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**Datasheet for the decision
of 30 November 2021**

Case Number: T 1133/15 - 3.5.01

Application Number: 10764812.3

Publication Number: 2414956

IPC: G06F15/16, G06F15/76, G06F9/50

Language of the proceedings: EN

Title of invention:
CLOUD COMPUTING FOR AN INDUSTRIAL AUTOMATION AND MANUFACTURING
SYSTEM

Applicant:
Honeywell International Inc.

Headword:
Cloud computing/HONEYWELL

Relevant legal provisions:
EPC Art. 56
RPBA Art. 12(2), 12(4)
RPBA 2020 Art. 13(1)

Keyword:

Amendment to appeal case - reverting to the refused requests that had been replaced by amendment (yes)

Inventive step - selective application of cloud computing technology described in the prior art to industrial automation system (no - known trade-off)

Decisions cited:

T 0520/13



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Case Number: T 1133/15 - 3.5.01

D E C I S I O N
of Technical Board of Appeal 3.5.01
of 30 November 2021

Appellant: Honeywell International Inc.
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Representative: Houghton, Mark Phillip
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 14 November
2014 refusing European patent application No.
10764812.3 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman W. Chandler
Members: A. Wahrenberg
C. Schmidt

Summary of Facts and Submissions

I. This case concerns the applicant's appeal against the examining division's decision to refuse European patent application No. 10764812.3 (published as WO 2010/120440 A2).

II. The application was refused on the grounds that the subject-matter claimed in the main and first auxiliary requests lacked clarity (Article 84 EPC) and inventive step (Article 56 EPC) over the disclosures of D1 and D2.

D1: Grossman R. L: "The Case for Cloud Computing", IT Pro, March/April 2009, IEEE.

D2: Leavitt N: "Is Cloud Computing Really Ready for Prime Time", IEEE Computer Society, January 2009, IEEE.

D1 was published in the IEEE magazine "IT Professional", Volume 11, Issue 2. According to the IEEE Explore online portal, the publication date is 21 March 2009, i.e. before the priority date.

III. In the statement setting out the grounds of appeal, the appellant requested that the decision of the examining division to refuse the application be set aside and that a patent be granted on the basis of the amended main or first auxiliary request annexed thereto.

IV. In a communication under Rule 100(2) EPC, the Board set out its preliminary view that neither the main request nor the auxiliary request submitted with the grounds of

appeal involved an inventive step.

- V. In a letter of reply dated 6 November 2020, the appellant requested that, as the main and first auxiliary requests, the patent be granted on the basis the main or first auxiliary request rejected by the examining division in the decision under appeal. The main and first auxiliary requests filed with the grounds of appeal were moved to second and third auxiliary requests respectively. The appellant also filed a new request as a fourth auxiliary request.
- VI. In the communication accompanying the summons to oral proceedings, the Board informed the appellant that it was minded to reject the main and first and fourth auxiliary requests as inadmissible. Furthermore, the Board maintained its view that the subject-matter claimed in the second and third auxiliary requests lacked an inventive step.
- VII. In a letter dated 29 October 2021, the appellant provided further arguments in favour of the admissibility of the main and first and fourth auxiliary requests and the inventive step of the second and third auxiliary requests.
- VIII. Oral proceedings were held as a videoconference due to the COVID-19 pandemic.

The appellant requested that the decision under appeal be set aside and that the patent be granted on the basis of the main request, or first auxiliary request (corresponding to the refused requests filed 19 September 2014), or the second or third auxiliary request (corresponding to the main and first auxiliary request filed with the statement setting out the

grounds of appeal dated 17 March 2015) or the new fourth auxiliary request, all (re-)filed with letter dated 6 November 2020.

IX. Claim 1 of the main request reads:

An industrial automation manufacturing control system having a manufacturing execution system comprising:

a computing cloud (108) comprising at least one data storage device (112) and at least one processing device (110), wherein the computing cloud is configured to provide shared services to a plurality of industrial automation systems; and

a client (102-106) configured for a process of both data and process segregation, the client configured to communicate with the computing cloud and selectively offload data from a local system (202) to the computing cloud based upon one or more specified criteria, the client also configured to offload processes from the local system to the computing cloud based upon the one or more specified criteria, wherein at least one of the one or more specified criteria is based upon a determination of whether data or processes are required for at least one real-time process for instruction and/or control and, in response to determining that the data or processes are required for at least one real-time process for instruction and/or control, the data or processes are not offloaded to the computing cloud;

wherein at least one of the industrial automation systems is configured to use at least one of the shared services of the computing cloud and at least one service from the local system.

X. Claim 1 of the first auxiliary request has the following additional feature at the end:

wherein the at least one real-time process comprises at least one function that instructs or controls other devices in the at least one of the industrial automation systems.

XI. Claim 1 of the second auxiliary request reads:

An industrial automation manufacturing control system having a manufacturing execution system comprising:

a computing cloud (108) comprising at least one data storage device (112) and at least one processing device (110), wherein the computing cloud is configured to provide shared services to a plurality of industrial automation systems;

a client (102-106) configured for a process of both data and process segregation, the client configured to communicate with the computing cloud and selectively offload data from a local system (202) to the computing cloud based upon one or more specified criteria, the client also configured to offload processes from the local system to the computing cloud based upon the one or more specified criteria; and

a service bus configured to redirect requests from at least one of the industrial automation systems for at least one of the shared services to the computing cloud, the service bus configured to cause the shared services of the computing cloud to appear as local services to the at least one industrial automation system;

wherein at least one of the one or more specified criteria is based upon a determination of whether data or processes are required for at least one process for instruction and/or control of other devices in one or more of the industrial automation systems and, in response to determining that the data or processes are required for the at least one process for instruction and/or control of the other devices, the data or processes are not offloaded to the computing cloud; and

wherein the at least one industrial automation system is configured to use the at least one shared service of the computing cloud and at least one service from the local system.

- XII. Claim 1 of the third auxiliary request differs from the second auxiliary request by the addition of "continuously available first" before "process for instruction and/or control of other devices..." in the fourth feature and a new penultimate feature "wherein, in response to determining that data or processes are required for at least one second process that trains the at least one first process or that simulates products created using the at least one first process, the data or process are offloaded to the computing cloud, the shared services of the computing cloud including the at least one second process;" after "the data or processes are not offloaded to the computing cloud;".
- XIII. The fourth auxiliary request is based on the first auxiliary request with the wording "based upon one ... whether data" changed to "based upon one [criterion], the client also configured to offload processes from the local system to the computing cloud based upon the one specified criteria, wherein the specified criteria

is whether the data"..

XIV. The appellant's arguments can be summarised as follows:

The grounds of appeal contained the statement "The Appellant appeals the Decision of the Examining Division of 14 November 2014 to refuse the above application".

Since it was primarily the decision that was being appealed, the main and first auxiliary requests should be admitted. This was not a material change in the appeal. The fourth auxiliary request should be admitted for the same reasons.

There were further circumstances justifying the admittance of the main request and the first and second auxiliary requests. The representative who filed the appeal had retired and a new representative was now in place. Furthermore, there was an error in the decision regarding clarity.

Starting from a conventional industrial automation system, there was no explicit or implicit motivation for the skilled person to use cloud computing. For example, if faster computing or large data storage were required, then the skilled person would rather provide a faster processor and more data storage within the local system.

There was no prior art disclosing the use of cloud computing for industrial control.

The question of what should be moved to the cloud and what should remain in the local system only arose once the decision to use cloud computing has been made.

Thus, the hybrid solution using both cloud services and local services required an additional step over the prior art. There was nothing motivating the skilled person to take this step. The skilled person would rather choose either cloud computing or local computing.

There was no evidence that latency was a deciding factor when moving data and processes to the cloud. There were other factors to consider, for example reliability and storage requirements.

Neither the decision T 520/13 itself nor the application to which it related were prior art in respect of the present application. Furthermore the case dealt with local data caching and not the offloading of processes to a computing cloud. Therefore, it was not prejudicial to the finding of an inventive step in the present case.

Although service buses were known, there was no indication that the skilled person would use a service bus in a hybrid local-cloud based system for the purpose of making the cloud services appear as local services.

Reasons for the Decision

1. *Background*

- 1.1 The invention concerns cloud computing in an industrial automation and manufacturing system (paragraph [0001] of the published application).

- 1.2 Cloud computing allows for the offloading of data storage and data processing from a local computer environment to a server cloud. This has the advantage that resources can be shared at a low cost (paragraph [0002]). However, cloud computing also has drawbacks. Therefore, some tasks are more efficiently performed locally (paragraphs [0022] to [0024]).
 - 1.3 The invention provides a hybrid approach in which the claimed industrial automation system uses a mix of cloud services and local services (paragraphs [0022] and [0027]). The system selectively offloads data and processes to the cloud based on whether or not those data or processes are needed for the instruction or control of devices in the system. For example, the programming of an automated system to drill into a substance for a specific period of time is best performed locally (paragraph [0024]). Conversely, computationally intensive tasks which do not instruct or control manufacturing devices, such as computer simulations, may be advantageously performed in the cloud (paragraph [0025]).
 - 1.4 The shared cloud services appear as local services to the user of the industrial automation system. To that end, there is a "service bus" which redirects requests for a service to the appropriate service provider, either locally, or in the cloud (paragraph [0021]).
2. *Admissibility of the main request and the first and fourth auxiliary requests*
 - 2.1 The main request and the first and fourth auxiliary requests were filed in reply to the Board's communication under Rule 100(2) EPC, i.e. after the

filing of the grounds of appeal.

2.2 According to Article 13(1) RPBA 2020, which applies to the present appeal (Article 25 RPBA 2020), amendments filed after the grounds of appeal may be admitted only at the Board's discretion. The Board shall exercise its discretion in view of, *inter alia*, the current state of the proceedings, the suitability of the amendment to resolve the issues which were raised by the Board, whether the amendment is detrimental to procedural economy, and, in the case of an amendment to the patent application, whether the appellant has demonstrated that any such amendment, *prima facie*, overcomes the issues raised by the Board and does not give rise to new objections.

2.3 The main and first auxiliary request are identical to the main and first auxiliary request rejected by the examining division in the decision under appeal. The subject-matter claimed in the fourth auxiliary request essentially corresponds to the subject-matter of the first auxiliary request with minor amendments intended to simplify the claim. None of those requests contains the feature defining the "service bus" and are therefore broader than the requests filed with the grounds of appeal. Furthermore, in claim 1, the criteria for deciding whether to offload data and processes to the cloud are based on a determination of whether the data or processes are required for at least one "*real-time process for instruction and/or control*".

2.4 The amendments sought by the appellant do not address the objection of lack of inventive step in the Board's communication. They furthermore reintroduce the issue of lack of clarity relating to the term "real-time process" in the decision under appeal. This ground had

been overcome by the amendments filed with the grounds of appeal. Therefore, admitting the main request and the first and fourth auxiliary requests at this stage of the appeal proceedings would be detrimental to procedural economy, since the Board would have to consider an issue that was previously moot. These are reasons for not admitting the requests.

2.5 The appellant argued that the statement "The Appellant appeals the Decision of the Examining Division of 14 November 2014 to refuse the above application" in the grounds of appeal indicated that the decision was appealed also on the basis of the refused requests. Furthermore, since the purpose of the appeal was primarily a review of the first-instance decision, and since the amendments did not, in the appellant's view, cause a material change, the main and first auxiliary request should be admitted. The fourth auxiliary request should be admitted for the same reasons. The appellant also advanced other circumstances, namely a change of representative, and an error in the appealed decision regarding clarity.

2.6 The Board is not persuaded by the appellant's arguments.

The grounds of appeal clearly identify the present second auxiliary request as the main request. There is no mention of the refused requests and no indication that those requests are maintained on appeal.

The appellant's argument to the effect that the refused requests are automatically part of the appeal is not convincing. The appeal proceedings are based on the notice of appeal and statement of grounds of appeal filed pursuant to Article 108 EPC (Article 12(4) in

connection with Article 12(2) RPBA 2007). The statement of grounds of appeal shall contain a party's complete case (Article 12(4) in connection with Article 12(2) RPBA 2007). If the appellant chooses to address a decision ground by amending the claims, then that is the appellant's appeal case. Cancelling the amendments at a later stage of the appeal proceedings is an amendment to the appeal case which may be admitted only at the discretion of the Board (Article 13(1) PRBA 2020).

Furthermore, none of the additional circumstances argued by the appellant justifies the amendment to the case. A change of representative does not on its own justify the late filing of requests (see Case Law of the Boards of Appeal 9th ed. 2019, Chapter V-A, Section 4.8.2). The perceived error in the appealed decision on the point of clarity could have been addressed in the grounds of appeal. Indeed, there was nothing preventing the appellant from doing so.

2.7 For these reasons, the Board holds the main and first and fourth auxiliary requests as inadmissible.

3. *Second auxiliary request*

3.1 It is common ground that the invention in claim 1 of the second auxiliary request distinguishes itself from a conventional industrial automation and manufacturing control system by the features relating to cloud computing including the selective offloading of data and processes from the local system to a computing cloud and the service bus for redirecting requests for services and for causing the cloud services to appear as local services.

3.2 During the appeal proceedings, it was discussed whether the determination of whether a process was to be offloaded to the cloud happened dynamically, on the fly, or whether the claim covered a determination based on predetermined criteria, for example the type of data or process.

The appellant argued that the determination was based on dynamic criteria such as the real time availability of processing and storage resources.

The Board however does not see any support in the application for such a dynamic distribution of processes. In paragraph [0027], it is determined whether a specific process is required to be performed in real time or non-real time. The Board reads "real time" in paragraph [0027] as referring to the function carried out by the process and not to the determination itself. In paragraph [0024], real time functions include functions that instruct or control other devices, such as the actual mechanical systems used in a factory. Non-real time functions include functions that can be used to form or support the real time functions, for example simulations of the products created by the real time functions (paragraph [0025]). Thus, the disclosure in the application supports a determination based on predetermined criteria relating to the type of process rather than a determination based on dynamic criteria.

Furthermore, claim 1 covers a determination based on predetermined criteria. The criteria for offloading data and processes to the cloud are *"based upon a determination of whether data or processes are required for at least one process for instruction and/or control of other devices in one or more of the industrial*

automation system". The claim does not define when the determination is made and thus does not exclude that it is done, in advance, based on the type of process e.g. drilling or simulation.

If a claim covers a certain interpretation, it does not matter that the claim *also* covers a different interpretation. Any technically reasonable interpretation that falls under the terms of the claim may be used for the purpose of assessing inventive step.

3.3 In the Board's view, the skilled person would consider transferring data and processes of the industrial automation system to the cloud in order to obtain the benefits of cloud computing. As shown in the overview papers D1 and D2, cloud services were widely available at the priority date and their advantages were well known.

As the appellant argued, an alternative to cloud computing would be to provide the required resources locally. However, this does not make cloud computing a less obvious choice. Indeed, there can be more than one obvious solution to a problem.

Having decided to use cloud computing, the skilled person would have to provide a workable implementation. It is clear that not every function in a computer system can and should be offloaded to the cloud. For example, D1 states that cloud service can suffer from latency and bandwidth related issues associated with remote application (page 25, left-hand column, last paragraph). In addition to the latency issue, D2 mentions reliability, i.e. that the cloud service may not always be available (page 19, heading

"Reliability"), or the Internet connection might not be reliable enough (page 19, heading "Other concerns"). In view of those well known issues, the skilled person would recognise that critical processes, such as the control of the actual mechanical systems in a factory, should not be performed in the cloud. That is not to say that skilled person would dismiss cloud computing entirely. The skilled person would still use cloud computing for non-time critical processes.

- 3.4 In any case, all of the parameters latency, reliability, and data storage and processing requirements are subject to well known trade-offs. The application offers no surprising effects for the choice made.

In T 520/13 (*Advertisement selection/MICROSOFT*) an analogous division of computations between a client and a server was found to be an obvious trade-off.

Paragraph 3.4 of the decision states:

"...the question of whether to process data locally or centrally is the sort of trade-off that the skilled person routinely deals with. It is well known that local processing reduces latency, but requires more storage space and processing capabilities in the client device. Conversely, central processing has more latency but allows for a relatively simple client."

T 520/13 is not cited as prior art against the claimed invention. It is cited as an illustration of how Boards tend to judge issues of trade-offs.

- 3.5 The "service bus" in claim 1 is a consequence of, but has no real synergy with the decision of whether or not

to offload data and processes to the computing cloud. Indeed, it has nothing to do with the efficiency of cloud computing versus local computing, but rather addresses a problem of user interface integration. The service bus redirects requests for a service to the appropriate service provider and makes cloud services appear as local services to the user. In other words, the service bus provides an abstraction of the distributed processing system to the user. Such abstractions were common in distributed systems, such as distributed file systems. Furthermore, "Enterprise Service Buses" (ESBs) were well known at the priority date. ESBs integrated different services in a distributed computer system in the manner claimed. In the Board's view, it would have been obvious for the skilled person to use this type of software architecture in order to integrate the local services and the cloud services in the user interface of the industrial automation system.

3.6 For these reasons, the Board judges that the subject-matter of claim 1 of the second auxiliary request lacks an inventive step (Article 56 EPC).

4. *The third auxiliary request*

4.1 Claim 1 of the third auxiliary request further specifies that the first process that instructs/or controls other devices is continuously available and that a second process that trains the real time processes or simulates products created using the first process are offloaded to the cloud.

4.2 Training and simulation processes are exactly the kind of computation intensive, non-time critical processes that could advantageously be performed in the cloud.

The skilled person knew this. He would, therefore, have offloaded the second process to the cloud.

4.3 For these reasons, the third auxiliary request does not involve an inventive step (Article 56 EPC).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



T. Buschek

W. Chandler

Decision electronically authenticated