at this level, that the right approach to the exclusions can be stated as follows. Taking the claims correctly construed, what does the claimed invention contribute to the art outside excluded subject matter?"

25   What I take from this is that the case law has continued since *CFPH* to underline the point that one must look at the contribution to the art, and ask whether it falls solely within excluded subject matter. Prescott QC in his discussion in *CFPH* frequently equates what is patentable with technical subject matter and the judgments referred to above confirm that *CFPH* is not

inconsistent with the technical contribution approach in *Fujitsu*. However, "consistent with" does not mean "exactly the same as". What has changed is how one analyses the invention in order to make that determination. The *CFPH* judgment provides a new way, arguably more secure and consistent in its application, of doing so. It does not, unfortunately, assist with the very determination of what is and what is not technical.

Travaux Preparatoires

26 To address what is to be understood by the "as such" derogation and by "technical contribution" or "technical effect", Mr Fox took me to the travaux preparatoires of the EPC. These consist of a series of documents, apparently obtained from the EPO, which minute the discussions of the working parties and diplomatic conferences in the early 1970's prior to adoption of the EPC. Mr Fox provided me with, as far as I could tell, all the relevant papers which relate to the present Article 52. He also referred me to Articles 31 and 32 of the Vienna Convention on the Law of Treaties, to support the proposition that it was appropriate to take account of the travaux preparatoires in interpreting the EPC.

27 Taking the latter point first, the EPO Enlarged Board of Appeal decision in the case of *EISAI/Second medical indication* G 5/83 found that although the Vienna Convention does not apply to the EPC *ex lege*, because the Vienna Convention applies only to treaties concluded after its entry into force, it is nevertheless appropriate to interpret the EPC as though the Vienna Convention does apply to it. Their reasoning, which is in paragraph 4 of the Reasons for the Decision, was that constitutional courts in Europe in making various decisions have applied Vienna Convention principles (including Articles 31 and 32) to the interpretation of treaties to which it does not strictly apply, and they consequently concluded that it was proper for the EPO Enlarged Board of Appeal to do the same. I am content to accept that the Vienna Convention can be treated as though it applies to the EPC in respect of the interpretation provisions in Articles 31 and 32.

28 The Vienna Convention, under the heading "Interpretation of treaties" provides a "General Rule of interpretation" in Article 31, and then states in Article 32 that:

> "Recourse may be had to supplementary means of interpretation, including the preparatory work of the treaty and the circumstances of its conclusion, in order to confirm the meaning resulting from the application of article 31, or to determine the meaning when the interpretation according to article 31:
> a) leaves the meaning ambiguous or obscure; or
> b) leads to a result which is manifestly absurd or unreasonable."

29 The EPC is a treaty within the meaning of the Vienna Convention as is clear from the definition of "treaty" in its Article 2, and from the preamble to the EPC. Subparagraph (b) of Article 32 does not apply in this case. Considering subparagraph (a), Mr Fox said, with some feeling, that if there is any section of the European Patent Convention which is obscure, it is the meaning of

"computer programs *as such*" and therefore Article 32 applies. A question arises whether there is a distinction to be made between ambiguity or obscurity in the meaning of the EPC on the one hand, and difficulty in its application on the other. The point may be summed up by Pumfrey J's observation in *Halliburton*, that "the law is clear albeit difficult to apply". However I have come to the conclusion that it is not material how the obscurity arises, since I do not think Article 32 excludes difficulties in interpretation arising from the application of a treaty. I therefore consider that Article 32 can be invoked in this case.

30   Mr Fox explained in relation to the travaux preparatoires firstly that the reference to computer programs was a relatively late addition into the list of exclusions which were being discussed in relation to the EPC. Some delegations thought that programs should not be included at all in view of uncertainty as to how computer technology would develop in future. In their view, the case law on exclusions should be left to develop along with the technology. Programs were only finally included when it was decided to harmonise the EPC exclusions with those that had appeared in the recently concluded Patent Cooperation Treaty. He made the point that the exclusions in the PCT are not exclusions as to patentability; (patentability is not part of the PCT framework) but rather exclusions as to subject matter in respect of which an International Search Authority is obliged under the PCT to perform a search. Intel also notes that the computer program exclusion under the EPC was considered for separate treatment from the other exclusions, but in the end it was decided to apply the "as such" rider in common to all of them. Mr Fox referred me to the minutes of the 11th meeting of Working Party I from 28 February to 3 March 1972 in Luxembourg. The majority view at this meeting was that exclusion of computer programs in the form eventually decided "would as a matter of fact make for the exclusion of computer programs as such, while allowing precedents to be used to assess the patentability of any related inventions."

31   Without having gone into all the twists and turns of the discussions in the travaux preparatoires, I am content to accept that this was the position reached by the Working Party which eventually found its way into the EPC and it seems to me that this is indeed the way Article 52 of the EPC has been interpreted in the event. Programs "as such" fall within the excluded area and there has been a continuing debate and development, just as envisaged in the travaux preparatoires, over the criteria to be used to assess the patentability of computer related inventions. The case law following *CFPH* continues this development, and it has been explained that this continuation is consistent with its earlier development under *Fujitsu.*

32   The "little man" test in *CFPH* should, says Intel, be considered in the light of this analysis of the travaux preparatoires. The "little man" test refers to the examples that Prescott QC gave in paragraph 104 of his judgment, namely an automatic pilot and a process for making canned soup. Substituting a little man for the computer program illustrates that there may be developments in the way such systems operate that are part of the computer program but represent and result in improvements in the physical processes controlled by

the programs. What I understand Intel to be saying is that one should not apply too narrow an interpretation to the range of patentable inventions that are to be permitted under the EPC. The computer programs exclusion was, in their view, intended to be limited to the most clearly unpatentable cases. Insofar as Prescott QC refers to particular examples and the "little man" test, those are to be regarded as non-limiting examples of the type of computer related inventions that are patentable. I think Mr Fox was concerned that the office may have taken the view that this well rehearsed part of the law may have been swept away with *CFPH* and the subsequent judgments. I do not think it has and I do indeed regard the examples given by Prescott QC in paragraph 104 as non-limiting.

Technical effect

33   Mr Fox went on to discuss arrangements that should be regarded as constituting a technical effect appropriate to confer patentability. He focused on arrangements in which the invention produced internal effects within the computer system as opposed to those in which the computer affects some external activity, such as the autopilot or soup canning systems referred to in *CFPH*. Mr Fox referred me to the EPO case *IBM/Computer programs* T1173/97. The main issue in this application concerns the allowability of claims to a computer program product, and a computer program product when stored on a computer usable medium. However the Board evidently considered it needed to comment on the technical character of the invention, and the decision includes a review of the sort of computer related developments that can be regarded as involving a technical effect. In paragraph 6.5 of the Reasons for the Decision, the Board says:

> "Consequently, a patent may be granted not only in the case of an invention where a piece of software manages, by means of a computer, an industrial process or the working of a piece of machinery, but in every case where a program for a computer is the only means, or one of the necessary means, of obtaining a technical effect within the meaning specified above, where, for instance, a technical effect of that kind is achieved by the internal functioning of a computer itself under the influence of said program."

34   I am content to accept that, as in the *IBM* case, an invention concerned with the internal functioning of a computer may be patentable. What sort of internal inventions might qualify? Mr Fox said that an increase in speed was one possibility; not any increase in speed but one which involved a technically new and inventive development. The present invention was an example, and under questioning, Mr Fox said that he thought a word processor or a spreadsheet application which provided an increase in speed over previous examples could also incorporate a patentable technical development. As he put it "Merely saying "I have a new word processor. It runs faster", doesn't mean you will get a patent. [If you say:] "I have a new word processor. It runs faster <u>because</u> I have done something new and non-obvious", then I see no reason why that should not be the subject matter for a patent. But it is important that it is all part of the whole, rather than saying it is "Version 2". If it is "Version 2" which

has been optimized using purely standard conventional techniques, then it is not suitable subject matter for a patent because it is obvious".

35   If Mr Fox is saying that any innovative development in computer programming which results in an increase in speed (or indeed improvements in accuracy or productivity which, like speed, are normal advantages of developments in computerisation) is patentable, I disagree. I don't think he was saying that since in other areas of his argument he rejected this view, but he was saying something close to it at this point. In the *Gale* case cited above for example, Nicholls LJ at page 318 quotes Mr Gale's specification. It describes an increase in efficiency resulting from use of the square root algorithm of the invention, which uses a simple binary shift function to perform multiplication steps instead of the relatively slow process of iterative division using combinations of "subtract", "test" and "shift" operations. At page 327, having stated that Mr Gale had discovered a new algorithm, and having remarked that nevertheless, since the algorithm is applied to the writing of computer instructions, it can not be regarded as a mathematical method as such, he continues:

>   "That still leaves the difficulty that those instructions when written, and without more, are not patentable, because they constitute a computer program. Is there something more? In the end I have come to the conclusion that there is not. The attraction of Mr Gale's case lies in the simple approach that, as claimed, he has found an improved means of carrying out an everyday function of computers. To that extent, and in that respect, his program makes a more efficient use of a computer's resources. A computer, including a pocket calculator with a square root function, will be a better computer when programmed with Mr Gale's instructions. So it may. But the instructions do not embody a technical process which exists outside the computer. Nor, as I understand the case as presented to us, do the instructions solve a "technical" problem lying within the computer, as happened with patent applications such as *IBM Corp./Computer-related invention* T115/85, and *IBM Corp./Data processor network* T06/83. I confess to having difficulty in identifying clearly the boundary line between what is and what is not a technical problem for this purpose. That, at least to some extent, may well be no more than a reflection of my lack of expertise in this technical field. But, as I understand it, in the present case Mr Gale has devised an improvement in programming. What his instructions do, but it is all they do, is to prescribe for the cpu in a conventional computer a different set of calculations from those normally prescribed when the user wants a square root. I do not think that makes a claim to those instructions other than a claim to the instructions as such. The instructions do not define a new way of operating the computer in a technical sense, to adopt the expression used in *IBM Corp./Document abstracting and receiving* T22/85.
>
>   In short, therefore, the claim is in substance a claim to a computer program, being the particular instructions embodied in a conventional type of ROM circuitry, and those instructions do not represent a technical

process outside the computer or a solution to a technical problem within the computer."

36   It appears from this that a new programming method producing an increase in speed through the more efficient use of computer resources does not necessarily involve a patentable technical effect. Just to reinforce this point, improvements in accuracy or productivity which are similarly the typical results of computerisation have also been found, of themselves, not to confer patentability. In the *Fujitsu* case referred to above, Aldous LJ stated:

"...a computer set up according to the teaching in the patent application provides a new "tool" for modelling crystal structure combinations which avoids labour and error. But those are just the sort of advantages that are obtained by the use of a computer program. Thus the fact that the patent application provides a new tool does not solve the question of whether the application consists of a program for a computer as such or whether it is a program for a computer with a technical contribution.

I believe that the application is for a computer program as such."

This supports the proposition that innovative developments in programming which avoid labour and error do not necessarily involve a patentable technical effect.

37   Mr Fox also referred to comments in the *RIM v Inpro* case. Here Pumfrey J says at paragraph 186,

"*RIM* says that the point does not require elaboration. It contends that all that is claimed, as a matter of substance, is a collection of programs for computers. I think this is wrong. What the claims give is a technical effect: computers running faster and transmitting information more efficiently, albeit ultimately for the purpose of displaying part of that information."

Mr Fox's view was that Pumfrey J in this remark intended that computers either running faster or transmitting information more efficiently would satisfy his criterion for a technical effect. Or at least he suggested that as a general proposition that was the case. Mr Beresford added that it was because the computer was running faster that it was able to transmit information more rapidly. I don't think either of those views is correct. The system under consideration was one in which Internet pages have their information content reduced so as to be suitable for transmission over a limited bandwidth channel for display on a small format screen. It is as a result of the reduction in content that the information can be transmitted rapidly and displayed effectively, not the other way round. Pumfrey J is referring in his remarks to the claims, and to the result of performing the invention specified in the claims. His remarks consequently have to be taken as a whole. He is not specifying a list of separate activities that involve a technical effect and I do not think one can put the interpretation on it that Mr Fox did.

38   I take from these cases that an increase in the speed of operation of a

computer (or indeed improvements in productivity or accuracy) which result from developments in the content of programs are not necessarily patentable. It appears rather that it is necessary to assess the invention on other criteria.

Scheme, rule or method for performing a mental act.

39   Although the examiner's objections to the main claims, 1 and 12, were made on the basis that the invention was excluded because it relates to a mental act, Mr Fox did not address this point directly. I think the present case in fact comes under the heading of a computer program. Claims 1 and 12 do not state in terms that they are concerned with a computer program, but as I discuss below, I consider that the invention properly construed does relate to a computer program and I have directed my attention to that aspect. I do not think that it is necessary to consider the invention separately under the mental act heading.

The present case

40   Applying the law to the case in hand, the *CFPH* inquiry requires me to assess what is, or is alleged to be, new and inventive and capable of industrial application in relation to the present case, and then to determine whether it is new and not obvious and susceptible of industrial application under the description "an invention" in the sense of Article 52 of the EPC. Claim 1 relates to a method of processing software code, which amounts effectively to steps in a compilation process. Claim 12 relates to computer apparatus for compiling software code which carries out the same steps as the method. Claim 23 claims a computer readable medium that provides instructions to carry out the method of claim 1 or to configure computer apparatus in accordance with claim 12. The authorities emphasize that the substance of the claimed invention must be assessed and in this case I find the substance to be a compiler program which carries out the value specialization functions specified in claims 1 and 12.

41   I understand that optimisation techniques in general, operating both at compile-time and at run-time are known in the art. Compile-time optimisation techniques are discussed in the preamble to the present specification, and run-time optimization is discussed in relation to slipstream processors by Professor Finkelstein. I therefore consider that it is the use of the particular technique of value specialisation set out in claim 1, at compile-time, that is the new and inventive subject matter, and in respect of which the second step of the enquiry has to be made.

42   I find this a very difficult assessment to make. The outcome of all the discussion on the law above is that one has guidance on how to direct ones attention to that aspect of the invention in respect of which the assessment has to be made, but little guidance, where inventions occupy the grey area between definite inclusion and definite exclusion, as to how to make the determination itself. One must guard against following decisions in similar cases. As Pumfrey J said in *RIM v Inpro* at paragraph 186: "The test is a

case-by-case test, and little or no benefit is to be gained by drawing analogies with other cases decided on different facts in relation to different inventions." It appears therefore that it is necessary to return to first principles and decide whether the advance is one which should rightfully be included within the scope of patentable inventions.

43   The compilation process is one of translating source code into executable code. What this invention involves is a clever way of doing that, and that process is itself realized by means of computer instructions. In one view the invention is a computer program which carries out the compilation process in a particular way. In another view, the invention is more than a computer program; it is a new technique for manipulating computer code which results in more efficient executable code. This is the view taken by Intel, and Intel asserts that, looked at in this way, the invention provides a technical effect over and above its operation as a computer program, which allows the computer to operate more efficiently at the processor level. The new technique is, they say, portable from one programming environment to another, which supports the view that it is for something more than just a program.

44   Mr Fox said that conventional, standard programming techniques do not have the necessary technical character even though they improve efficiency of operation of a computer, but I find it difficult to draw a distinction. Presumably whenever a new version of a word processor or spreadsheet is released it will involve new programming techniques. All such developments will affect the way the computer operates at the processor level, and if they are advantageous it is possible to argue that they thereby amount to a technical improvement because of the more efficient way instructions operate on processor registers and memory locations etc. Clearly this cannot be right or it would be possible for inventors to patent programming techniques per se. It is clear that clever new ways of programming alone can not render an invention patentable and it is necessary to look for something further.

45   Reverting to the explanation provided in the *IBM* case T1173/97 referred to above, the Board members were at some pains to point out in the decision, at paragraphs 6.2, 6.3 and 6.6, that a technical effect could not reside in the physical modifications of the hardware brought about by the execution of the instructions making up the program, since that is the nature of all programs running on all computers. A technical effect could nevertheless reside in the internal functioning of a computer under the influence of a program.

46   The patent in question, EP 0457112 relates to distributed (eg networked) computer operating systems, and deals with recovering a "two-phase commit procedure" after a failure in the system which occurs during the procedure. A two-phase commit procedure effects related, quasi-simultaneous, operations on separate data structures. Quoting from the "Summary of the invention": "An application is run on a processor and requests a work operation involving a resource such as a protected conversation with another application in a different real machine. A commit procedure is begun for the work request, and if the commit procedure fails before completion, the following steps are taken to optimize the use of one or both of the applications. At some time after the

commit procedure fails, a return code is sent to at least the application that initiated the commit indicating the intent of the application commit order and that the application can continue to run and does not have to wait for resynchronization (recovery). Then, while the initiating application continues to run, resynchronization is implemented in parallel, asynchronously."

47   It seems to me that the "internal functioning of a computer" in this case is of a different character to the present one and operates in a way that the present compiler system does not. It sets out the manner in which various agents within the computer system interact to achieve the desired recovery action. The specification and the claims of '112 set out the very features and the interrelationships between them that define the internal functioning of the computer. The present compiler produces code that operates more efficiently when it is run. However, the more efficient operation is within the confines of the program itself. It is true that in certain embodiments the code runs on a multiple processor system and has been optimized to do so, but that is conventional in the present discussion. The system involves improved code running in an otherwise conventional way on conventional hardware. In providing an improved compilation procedure, the present system may involve the internal functioning of the software, but it does not to my mind relate to the internal functioning of the computer.

48   I am also influenced by the related fact that the operations defined by the present invention are at one step removed from the internal functioning of the computer. The process defined by the invention operates at compile-time, whereas the code that is produced operates the computer at run-time. The connection between the invention and the running of the computer is therefore a tenuous one, and makes it more difficult to discern a relationship.

Conclusion

49   I do not think that there is a very clear line to be drawn here. It is the nature of the enquiry that it is difficult to see a clear distinction between patentable and non-patentable inventions at the borderline and, as has been said before, each case has to be decided on its merits. However, having considered the matter carefully, I find that the present invention does not have the necessary technical character for it to be patentable. Answering the second question in the *CFPH* test, I find that a compiler program which carries out the value specialization functions specified in claims 1 and 12 is not new and inventive under the description of patentable subject matter, but is only new and inventive under the description of a computer program as such.

50   As a result, I find claims 1, 12 and 23 to be unpatentable and the appendant claims necessarily also unpatentable. I have also considered the description, and do not believe that it would be possible to formulate patentable claims on the basis of the remainder of the disclosure. I consequently refuse this application because it does not comply with section 1(2)(c) of the Patents Act.

Appeal

51   Under the Practice Direction to Part 52 of the Civil Procedure Rules, any appeal must be lodged within 28 days.

P MARCHANT
Deputy Director acting for the Comptroller