Intellectual Property Office

BL O/287/19

28 May 2019

PATENTS ACT 1977

APPLICANT	Ariadne Insight Limited
ISSUE	Whether application GB1222279.0 complies with section 1(2)(c)
HEARING OFFICER	Ben Buchanan

DECISION

Introduction

1 This decision considers the issue of whether the invention claimed in patent application GB1222279.0 satisfies the requirement for patentability as defined by section 1(2) of The Patents Act 1977 (the Act).

2 The application was filed on 11 December 2012 in the name of Ariadne Insight Limited and is entitled "A framework for defining user-defined functions". At the search stage the Examiner determined the invention related to a program for a computer as such and was likely to be excluded from patentability by section 1(2)(c) of the Act. He reported under section 17(5)(b) that a search would search no useful purpose and issued an Examination Opinion on 11 June 2013. The application was published as GB2508826 A on 18 June 2014.

3 The Applicant did not respond to the Opinion, and so when accelerated examination was requested on 1 June 2017, the Examination Opinion was re-issued as an Abbreviated Examination Report under section 18(3) on 27 June 2017. The Applicant responded with observations, which were followed by two further rounds of re-examination and amendments. In his report of 25 April 2018, the Examiner maintained the objection under section 1(2)(c) and indicated his intention to refuse the application, consequently offering the Applicant the opportunity for the matter to be heard. Subsequent amendments failed to satisfy the Examiner that the objections were overcome and were considered to add matter. Ultimately, the Applicant requested a hearing and agreed that the issue of added matter would not affect consideration of exclusion. A pre-hearing report was issued on 23 October 2018 and skeleton arguments were received on 19 March 2019.

4 The application came before me at a telephone hearing on 26 March 2019. The Applicant was represented by Mr David Moore of Jensen & Son. Also attending in person were the Examiner Thomas Davies, hearing assistant Brendan Churchill and an observer, Gareth Jones.

5 At the point of the first substantive examination, the normal unextended compliance date was set as 27 June 2018. Pending confirmation of the hearing the rule 30 compliance period was extended on several occasions such that at the time of the hearing it was 27 April 2019. During the hearing I made it clear to Mr Moore that if necessary a further discretionary extension would be allowed if requested, while the decision was being prepared.

The Application

6 The application addresses problems associated with spreadsheet software. These problems are firstly that organisations require spreadsheets to be flexible, handle complex calculations and to represent developing business logic, so they need to be able to process multiple complex functions and cell contents and be easily reconfigured. Secondly, a cell within a spreadsheet can only contain certain types of content. If a cell could contain a complex, structured value or set of values, user-configured functions could be more sophisticated. Finally, the addressable memory available to a spreadsheet can limit the capability of the spreadsheet to perform calculations and recalculate multiple results. This can lead to users experiencing instability and delays when using spreadsheets with cells containing complex formulae and/or performing recalculation for large numbers of cells.

7 The proposed solution is a computer program which comprises a framework having functions which can be called from a cell or cells in a spreadsheet to then run in a separate process in memory. The program runs separately to but in conjunction with the spreadsheet application. This solution effectively increases the limit of addressable memory available to the spreadsheet software.

8 At the hearing I summarised the invention as:

A framework for use in conjunction with a spreadsheet application which enables two primary benefits to be realised:

(1) Functions (e.g. calculations to be carried out on data in a cell or cells) to be called from a cell and executed in a separate process and
(2) Values to be returned from a function running in a separate process as a code or reference held within a cell, which may be accessed and passed to a function running in a separate process, as a structured result

This has the advantage of effectively making an additional amount of addressable memory available to the function or structured result in the separate process; thus instability and constraints of addressable memory available to the spreadsheet application are avoided, by making available the capacity of the addressable memory allocated to the separate process in addition to the memory available to the spreadsheet process. Mr Moore agreed this reflected the invention claimed.

The Claims

9 The original claims filed on 11 December 2012 have been amended during the application process. Those now under consideration were filed on 16 August 2018 and comprise two independent claims (claims 1 and 2), each directed to a computer

program product, and five dependent claims, each dependent directly to any of the preceding claims.

Claim 1 reads:

> *A computer program product for use in conjunction with a 32 bit spreadsheet application program running in a 64 bit operating system comprising*
> *a framework having a library of functions, which functions comprise one or more defined functions, wherein*
> *the spreadsheet application is, in use, executed in a first process in memory and*
> *the function is, in use, held in a second process in memory, which second process is independent of the first process,*
> *wherein the or each user defined function is adapted to be called from a cell in the spreadsheet application such that object size is not constrained by the 32bit memory limit, the function being evaluated or executed in the second process to return a value which is shown in the cell.*

Claim 2 reads:

> *A computer program product for use in conjunction with a 32 bit spreadsheet application program running in a 64 bit operating system comprising*
> *a framework having a library of functions, which functions comprise one or more defined functions, wherein*
> *the spreadsheet application is, in use, executed in a first process in memory and*
> *the function is, in use, held in a second process, which second process is independent of the first process,*
> *wherein the or each function is adapted to be called from a cell in the spreadsheet application, the function being evaluated or executed in the second process to return a value which is shown in the cell, the framework allocating a unique identifier value which is shown in the cell, the value being returned being a symbolic code.*

10 I consider the claims to have a clear common concept, which is calling a function in a framework from a cell and executing it in a separate process. Claim 1 does this to increase the effective addressable memory available to the function and hence effectively to the spreadsheet. Claim 2 does this to enable a cell to reference a complex and/or structured entity via the function call which entity could not be represented as a value within the cell in the spreadsheet itself. While the novelty and inventiveness of this concept has not been tested, for the purposes of the matter at hand, the present claims are considered to be directed towards the same inventive concept. Furthermore, I note in the pre-hearing report the Examiner has identified some issues of clarity; again, for the purposes of the matter at hand here, I consider the claims to be clear.

The Law

11 The Examiner has raised an objection under section 1(2)(c) of the Patents Act 1977 that the claimed invention is not patentable because it relates to a program for a computer as such. 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) …..
(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****.*

12 The starting point for determining whether a claimed invention is excluded from patentability by section 1(2) is the judgment of the Court of Appeal in *Aerotel/Macrossan*[1]. *Symbian*[2] then makes it clear that, in deciding whether an invention is excluded one must ask if it makes a technical contribution? If it does then it is not excluded.

Therefore, I must proceed on the basis of the four-step approach set out in *Aerotel/Macrossan* and clarified in *Symbian*, namely:

1. Properly construe the claim.
2. Identify the actual contribution (although at this stage it is an alleged contribution).
3. Ask whether that contribution falls solely within the excluded matter.
4. If the third step has not covered it, check whether the actual or alleged contribution is actually technical.

13 Jacob LJ outlined the considerations to be applied when identifying the contribution made by the claims in paragraph 43 of *Aerotel/Macrossan*:

> *"The second step – identify the contribution - is said to be more problematical. How do you assess the contribution? Mr Birss submits the test is workable – 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. The formulation involves looking at substance not form – which is surely what the legislator intended."*

14 To assist in deciding whether a computer program provides a technical contribution, the judgment in *AT&T/CVON*[3] (hereafter *AT&T*) provided guidance in the form of a number of signposts. The signposts were updated in *HTC v Apple*[4] and are considered as follows:

(i) whether the claimed technical effect has a technical effect on a process which is carried on outside the computer;

---

[1] Aerotel Ltd v Telco Holdings Ltd and Macrossan's Application [2006] EWCA Civ 1371; [2007] RPC 7
[2] Symbian Ltd v Comptroller-General of Patents, [2009] RPC 1
[3] AT&T Knowledge Ventures LP and Cvon Innovations Ltd v Comptroller General of patents [2009] EWHC 343 (Pat)
[4] HTC Europe Co Ltd v Apple Inc [2013] EWCA Civ 451

(ii) whether the claimed technical effect operates at the level of the 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 the program makes the computer a better computer in the sense of running more efficiently and effectively as a computer;
(v) whether the perceived problem is overcome by the claimed invention as opposed to merely being circumvented.

At the hearing, Mr Moore agreed that the correct approach was to follow these precedents and guidance.

Arguments and Analysis

Step 1: Properly construe the claim

15 I have taken into account the Examiner's detailed construction of the claims in his pre-hearing report. I agree with his construction and would add the following, particularly with regard to "object size".

16 There was a brief discussion in the hearing about the definition in the claims of a 32 bit spreadsheet application running in a 64 bit operating system, and object size not being constrained by the 32 bit memory limit. These features rely on the disclosure in paragraph 1 on page 4 of the description which suggests that if a 32 bit spreadsheet is running in a 64 bit operating system, a full 64 bit addressable memory space is available to the result (object) of a Structured Result Function (SRF). It is not clear in the claim whether the *object* referred to is a *structured result object* and/or another object created during execution of the function in the separate process.

17 When the Examiner construed the claim, he interpreted the object as a structured result object. I am minded to adopt a broader construction, on the basis that the purpose of the invention is to execute a function in a separate process in order not to increase the memory footprint of the 32 bit spreadsheet application. Naturally the second process will be constrained by a limited addressable memory space but that may not be the 32 bit memory limit of the spreadsheet application. Within a 64 bit operating system it may be in excess of a 32 bit limit. The claim is therefore arguably more generalised than the description, and this is the basis for the added matter objection referred to in the Examiner's pre-hearing report. This objection was not resolved before the hearing and I make no finding on this point.

18 I do not think it matters for the purposes of construing the claims and identifying the contribution, because what is clear is that executing a function, e.g. a SRF, in a separate process does not increase the memory footprint of the spreadsheet process (from paragraph 3 on page 3). The *effective* memory available to the spreadsheet application is therefore increased. Whether or not the execution and/or the result of the function is subject to a 64 bit memory limit does not change the advantage itself, which is to use memory available to a separate process and not to consume memory within the 32 bit spreadsheet process.

19 For the avoidance of doubt I construe the claim to be limited to a 32 bit spreadsheet application running in a 64 bit operating system and such that objects created during the execution of a function within a framework which are called from the spreadsheet use memory in a separate process and do not increase the memory footprint of the 32 bit spreadsheet application.

Step 2: Identify the actual contribution

20 It is important to note that no search has yet been performed and the basis of assessing the contribution is therefore the alleged contribution. In paragraph 6 of the witness statement filed on 16 August 2018, it was acknowledged that it was known in the context of databases at the priority date of the patent application to hold datasets elsewhere than the memory process of a software application and to perform calculations. In paragraph 12 of the witness statement it is alleged that using data links so that complex calculations are held in a second process in a framework of an add-in and not as a separate API was unknown at the priority date.

21 In the pre-hearing report of 23 October 2018, the Examiner presented his view of the contribution. In the skeleton arguments responding to that report, Mr Moore presented a slightly narrowed "synthesised" contribution:

> *A computer program/add-in, for use in conjunction with a [32 bit] spreadsheet application, which add-in is held in a separate memory process from the spreadsheet application and comprises a framework holding complex calculations/functions and data, which can be executed outside the spreadsheet application and called from and return results to the spreadsheet application. This increases the addressable memory beyond the physical limits of the 32bit spreadsheet application.*

22 At the hearing, I indicated that I was content to accept the "synthesised contribution" for the purposes of the hearing. Having reflected on that formulation I am still of the opinion that it fairly reflects how the invention works and what the advantages are. Importantly, it specifies that the addressable memory used by functions called from the spreadsheet does not increase the memory footprint of the spreadsheet process.

23 However, there are one or two minor points to note. The claims do not define the program as an add-in (a term in the art) and they do specify that the spreadsheet application is a 32 bit application. It is referred to as such in the skeleton arguments which also explain that 32 bit applications are still de facto for compatibility with legacy drivers, modules and plug-ins and as such are subject to 32 bit addressable memory space, hence the problem to be solved. Finally, I have clarified that the *effective* memory available to the spreadsheet application is increased; the memory capacity within the computer as a whole is unchanged. Consequently, I have refined the contribution to reflect the claims as I have construed them:

> *A computer program (e.g. an add-in) for use in conjunction with a 32 bit spreadsheet application, which program is held in a separate memory process from the spreadsheet application and comprises a framework holding complex functions (e.g. to carry out calculations) and data, which can be executed outside the spreadsheet application and called from and return results to the*

spreadsheet application; this increases the effective addressable memory beyond the physical limits of the 32 bit spreadsheet application.

Step 3: Ask whether that contribution falls solely within excluded subject matter

24 There is no doubt that the invention is implemented by a computer program, but that does not preclude it from being patentable if there is a technical contribution. The question is whether the claimed invention relates to a program for a computer *as such*. As I have set out above, determination of a technical contribution can be aided by following the signposts introduced in *AT&T*. The Examiner and Mr Moore have considered each of these signposts during the examination process but only signposts (ii), (iv) and (v) were discussed at length in the hearing.

Signpost (i): whether the claimed technical effect has a technical effect on a process which is carried on outside the computer

25 In correspondence and briefly during the hearing, it was asserted that the claimed invention could be used to advantage for optimising physical gas networks, physical assets and virtual power plants or to analyse oil and gas reserves. That may be the case but is somewhat removed from the alleged contribution and any effect within such a field is not a part of the contribution of the claimed invention. The alleged contribution is to the use of spreadsheets within a limited addressable memory space and does not extend to the use to which data processed within a spreadsheet may be put. The claimed technical effect has no effect – technical or otherwise – outside the computer.

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

26 This signpost is concerned with understanding whether the invention changes how the computer runs internally. In practice, this means in the sense of the operation of the processor, the cache memory, or other internal components of the computer. The "architecture" can be thought of as the combination of these components, which operate in the same way regardless of the application being run.

27 Mr Moore has made the point that the existing case law (exemplified by *ProProcure* (*BL O/461/17*)[5]) shows that this signpost tends to point away from a technical contribution when that contribution is solely at the level of an application. I agree with this. Mr Moore stated that the problem of limited addressable memory is one imposed not by the application layer but by the operating system. His arguments asserted that consequently the present contribution is not at the application level:

> *"The problem the application is addressing is the physical limits of the addressable memory in a 32 bit software application. In that sense, although it is being run at the application layer, the effect is interacting with the level of the architecture of the system because it is the architecture of the system which gives that 32 bit addressable memory limit."*

[5] BL O/461/17 ProProcure "Improved querying method for ORM database"

28 I am not sure I agree with this logic. If the addressable memory limit within a 32 bit application running in a 64 bit operating system is 2GB, that is a function of the 32 bit software application. More generally, the claimed technical effect interacts with the level of architecture of the application only insofar as any software application is limited by the application and operating system constraints. The inventor has realised that constraints upon the spreadsheet process which would be encountered by executing functions within the same process can be avoided by executing functions within a separate process. The separate computer program process is nonetheless a dedicated application for use in conjunction with a spreadsheet application and the effect operates at the application layer; it operates conventionally at the level of the architecture of the computer. Moreover, the effect is only produced for data from the spreadsheet application and in conjunction with the spreadsheet application being run. This signpost contraindicates a technical effect.

29 I note Mr Moore's analogy between the present application and the underlying case law *T 0006/83*[6]. However, the architectural processors referred to in that case are entirely different to the application-level software referred to here. Comparison was also made to *Fisher-Rosemount Systems* (*BL O/148/19*)[7], but I do not consider that relevant: that application was allowed because the process was aligned to a technical process and related to providing data about conditions within the process.

30 When asked whether the contribution could apply to other software applications, Mr Moore confirmed that the application was only limited to spreadsheets (as described and claimed) because that is where the problem arises on a wide enough commercial scale to merit developing a solution. There was some speculation that the principle could be applied to any application constrained by an addressable memory limit, such as word-processing or a drawing application, however the patent application makes no suggestion for implementing the invention other than in conjunction with a spreadsheet application. It would seem even if the benefits might be realised by other types of application, a specific implementation would have to be provided for each. There is no basis nor assertion that the contribution of the claimed invention is directed to anything other than a spreadsheet application, much less generally to any type of application.

31 There is no doubt to me that the effect occurs at the application level and not the architectural level. The contribution is only in conjunction with the spreadsheet application, and the signpost does not suggest that the contribution is technical.

Signpost (iii): whether the claimed technical effect results in the computer being made to operate in a new way

32 This signpost was not discussed at the hearing beyond Mr Moore's acknowledgement that the signpost was not relevant to this case. The Examiner has maintained a consistent approach towards this signpost throughout the proceedings. That is, the claimed invention involves executing the program and the computer operates in accordance with the claimed program to produce the claimed technical effect, but this does not result in the computer being made to operate in a new way.

---

[6] EPO Board of Appeal T 0006/83 (Data processor network)

[7] BL O/148/19 Fisher-Rosemount Systems Inc. "Methods and apparatus to manage process control search results".

The computer operates in a conventional way under the control of the program at the application layer. I agree; this signpost does not point toward the contribution being technical.

Signpost (iv): whether the program makes the computer a better computer in the sense of running more efficiently and effectively as a computer

33 The fourth signpost has been revised from referring specifically to the speed or reliability of a computer, to being a question of whether there is a "better computer". It is not solely about the perception of speed or reliability, but a matter of relative fact as to whether there is an improved computer; that is, a better computer.

34 Mr Moore's argument acknowledged that in a physical sense the computer is no better. He argued that the test is not whether a physicist would consider the computer to operate more efficiently and effectively in an academic sense, but whether a user would perceive a better computer. He suggested that the signpost should be interpreted from the point of view of an end user or software engineer, and not a physicist. The argument acknowledges that the underlying physical nature of the computer is unchanged, but postulates that a user or software engineer would perceive an improvement in speed and stability. Whilst I agree that a user may experience a spreadsheet application running better in conjunction with the claimed invention, that is not the same thing as perceiving a better computer. Mr Moore made the point that the user may find the computer as a whole is frozen while a conventional 32 bit spreadsheet application is executing above a threshold within its memory limit. In that case I think the user is experiencing the impact of the shortcomings of the 32 bit spreadsheet application, not the computer per se.

35 When the claimed invention is used in conjunction with a 32 bit spreadsheet application the application may appear to run more effectively and efficiently. In fact, the computer is using additional addressable memory under the control of an additional application process within a framework. While to the user it may appear to be a better computer, the computer is in fact unchanged. Perceived improvement is because of the spreadsheet application sharing memory with the function framework program, not because of a better computer.

36 It is often argued that a program requiring less processing power, or which operates more quickly, must be a result of a better computer. These will be both perceivable from the perspective of the user and will be definable and identifiable. But I concur with the previous decisions cited in the skeleton arguments in this respect: *Q Software Global* (*BL O/120/11*)[8] and *JDA Software Group* (*BL O/386/12*)[9]. When the computer system remains unchanged it is not enough to merely program it to use resources more efficiently. The applications may be improved but the computer is the same.

37 I am also drawn to the points made by the hearing officer in *Commonwealth Scientific and Industrial Research Organisation* (*BL O/367/11*)[10] in respect of this signpost when considering whether the test is reliability of the computer or the

[8] BL O/120/11 Q Software Global Limited "A Security Analysis Method"
[9] BL O/386/12 JDA Software Group, Inc.
[10] BL O/367/11 Commonwealth Scientific and Industrial Research Organisation.

software. Her view, which appears to me to be correct, is: “the key point here is that it has to be the computer that is more reliable and not the program.” Following this, whichever perspective I take, the fourth signpost does not point toward the contribution being technical.

Signpost (v): whether the perceived problem is overcome by the claimed invention as opposed to merely being circumvented.

38 Mr Moore began by asserting that the problem of a 32 bit memory limit is a real world technical problem. I am inclined to agree. It is a physical constraint imposed by the characteristics of computing resources. The question is whether the problem is overcome or merely circumvented.

39 At the hearing, Mr Moore argued that the invention increases the effective addressable memory space available to the spreadsheet application. He presented the argument that this is counter-analogous to my previous decision in *Apple* (*BL O/244/13*)[11]. In that case a problem of limited bandwidth was solved by sending fewer messages in a network, and that was found to be circumventing the problem, rather than overcoming it by increasing the bandwidth. By extension, he argued, increasing the addressable memory available to the spreadsheet application overcomes the problem of limited memory available to a 32 bit spreadsheet application. This is an attractive argument, but I do not agree that the memory available to the spreadsheet application is increased. Rather, addressable memory in a separate process is used in addition to the memory footprint of the spreadsheet. The problem of memory constraints in a 32 bit application is circumvented by using additional memory in a separate process. The physical constraint upon the 32 bit spreadsheet application is unchanged. The extra memory places a proportionately increased demand on the resources of the computer. To quote myself in *Apple* “…it does not change and therefore overcome the technical characteristic or constraints [of the computer]”.

40 Mr Moore stated that to circumvent a 32 bit limit (within a 64 bit operating system) you would use a 64 bit application and get 1 TB of addressable memory. I think that overlooks the increased capability of the computer running a 64 bit operating system. In this hypothesis is it the 64 bit application or the 64 bit operating system that addresses the problem of a 32 bit limit? A moot point because that is not the issue under consideration.

41 The key point is that the resources of the computer (and available to each process) are unchanged. It would be more appropriate to say that the invention provides a separate computer program application which has its own limited addressable memory space, to be shared with the spreadsheet application. This does circumvent the problem of an individual software application being subject to memory constraints as a consequence of the operating environment within which it runs. I can only conclude that the fifth signpost does not help in suggesting the contribution is technical.

[11] BL O/244/13 Apple Inc. “Data synchronization protocol”

Does the contribution fall solely within excluded subject matter?

42 Drawing the analysis of the five signposts together, none points toward a technical effect. I therefore conclude that the contribution does fall solely within the excluded subject matter and that the claimed invention relates solely to a program for a computer as such.

Step 4: If the third step has not covered it, check whether the actual or alleged contribution is actually technical.

43 The fourth step needs only to be explored if the preceding step did not reach a clear conclusion. I believe the question has been answered above: the alleged contribution is not technical in nature.

44 I have fully considered the claims and do not consider them to define a technical contribution. Furthermore, I have considered the application as a whole and can find no basis for a technical contribution.

Conclusion

45 I find that the claimed invention is excluded under section 1(2)(c) because it relates to a program for a computer as such.

46 I therefore refuse the application under section 18(3).

Appeal

47 Any appeal must be lodged within 28 days after the date of this decision.

Ben Buchanan

Deputy Director, acting for the Comptroller