

09 March 2012

Patents Act 1977

APPLICANT VMware, Inc

ISSUE Whether patent applications
GB 0807865.1 and GB 0807867.7
comply with Section 1(2)

HEARING OFFICER Phil Thorpe

DECISION**Introduction**

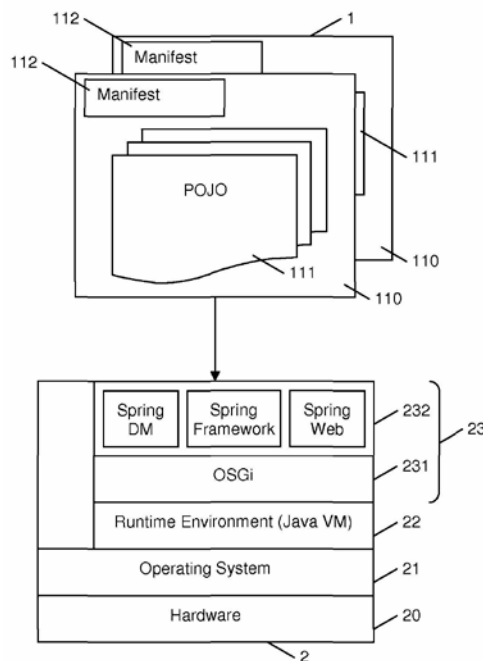
- 1 This decision concerns whether the inventions set out in two patent applications, GB 0807865.1 and GB 0807867.7 relate to excluded matter. The examiner has maintained throughout the examination of these applications that the claimed inventions are excluded from patentability as programs for a computer under section 1(2)(c) of the Patents Act 1977. The applicant has not been able to overcome the objections, despite amendments to the applications.
- 2 The matter subsequently came before me at a telephone hearing on 9 November 2011 at which Mr Ian Robinson appeared for the applicant, VMware Inc.
- 3 I very much regret the delay in issuing this decision.

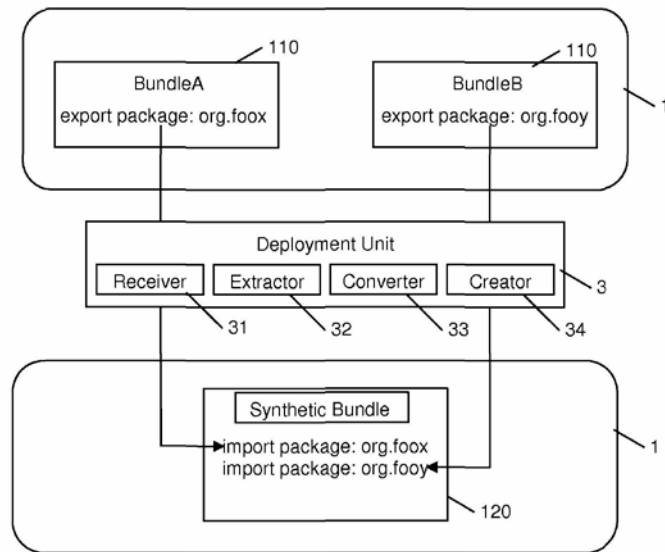
The Inventions in general

- 4 Both GB 0807865.1 and GB 0807867.7 were filed on 30 April 2008, with both applications being published on 4 November 2009 as GB2459681 and GB2459682 respectively.
- 5 The inventions are both concerned with how application programs are deployed in a computer system.

The invention in GB 0807865.1

- 6 In general application programs are developed on a separate computer system and are then deployed on a host computer system where they are run or executed. The deployment process turns the application program into its final executable form and typically includes the creation of links between the application and any libraries upon which the application relies.
- 7 However according to the description unintended dependencies may arise between the application program and the libraries, and these dependencies may cause difficulties and unexpected behaviour in the host computer system. The invention seeks to avoid these unintended dependencies.
- 8 Mr Robinson outlined the invention in layman's terms. He explained that a mechanism is provided to ensure the application program ends up wired to the libraries you intended and is not linked to something you did not intend. The invention achieves this by essentially placing a box around the application program and then by providing a front door. If anything wants to get to the application program it has to go through the front door and the only things accessible via the front door are those which you want to expose.
- 9 The mechanics for providing this "front door" is best described with reference to Figures 3 and 4 of the description (shown below). In the particular embodiment depicted in these figures a computer system





has hardware and an operating system. The system also has what is commonly referred to as a runtime environment. In the example shown this runtime environment is based on the Java Virtual Machine or Java VM (RTM).

- 10 A deployment unit is arranged to deploy the application into the runtime environment. The application comprises bundles with manifest metadata having export statements defining exported packages. A bundle is a packet, module or other subdivision comprising one or more portions of computer code (classes) which form part of an application program. Typically, the code in one bundle 110 will rely upon code in one or more other bundles 110 for proper execution of the application program 1. Thus, the bundles 110 are semi-independent collections of computer code but which are interdependent upon one another as part of a larger application.
- 11 The deployment unit comprises a receiver unit to receive the bundles, an extractor unit to examine the metadata and extract the export statements, a converter unit to convert each of the export statements into a corresponding import statement, and a creator unit to add an additional synthetic bundle having the import statements inserted in its metadata. This synthetic bundle is in effect the front door referred to above. The deployment unit sets a thread context class loader, which is the part that looks for the code it wishes to operate on next, to delegate class loading to a class loader of the synthetic bundle. Thus, at runtime, classes of the application are only loaded when they are explicitly exported packages as defined by the synthetic bundle.
- 12 Although it is not entirely clear from the description, it is my understanding that the steps of creating the synthetic bundle and setting the thread context class loader are done once when the application is deployed rather than each time it is run. The description does however note that the invention is concerned with (although this is not claimed) the deployment of a program to a web server which then serves data/requests to/from a client (i.e. an ordinary web user). Such processes are generally interpreted and run whenever required. Class

loading is performed when the deployed application is running and any number of instances of the same code can be running in different virtual machines at the same time when there are multiple clients. However the creation of a synthetic bundle and setting of the thread context class loader delegation would need to occur before the code attempted any class loading (i.e. before it is run) in order for the proposed method to work since both of these involve in effect the re-writing of the code being deployed.

- 13 The latest claims upon which this decision is based are those filed on 28 February 2011. Claim 1 reads as follows:

A computer system, comprising:

a processor;

a memory comprising at least one computer-readable storage medium coupled to the processor;

a runtime environment that is arranged to support execution of an application with respect to the memory and the processor, wherein the application is divided into a plurality of bundles each including one or more classes and metadata relating to the classes, the metadata of at least one of the bundles including one or more export statements defining at least some of the classes as an exported package, the runtime environment including a thread context class loader associated with a thread of the application to load the exported packages into the runtime environment for execution by the processor, at least one library to support the application, and at least one class loader associated with the library, wherein the class loader associated with the library delegates to the thread context class loader; and

a deployment unit arranged to deploy the application into the runtime environment, the deployment unit comprising

a receiver unit arranged to receive the application,

an extractor unit arranged to examine the metadata and extract each of the export statements from the metadata,

a converter unit arranged to convert each of the export statements into a corresponding import statement defining the respective exported package as an imported package, and

a creator unit arranged to create an additional synthetic bundle comprising metadata and a class loader, insert the import statements into the metadata of the synthetic bundle, and add the synthetic bundle to the application,

Wherein the deployment unit is further arranged to set the thread context class loader to delegate class loading to the class loader of the synthetic bundle and the class loader of the synthetic bundle is arranged to load each of the exported packages of the plurality of bundles as the imported packages from the synthetic bundle.

- 14 There are two further independent claims relating to a method of deploying an application program and a computer readable storage medium having a

program thereon for deploying an application program. Each of these claims includes the specific features set out in claim 1 and hence it is not necessary to set them out in full here. I am satisfied that the allowability of these claims will stand or fall with that of claim 1.

The Law

- 15 The examiner has raised an objection under section 1(2)(c) of the Patents Act 1977 that the invention is not patentable because it relates to a computer program. The relevant provisions of this section of the Act are shown in bold below:

1(2) It is hereby declared that the following (amongst other things) are not inventions for the purpose of the Act, that is to say, anything which consists of –

(a) a discovery, scientific theory or mathematical method;

(b)

(c) a scheme, rule, or method for performing a mental act, playing a game or doing business, or a **program for a computer**;

(d)

but the foregoing provisions shall prevent anything from being treated as an invention for the purposes of the Act only to the extent that a patent or application for a patent relates to that thing as such.

- 16 As explained in the notice published by the UK Intellectual Property Office on 8 December 2008¹, the starting point for determining whether an invention falls within the exclusions of section 1(2) is the judgment of the Court of Appeal in *Aerotel/Macrossan*².
- 17 The interpretation of section 1(2) has been considered by the Court of Appeal in *Symbian Ltd's Application*³. *Symbian* arose under the computer program exclusion, but as with its previous decision in *Aerotel*, the Court gave general guidance on section 1(2). Although the Court approached the question of excluded matter primarily on the basis of whether there was a technical contribution, it nevertheless (at paragraph 59) considered its conclusion in the light of the *Aerotel* approach. The Court was quite clear (see paragraphs 8-15) that the structured four-step approach to the question in *Aerotel* was never intended to be a new departure in domestic law; that it remained bound by its previous decisions, particularly *Merrill Lynch*⁴ which rested on whether the contribution was technical; and that any differences in the two approaches should affect neither the applicable principles nor the outcome in any particular case.
- 18 Subject to the clarification provided by *Symbian*, it is therefore still appropriate for me to proceed on the basis of the four-step approach explained at

¹ <http://www.ipo.gov.uk/pro-types/pro-patent/p-law/p-pn/p-pn-computer.htm>

² *Aerotel Ltd v Telco Holdings Ltd and Macrossan's Application* [2006] EWCA Civ 1371; [2007] RPC 7

³ *Symbian Ltd v Comptroller-General of Patents*, [2009] RPC 1

⁴ *Merrill Lynch's Application* [1989] RPC 561

paragraphs 40-48 of *Aerotel* namely:

- 1) Properly construe the claim.
- 2) Identify the actual contribution.
- 3) Ask whether it falls solely within the excluded matter, which (see paragraph 45) is merely an expression of the “as such” qualification of section 1(2).
- 4) If the third step has not covered it, check whether the actual or alleged contribution is actually technical.

19 Mr Robinson agreed that this was the correct approach to take.

Step 1 - Properly construe the claim

20 There is no issue regarding the construction of the claims.

Step 2 - Identify the actual contribution

21 Before I turn to the actual contribution in this instance it is I believe useful to reiterate that in *Aerotel/Macrossan*, the Court of Appeal sought to provide guidance on how the actual contribution should be identified. It noted (paragraph 43) that:

“It is an exercise in judgment probably involving the problem said to be solved, how the invention works, what its advantages are. What has the inventor really added to human knowledge perhaps best sums up the exercise.”

22 Both the examiner and Mr Robinson seem to concur that the actual contribution lies in a mechanism for avoiding unintended dependencies that may occur at runtime between an application and the libraries upon which the application depends. Mr Robinson believes however that the actual contribution goes further. In particular he believes that the invention provides a modified runtime environment and that this results in an improved computer system.

23 I accept that the computer system is a more reliable system because of the invention. However a computer system which has simply loaded onto it a more reliable program would also be an improved computer system. The contribution in that case would extend only to the improved program. Is it any different here? I think it is. Here it is the method of deploying the application to the computer system which results in the improved system. More particularly the runtime environment is made more reliable by the creation of the synthetic bundle and the setting of the thread specific class loader. Such a contribution extends beyond deploying a better application. It is the process of deployment into the runtime environment that leads to the avoidance of unintended dependencies.

- 24 Hence I believe the contribution in this instance is an improved method of deploying an application to a computer system involving the creation of a synthetic bundle and the setting of the thread context class loader to delegate class loading to the class loader of the synthetic bundle.
- 25 Having identified the contribution I turn now to considering whether it relates to excluded matter.

Steps 3 & 4 - Does the contribution fall solely within excluded matter and is it actually technical in nature

- 26 I will consider steps 3 and 4 in effect together since if the contribution made by the invention, which in this instance is clearly embodied in a computer program, is technical then it does not fall solely within excluded matter.
- 27 Mr Robinson suggests that there are similarities between this case and the application discussed in *Symbian Ltd's Application*. He refers in particular to the following extracts from the judgement in respect of the first appeal to the High Court⁵ in that case:

“55. So is this invention no more than the running of the program? Having regard to the earlier authorities the answer has to be that it depends on what the program does and not merely how it does it. The mere fact that it involves the use of a computer program does not exclude it: see *Aerotel* at paragraph 22. This point was made in its clearest form in paragraph 16 of the decision in *Vicom* (quoted at paragraph 27 above) which underpins all of the current English authority on this point..

59. Without an effective operating system a computer is nothing. It is simply inaccurate to label all programs within the computer as software and on that basis to regard them as of equal importance in relation to its functionality. The end result of the invention (as claimed) is that it does (to use the test in *Gale*) solve a technical problem lying within the computer....

63. In the present case there is a perceived technical shortcoming caused by modification to the DLL as a result of updates to the computer's functionality. This is not a case where the invention is limited to the processing of data. If an increase in the speed at which the computer works can take the program out of Art.52 (3) (see *Aerotel* at paragraph 92) it is difficult to see why the improved reliability of the machine brought about by the re-organisation of the DLL in its operating system does not”

- 28 Mr Robinson suggests that there is no arguable distinction between the

⁵ *Symbian Limited v Comptroller General of Patents* [2008] EWHC 518(Pat)

invention here and that in *Symbian*. He argues both are fundamental to the operation of the machine. Both result in a more reliable computer which is above that achieved simply by a more reliable program.

29 I find considerable force in these arguments though I must stress that each case must be determined by reference to its particular facts and features. For the reasons that I have already set out I believe the improved reliability does not simply come from an improved program or application but rather from an improved method of deploying applications to the computer. To put it another way I think the contribution of the claimed invention provides a solution in a technical sense to the problem of unintended dependencies. The computer with the invention works better as a matter of practical reality.

30 Mr Robinson seeks to provide further support by referring to the judgment in *AT&T/CVON*⁶ and in particular the five signposts set out in that decision (paragraph 40) that provide guidance on whether the contribution is actually technical in nature. These are:

i) Whether the claimed technical effect has a technical effect on a process which is carried on outside the computer.

ii) Whether the claimed technical effect operates at the level of architecture of the computer; that is to say whether the effect is produced irrespective of the data being processed or the applications being run;

iii) Whether the claimed technical effect results in the computer being made to operate in a new way;

iv) Whether there is an increase in the speed or reliability of the computer;

v) Whether the perceived problem is overcome by the claimed invention as opposed to merely being circumvented.

31 Mr Robinson suggests that in this instance all but the first of these five signposts are met by the invention. I agree that the claimed invention does indeed satisfy one or more of these signposts. Hence I am further satisfied that the invention is not excluded as a computer program.

32 I turn now to the second application.

The invention in GB 0807867.7

33 The invention set out in 0807867.7 also relates to the deployment of application programs. The specification notes that

⁶ *AT&T Knowledge Ventures LP and CVON Innovations Limited v Comptroller General Of Patents* [2009] EWHC 343 (Patents)

“Applications are configured using a variety of different techniques, in order to link to the other components of the increasingly complex and interconnected computer systems of the current art. For instance, an OSGi application configures imported packages using a JAR manifest, but the application may also be a web application which uses the Spring framework. Further, the Spring configuration may be provided in an XML file defining Spring beans. Thus, there is a real difficulty in deploying the application efficiently and correctly on the host computer system, such that the host system will execute the application safely and reliably, whilst taking account of these different various configuration mechanisms.”

34 The invention seeks to overcome this difficulty by deploying the various bundles that make up the application differently according to their personality. The set of personality types may include for example a web personality type and a batch personality type. Personality specific deployers are responsible for deploying a particular type of bundle. The deployers determine the personality by analysing explicit metadata within the bundle. When a bundle is determined as having a specific type of personality then that bundle is supplied to the personality specific deployer which then transforms the bundle by inserting additional dependencies according to the personality. Where the personality of a bundle cannot be determined then it is processed by a generic deployer. According to the specification, the deployment process improves the reliability of the host computer. In particular less initial metadata is required because the necessary dependencies are instead identified and inserted automatically by the deployment system.

35 The latest claims are those filed on 28 February 2011. Claim 1 reads:

1. A computer system, comprising:

a processor;

a memory comprising at least one computer-readable storage medium coupled to the processor;

a runtime environment arranged to support execution of an application program with respect to the memory and the processor, wherein the application program is divided into a plurality of bundles and wherein at least some of the bundles comprises metadata that include a definition of one or more dependencies related to the respective bundle; and

a deployment system arranged to deploy the application program into the runtime environment, the deployment system comprising a deployment management unit and one or more personality specific deployers;

wherein the deployment managements unit comprises:

a personality determining unit arranged to determine whether each bundle of the plurality of bundles is a personality-specific bundle having a personality selected from among a predetermined set of personality types, or else is a generic bundle not having a specific personality;

an operator unit arranged to apply one or more operations to each of the plurality of bundles, including installing each of the bundles ready for deployment; and

a generic deployment unit arranged to deploy each of the generic bundles installed by the operator unit into the runtime environment; and

wherein each of the one or more personality specific deployers comprises:

a transformer unit arranged to transform each of the personality-specific bundles by inserting one or more additional dependencies into the metadata of the bundle according to the personality of the respective personality-specific bundle; and

a specific deployment unit arranged to deploy each of the personality-specific bundles installed by the operator unit into the application runtime environment, according to the respective personality of the personality-specific bundles.

- 36 There are two further independent claims relating to a method of deploying an application program and a computer readable storage medium having a program thereon for deploying an application program. Each of these claims includes the specific features set out in claim 1 and hence it is not necessary to set them out in full here. I am satisfied that the allowability of these claims will stand or fall with that of claim 1.

Step 1 - Properly construe the claim

- 37 There is no issue regarding the construction of the claims.

Step 2 - Identify the actual contribution

- 38 The examiner and Mr Robinson both agree that the contribution is a mechanism for deploying additional dependencies into the metadata of a plurality of bundles having a specific personality type. Mr Robinson's view is that the contribution goes further. He argues that it extends to a modified computer that operates in a new and more reliable way. Again as with the first case the question for me seems to be if I accept that the computer does operate in a new and improved way, which I do, then does this flow from simply the fact that a better application has been loaded onto the computer or is there something more. In this instance I believe there is something more. It is the method of deploying the application to the computer system which results in the improved system. More particularly the bundles are deployed in accordance with their personality. Such a contribution extends beyond deploying a better application. It is the process of deployment into the runtime environment that leads to the improved reliability.
- 39 I believe therefore that the actual contribution in this instance is an improved method of deploying applications into a computer system wherein each of a plurality of bundles making up the application that has a determined personality is modified by inserting additional dependencies and then

deployed in accordance with its personality.

Step 3 - Does the contribution fall solely within excluded matter and is it actually technical in nature

- 40 I will again consider steps 3 and 4 in effect together since if the contribution made by the invention, which in this instances is clearly embodied in a computer program, is technical then it is does not fall solely within excluded matter.
- 41 Mr Robinson again seeks to draw out the similarities between this case and the application discussed in *Symbian Ltd's Application* referring in particular to the passages set out above.
- 42 Mr Robinson suggests that there is no arguable distinction between the invention here and that in *Symbian*. He argues both are fundamental to the operation of the machine. Both result in a more reliable computer which is above that achieved simply by a more reliable program. I find considerable force in these arguments though I must stress again that each case must be determined by reference to its particular facts and features. For the reasons that I have already set out I believe the improved reliability does not simply come from an improved program or application but rather from an improved method of deploying applications to the computer. To put it another way I think the contribution of the claimed invention provides a solution in a technical sense to the problem of deploying applications made up of bundles having different personalities. The computer with the invention works, and that in my mind includes how applications are deployed into the runtime environment, better as a matter of practical reality.
- 43 Mr Robinson has also pointed me to the five signposts of AT&T suggesting that four were met by the claimed invention. I am satisfied that a number of these are indeed met thus reinforcing me view that the claimed invention is not excluded as a computer program.

Conclusion

44 I conclude that the inventions defined in GB 0807865.1 and GB 0807786.7 do not relate to a computer program and as such the applications are not excluded from patentability under section 1(2)(C) of the Patents Act.

45 The applications are remitted back to the examiner.

Appeal

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

PHIL THORPE

Deputy Director acting for the Comptroller