

This document includes some recent decisions of the EPO in 2019 with regards to software related inventions and shows relevant extracts from the respective decisions.

T 2049/12 (Data structure for defining transformations / MICROSOFT) of 9.5.2019

European Case Law Identifier: ECLI:EP:BA:2019:T204912.20190509

DECLARATIONS FOR TRANSFORMATIONS WITHIN SERVICE SEQUENCES

No Inventive step - not technical

Catchwords:

A common misconception regarding the PHILPS decision is that there are only two kinds of data - cognitive and functional - and that functional (i.e. non-cognitive) data is always technical. The relevant question for assessing whether a data structure has technical character is rather whether it produces a technical effect. In the present case, the Board considers that there is no technical effect..

Application number: 07750851.3

IPC class: G06Q 99/00, G06F 17/00

Applicant name: Microsoft Technology Licensing, LLC

Cited decisions: G 0003/08, T 1194/97, T 0258/03, T 0424/03, T 1539/09, T 1755/10

Board: 3.5.01

<https://www.epo.org/law-practice/case-law-appeals/pdf/t122049eu1.pdf>

Claim 1 reads:

One or more computer-readable media having thereon a data structure (300), for defining transformations declaratively, the data structure including the following:

a plurality of service identification fields (311), each identifying a service (211, 212, 213, 214) in a sequence (210) of two or more services; and

a transformation class field (312A, 313A) specifying a class of transformation, including parameter mapping transformations or format conversion transformations, to be performed on either input data (221) prior to being provided to the sequence (210) of services, inter-service data provided between two services (211, 212, 213, 214) of the plurality of services in the sequence (210) of services, or output data (224) output from the sequence of services; and

one or more transformation parameter fields (312B, 313B) identifying one or more parameters of the class of transformation to thereby more specifically define the transformation, wherein the transformation is specified declaratively by using the transformation class field (312A, 313A) specifying the class of transformation to be performed, as well as the one or more transformation parameter fields (312B, 313B) that more specifically define the transformation.

1. The invention

1.1 The invention relates to performing complex tasks that involve using a sequence of different services (see paragraphs [002] and [003] of the published application). The task might be to get a stock quote from all corporations in a given geographical area, which involves using a map service and a finance service [023].

The different services accept and output data in different formats and so the data must be transformed between services, as well as possibly at the end before presentation to a user [003].

The invention concerns the problem of avoiding the need for dedicated code for each transformation, which is time consuming and requires programming skills [004].

This is achieved by specifying the transformations "declaratively", i.e. in a high-level representation, by using a data structure (e.g. in XML form) that specifies the services, the class of transformation involved, and the parameters required for the transformations [027] to [032].

5. Inventive step (Article 56 EPC)

5.1 In the oral proceedings, inventive step was discussed starting from the prior art described in the application, from paragraphs [001] to [004]. As mentioned above, it was known to provide multiple services in a sequence, and to transform data provided from one service to another. In the prior art, those transformations (i.e. from "latitude" to "lat" and from "longitude" to "long") were implemented using "specific dedicated code" for each of the transformation. The dedicated code was, of course, stored on some computer-readable medium.

5.2 **The prior art and the invention achieve the same transformations.** The *difference lies in how those transformations are defined*. In the prior art, they are defined in "dedicated code", whereas in the invention, they are defined in a data structure having service identification fields, a transformation class field and transformation parameter fields.

5.3 The **appellant** argued that the claimed data structure provided more flexibility in defining the transformations. Owing to defining the transformations "declaratively", it sufficed to change the declaration in the data structure in order to change them; it was not necessary to change the code that carried out the transformation. The increased flexibility was a technical effect that supported the presence of an inventive step.

5.4 The Board, however, is not persuaded that the claimed data structure has technical character.

The invention in claim 1 provides a **different, and arguably more flexible, way of structuring a computer program**. Computer programs as such are excluded matter under Article 52(2)(c) and (3) EPC. Therefore, **pure software concepts are considered to lack technical character** (see for example T 1755/10 - Software structure/TRILOGY). Indeed, the software concept in TRILOGY was the separation of rules from an "engine" (the code that implements those rules), which is similar to the data structure and the transformations in claim 1.

5.5 Furthermore, the **activity of programming is also excluded** under Article 52(2)(c) and (3) EPC, because **it is a mental act** (see: G3/08, Reasons, point 13; and T 1539/09, Reasons, point 4.2). The **choice of program structure**, including the choice of data structures, **belongs to the activity of programming**. Well structured code helps the programmer in performing this activity, because the code is easier to understand, maintain, and adjust, but, since programming is not technical, this is not a technical effect.

5.6 The appellant furthermore argued that, when assessing a data structure according to established case law (see for example T 1194/97 - Data structure product/PHILIPS), a distinction had to be made between cognitive data and functional data. While cognitive data was non-technical, functional data had technical character. The claimed data structure was clearly functional data, and, therefore, it was technical.

5.7 The Board is not persuaded. The PHILIPS decision indeed makes a distinction between cognitive information content and functional data inherently comprising features of the technical system in which it is operative. However, in order to understand the distinction, one needs to look at the whole case.

The invention in PHILIPS concerned a picture data structure recorded on a record carrier. The data structure comprised information specifying where a relevant coded picture line had been recorded on the track, thereby facilitating access by a reader to the relevant picture content. The Board distinguished between the content of the picture, and the **data structure, which had a technical function (facilitating access) in a technical system (reader plus record carrier)**. In other words, the data structure in PHILIPS mapped to technical features in a technical system.

In **the present case, however, the data structure does not map to a technical system**; it maps to a computer program, which is excluded matter under Article 52(2)(c) and (3) EPC.

5.8 A **common misconception** regarding the PHILIPS decision is that there are only two kinds of data - cognitive and functional - and that **functional (i.e. non-cognitive) data is always technical**. The **relevant question for assessing whether a data structure has technical character is rather whether it produces a technical effect**. In the present case, the Board considers that there is no technical effect. Therefore, the claimed data structure does not provide an inventive step (Article 56 EPC).

T 0370/15 (Wiedergabe von Audio- und/oder Videodaten/WENDT) of 28.6.2019

European Case Law Identifier: ECLI:EP:BA:2019:T037015.20190628

Wiedergabe von Audio- und/oder Videodaten in einer wenigstens eine Kasse enthaltenen Umgebung

Erfinderische Tätigkeit - (nein)

Anmeldenummer: 11153013.5

IPC-Klasse: G11B 27/10, G11B 27/32, G06Q 30/00, G06F 17/30

Name des Anmelders: Wendt, Jan

Kammer: 3.5.07

<https://www.epo.org/law-practice/case-law-appeals/pdf/t150370du1.pdf>

Anspruch 9 des einzigen im Verfahren befindlichen Antrags lautet wie folgt:

"Verfahren zur Wiedergabe von Audio- und/oder Videodaten bzw. zum Einsatz von diese erzeugenden Programmen oder Applikationen (Apps) in einer wenigstens eine Kasse (18) umfassenden Umgebung (12, 14, 16), in welchem Verfahren:

- die abgespielten Audio- und oder Videodaten bzw. Programme oder Applikationen über die Zeit erfasst werden,
- die Kassenumsätze der sich in der Umgebung aufhaltenden Personen über die Zeit erfasst werden,
- Korrelationsdaten zwischen der Wiedergabe der Audio- und/oder Videodaten bzw. den Programmen oder Applikationen einerseits und den getätigten Kassenumsätzen andererseits ermittelt wird [sic], und
- die Korrelationsdaten zur Steuerung des weiteren Abspielens der Audio- und/oder Videodaten bzw. zum Einsatz der Programme oder Applikationen verwendet werden."

Erfindung

2. Die Erfindung betrifft ein System und ein Verfahren zur Wiedergabe von Audio- und/oder Videodaten bzw. zum Einsatz von Applikationen in interaktiven Endgeräten in einer Umgebung mit mindestens einer Kasse, z.B. in einem Restaurant. Der Erfindung liegt die **Aufgabe** zugrunde, eine **Steigerung des Umsatzes bzw. der Kunden-Verweilzeit durch das Abspielen von Audio- und/oder Videodaten zu ermöglichen**.

2.1 Erfindungsgemäß werden die an der Kasse getätigten Umsätze und/oder die Verweildauer der sich in der Umgebung aufhaltenden Personen, z.B. über ein mit Sensoren ausgestattetes Erfassungssystem, über die Zeit erfasst. Gleichermaßen wird über die Zeit erfasst, welche

Audio- und/oder Videodaten abgespielt werden. Hierfür sind wenigstens eine Kasse und/oder wenigstens ein Erfassungssystem und die Audio- und/oder Videoabspielvorrichtung mit einer Steuerung verbunden, die eine Korrelation zwischen diesen Daten ermittelt. Auf der Basis der zeitlichen Korrelation zwischen den Kassenumsätzen bzw. der Verweildauer und den abgespielten Audio- und/oder Videodaten wird ermittelt, ob bzw. welche Audio- und/oder Videodaten zu einer Erhöhung des Kassenumsatzes bzw. der Verweilzeit führen. Die ermittelten Ergebnisse werden bei der Wiedergabe der Audio- und/oder Videodaten berücksichtigt.

Technischer Beitrag und erfinderische Tätigkeit

3. Unabhängiger Anspruch 9 - notorischer Stand der Technik

3.1 Anspruch 9 beschreibt ein Verfahren zur Wiedergabe von "Audio- und/oder Videodaten bzw. zum Einsatz von diese erzeugenden Programmen oder Applikationen" (im Folgenden "Medieninhalte" genannt) in einer Umgebung, die wenigsten eine Kasse umfasst.

3.2 Im Verfahren werden Schritte zur Erfassung von zeitbezogenen Informationen und Ermittlung von Korrelationsdaten durchgeführt. Im einem letzten Schritt werden die Korrelationsdaten verwendet, um das Abspielen der Medieninhalte zu steuern. Im Anspruch wird **nicht genauer definiert, wie die Verfahrensschritte durchgeführt werden.** Der Anspruch **kann deswegen so ausgelegt werden, dass eine Person die Verfahrensschritte ausführt.** Mit Ausnahme eines Medien-Wiedergabegeräts und einer Kasse in einer Umgebung (z.B. ein Restaurant) werden keine technische Mittel ausdrücklich oder implizit im Anspruch genannt.

Abgesehen von der Wiedergabe von Medien erfüllt das beanspruchte Verfahren die nicht-technische Aufgabe, die Kassenumsätze zu steigern.

3.3 Die einzigen technischen Merkmale des Anspruchs, **Medien-Wiedergabegerät und eine Kasse, sind notorisch bekannt** und in Kombination allgegenwärtig in z.B. Restaurants oder Geschäften zu finden. Gegenüber der notorisch bekannten Kombination von einem Medien-Wiedergabegerät und einer Kasse hat das beanspruchte Verfahren die alleinige nicht-technische Aufgabe, den Umsatz in einem Geschäft zu steigern.

3.4 Die Kammer ist deswegen der Auffassung, dass es sich bei den **Unterschiedsmerkmalen um Schritte einer nicht-technischen Geschäftsmethode handelt, die nicht zur erfinderischen Tätigkeit beitragen können.**

T 2458/16 (OBJECT DISPLACEMENT METHOD FOR A WEB PAGE / RAKUTEN) of 23.7.2019

European Case Law Identifier: ECLI:EP:BA:2019:T245816.20190723

OBJECT DISPLACEMENT METHOD FOR A WEB PAGE

Inventive step - (no)

Inventive step - effect not made credible within the whole scope of claim

Application number: 10820486.8

IPC class: G06F 3/048, G06F 3/14, G06F 17/30, G06Q 30/00

Applicant name: Rakuten, Inc.

Board: 3.5.05

<https://www.epo.org/law-practice/case-law-appeals/pdf/t162458eu1.pdf>

1. The application pertains to a Web page which comprises a plurality of elements. The elements provide links to associated Web pages and information relating to products sold or services provided via those Web pages.

The problem addressed is how to indicate additional information to the user of the Web page.

The solution suggests displacing, on the Web page, a number of icons towards elements on the page to indicate, for example, the popularity of a product.

2. Prior art

Document D1 discloses techniques for improving the experience of online shopping. A customer is shown the activity of other customers pertaining to products or groups of products in an online store.

Main request

3. The board is satisfied that the independent claims as amended meet the requirements of Articles 123(2) and 84 EPC.

4. Patentability

4.1 It was not disputed by the appellant that document D1 discloses all features of the subject-matter of claim 1 except that:

(a) D1 relates to the displaying of icons and not to displacing them.

(b) Only target positions of icons are disclosed in D1.

(c) D1 does not disclose an object displacement step of displacing each of the icons by designating a path lying outside the display areas of the elements in the Web page between the initial position and the display area of a respective set target element, and of displacing each of the icons to a respective target position or a predetermined range from a respective target position.

4.2 The board considers that these **distinguishing features lead to the effect of providing an alternative presentation of information which is based on access data pertaining to elements on a Web page.**

4.3 In the board's judgement, this is not a technical effect. The **access data pertaining to elements on a Web page may be of non-technical nature**, for example, order quantity of a product sold or a service provided through a Web page linked from each of the elements during a past certain time period (claim 1, lines 18 to 20). Furthermore, it is **not apparent if, and to what extent, the information presented to the user of the Web page correlates with the access data**. Independent claim 1 does not comprise any features in this regard. In view of figures 7 to 10 of the present application, it appears that the same number of icons may move to and arrive at all elements (product images).

4.4 The appellant submitted in the statement setting out the grounds of appeal a number of technical problems allegedly underlying the invention as claimed.

The board is not convinced.

4.5 The **distinguishing features do not lead to a more efficient use of screen space**. First, in document D1 (Figure3) and in the application (Figure 10, claim 1, lines 23 to 25), the icons at the target position cover similar parts of the elements. Second, the claimed Web page uses the available screen space rather less efficiently due to the space needs of the path lying outside the display areas of the elements.

Consequently, the question on whether a more efficient use of screen space is a technical effect does not need to be addressed. Likewise, decisions T 928/03, T 1562/11, T 1237/10, T 1375/11 and T 1741/08 are not pertinent.

4.6 The **graphical user interface is not improved by the distinguishing features**. As is apparent from figures 7 to 10 and the wording of the independent claims (claim 1, lines 23 to 25), the human-shaped icons at the target position do obscure the elements of the Web page. Hence, the invention does not enable a more accurate selection of a link to a Web page.

4.7 In view of section 4.3 above, the **invention does not provide an indication of a state of a technical system**.

4.8 The appellant argued further that the invention as claimed could be "applied to a wider range of layouts" and would be able to "deal with a wider range of access conditions without changing the method of indicating same, because it does not rely on space being available in the margins of display areas".

The **board disagrees**. Neither the claims nor the description of the application relate to any specific layouts or specific access condition values. Moreover, the icons as claimed are displayed, at least in part, inside of the margins of display areas (see section 4.6 above), and the screen space is not used more efficiently (see section 4.5 above).

The **subject-matter claimed, hence, does not address conflicting technical requirements**.

4.9 At the oral proceedings, the appellant submitted that the distinguishing features would solve the following problem:

"How to resolve the tension between a desire to indicate number of icons and a desire to indicate a particular area of the screen?"

4.10 The board holds that the **distinguishing features (see section 4.1) do not solve this problem**. As is apparent from figures 7 to 10 of the application, during the displacement of the icons, a user does not get any indication on the target element. Figure 8 depicts positions of human-shaped icons in the course of the displacement process. The final target elements of the two icons on the right are not indicated to the user. Likewise, the target element of the icon positioned between the "product image 5" and "product image 6" is not apparent for the user. The target element becomes clear only when an icon arrives at this target element. Document D1, however, discloses a plurality of icons positioned at a target element.

When there are only two target elements, as visualised in the video sequence presented by the appellant at the oral proceedings, the user may receive an indication on the target element of an icon during the displacement process. **Claim 1, however, is not limited in this way.**

4.11 The appellant argued that the distinguishing features would amount to an alternative solution.

The board, as a rule, agrees with this argument. However, as set out in sections 4.2 and 4.3, the **alternative solution does not lead to a technical effect**.

4.12 The board would like to note that the use of moving icons has disadvantages with regard to accessibility for visually impaired persons.

4.13 In view of these considerations, the board judges that the subject-matter of claim 1 does not involve inventive step based on document D1 as the closest prior art and the lack of technical effect of the distinguishing features.

First auxiliary request

5. Patentability

5.1 Document D1 does not disclose the features added to claim 1:

"the object displacement method further comprises an access load detection step for detecting current server loads of Web servers that provide Web pages linked from each of the elements, and

the target element setting step comprises setting the one or more target elements among elements for which the server load is less than a certain threshold".

5.2 The appellant submitted that "providing a user with information about conditions of a technical system is of itself technical" and that the user of the Web page is guided with regard to resource availability.

5.3 The **board agrees that the current server load is information about the conditions of a technical system**. However, the **Web page as claimed does not provide the user with the**

(values of the) current server loads. Instead, the current server load is used for "setting the one or more target elements among elements for which the server load is less than a certain threshold".

5.4 The **user is not consistently provided with guidance with regard to the current server loads**. First, if no icons arrive at an element, it might be due to a very high server load or a very low order quantity of a product sold or service provided through a Web page linked from this element. Second, if an element is set as a target element due to a low server load, this will only be visible for the user if, at the same time, the order quantity is not zero and thus icons arrive at this target element. In other words, the part of the target element setting step specified on page 2, lines 15 to 17, of claim 1 influences the information displayed to the user only when the corresponding element is linked to a Web page through which a sufficient number of products are sold. In this regard, claim 1 does not define any specific mapping between order quantity and the number of initial positions of icons.

Consequently, the user is not always provided with guidance with regard to the current server loads. The effects referred to by the appellant (section 5.2) are thus not consistently achieved. The appellant did not suggest other effects and the board is not aware of any.

5.5 Document D1 hints, in general terms, at the access load detection step in paragraphs 39 (last sentence) and 57 (second sentence).

5.6 In view of the above considerations, the board judges that the subject-matter of claim 1 does not involve inventive step.

T 1924/17 (Data consistency management/ACCENTURE GLOBAL SERVICES) of 29.7.2019

European Case Law Identifier: ECLI:EP:BA:2019:T192417.20190729

Data consistency management

Inventive step - mixture of technical and non-technical features

Inventive step - identification of technical features

Interpretation of Article 52(2)(a) and (3) EPC - mathematical methods as such

Remittal to the department of first instance - (yes)

Application number: 13005454.7

IPC class: G06F 17/30

Applicant name: Accenture Global Services Limited

Cited decisions: G 0003/08, T 0208/84, T 0026/86, T 0107/87, T 1173/97, T 0641/00, T 0258/03, T 0154/04, T 1242/04, T 0279/05, T 0862/05, T 1227/05, T 1569/05, T 0658/06, T 1326/06, T 1500/08, T 0963/09, T 1316/09,

Examples of recent 2019 Board of Appeals decisions related to Software Innovations

T 0309/10, T 0318/10, T 2230/10, T 1965/11, T 0104/12, T 0650/13,
T 2330/13, T 0598/14, T 0817/16
Citing decisions: T 0697/17

Board: 3.5.07

<https://www.epo.org/law-practice/case-law-appeals/pdf/t171924eu1.pdf>

The invention

2. The invention relates to data consistency management. It aims at achieving scaling using cloud computing for applications relying on a relational database as the data tier to provide transaction support and to ensure data consistency (originally filed description, paragraph [0001]).

...

Transaction support with a strong consistency guarantee may be needed only on a part of the data for a transaction (paragraph [0019]). For example, in an online shopping website, while transaction support may be of importance for purchase orders, transaction support may not be considered essential for product descriptions. Non-relational database management systems, denoted not-only structured query language (NoSQL) data stores, may provide higher performance, scalability and availability in a cloud computing environment by forgoing the ACID property. For example, a NoSQL data store may achieve scalability and availability in a cloud computing environment by forgoing the consistency guarantee, and instead support eventual consistency, where all updates will either reach all replicas eventually, or be discarded due to later updates to the same data items. For example, data tables that do not require the ACID property may be identified, and a NoSQL data store may be used to manage the data for the identified data tables to improve performance. However, for applications for which transaction support is essential, relational database management systems may still be needed.

The invention proposes an automated approach for determining the trade-off between data consistency and scalability, thus accelerating the process of augmenting the data tier with NoSQL data stores for scalability in the cloud (paragraph [0027]). The invention monitors database queries issued by an application, and identifies data tables with query patterns that are most suitable to be managed by a NoSQL data store (paragraph [0027]). Based on a determination that a certain data table may be managed by a NoSQL data store, the invention creates data structures in the NoSQL data store according to the data schema of the table, and translates SQL queries to the data table into corresponding NoSQL application programming interface calls (paragraph [0027]). For example, the invention may identify queries that select data from a single table using the primary key for this table. Such queries may be supported by key-value stores, which are NoSQL data stores, with high performance. As a further example, the invention may identify select queries aggregating a single column of a table. For such queries a column store may be suitable (paragraph [0047]).

A data table ranking module of the invention ranks data tables with a linear combination of the percentage of read queries and the percentage of query patterns suitable for a NoSQL data store (paragraph [0038]). A data table determination module automatically determines which data table can tolerate data inconsistency from the ranked data tables, and thus can be managed using a NoSQL data store (paragraph [0041]).

Main request

3. Claim 1 of the main request relates to a data consistency management system determining whether to forward a query to a NoSQL data store or to a relational database management system (RDBMS) by monitoring database queries issued by an application, and identifying data tables with query patterns that are suitable to be managed by the NoSQL data store. The system comprises the following features itemised by the Board (with reference signs removed):

A a query identification module for monitoring and parsing queries to identify all queries of a data table, and calculating how many of the identified queries are read queries, and how many of the identified queries match the query patterns

B a data table ranking module for ranking data tables with a linear combination of a percentage of read queries and a percentage of the query patterns

C a data table determination module for automatically determining which data tables are to be managed using the NoSQL data store

D a query translation module for automatically translating queries targeting the determined data tables to NoSQL API calls

E a memory storing machine readable instructions to:

E1 receive, by the query identification module, a query

E2 determine, by the query identification module, a suitability of the query for processing by the NoSQL data store, or the RDBMS,

wherein the machine readable instructions to determine the suitability of the query for processing by the NoSQL data store, or the RDBMS, further comprise:

E2a determining whether the query is a select query that selects data from a data table via a primary key of the data table, the query matching a key-select pattern

E2b determining whether the query is a select query that aggregates a single column of a data table, the query matching an aggregation pattern

E3 rank, by the data table ranking module, data tables based on a combination of read queries for the data tables and the query patterns suitable for the NoSQL data store for the data tables, at least one of the data tables containing information for responding to the query,

Examples of recent 2019 Board of Appeals decisions related to Software Innovations

wherein the machine readable instructions to rank the data tables further comprise:

E3a ranking a data table based on a linear combination of a percentage of the read queries for the data table, a percentage of queries of the data table that match the key-select pattern, and a percentage of queries of the data table that match the aggregation pattern,

E3b wherein the linear combination comprises an equation

$$\text{rank}(t) = \text{lambda1 } rp(t) + \text{lambda2 } kp(t) + \text{lambda3 } \text{maxc}(ap(t,c)),$$

wherein $rp(t)$ represents a percentage of read queries of a table t , $kp(t)$ represents a percentage of queries of the table t that match the key-select pattern, $ap(t,c)$ represents a percentage of queries of the table t that match the aggregation pattern and aggregate over the data in a column c of the table t , and lambda1 , lambda2 and lambda3 are linear coefficients

E4 based on the ranking, determine, by the data table determination module, data tables from the ranked data tables that are to be managed by the NoSQL data store, or by the RDBMS

E5 determine, by the query identification module, whether the query is for at least one data table managed by the NoSQL data store

E6 based on a determination that the query is for the at least one data table managed by the NoSQL data store, translate, by the query translation module, the query to NoSQL application programming interface (API) calls for using the NoSQL data store to respond to the query

E7 forward the translated query to the NoSQL data store

F and a processor to execute the machine readable instructions

Inventive step - Article 56 EPC

4. Claims 1 to 12 of the main request are identical to claims 1 to 12 of the main request decided upon by the Examining Division. Hence, in the following, the Board will review the Examining Division's decision, in the light of the appellant's submissions filed with its statement of grounds of appeal, in order to examine whether the appeal is allowable (Article 110 EPC).

The contested decision

5. The Examining Division argued that claim 1 of the main request was "narrower" than claim 1 of the third auxiliary request. Since the third auxiliary request lacked inventive step over document D1, the main request therefore also lacked inventive step. The Board presumes that the Examining Division intended to state that claim 1 of the main request was broader than claim 1 of the third auxiliary request.

Although the contested decision does not discuss the differences between the main request and the auxiliary requests in any detail, the appellant submitted in its statement of grounds of appeal that claim 1 of the present third auxiliary request, which was identical to the third

auxiliary request decided upon by the Examining Division, differed from claim 1 of the present main request in that it added features from originally filed dependent claims 4, 6, 7 and 8 and features taken from the original description.

6. In its decision, point 3.2, the Examining Division identified the following features of claim 1 of the third auxiliary request which it considered as technical: a system, a data store, a database management system, a memory and a processor.

Document D1, which it identified as the closest prior art, disclosed a system comprising all the features identified as technical.

In the Examining Division's view, the remaining features were non-technical because, taken in isolation, they merely constituted a number of abstract procedural steps in terms of a computer program as such.

The Division considered that features of a computer program may contribute to the technical character of the invention if they were capable of bringing about a "further" technical effect, when being executed, or involved "further" technical considerations. It referred to the Guidelines for Examination, G-II, 3.6. In the system according to claim 1, the effect of the procedural steps was to achieve different execution times and data consistency levels. These effects, however, were not "further" technical effects. Achieving data consistency levels was a "human requirement", as there was "no technical reason for keeping data consistent versus partially or totally inconsistent". Hence, data consistency was part of the requirements specification. Achieving different execution times was "an inherent side effect of the (any) different computer programming" and, therefore, "not sufficient on its own to qualify as a technical effect".

The various modules of the claimed system were "logical containers each providing a logical functionality performed by a collection of procedural steps and constituting a computer program as such", and were therefore considered as being non-technical.

Features like "key-value store" and "column store" were "data structures" and, hence, merely static memory configurations not contributing to the technical character of the invention (see point 3.2 of the contested decision).

As all the features contributing to the technical character of the invention were already known from a notoriously known system as described in D1, and as none of the potentially differentiating features contributed to the technical character of the invention, claim 1 lacked inventive step (see points 3.3 and 3.4 of the contested decision).

7. In its statement of grounds of appeal (point I.4), the appellant disagreed and argued that the reasoning of the contested decision ignored functions and interactions of the claimed modules, as well as the technical considerations required for the invention and its technical advantages. Results of queries processed by a NoSQL data store could be returned faster and the overall system performance could be improved in comparison to sending the queries to the RDBMS. Achieving this advantage required the technical consideration of how to realise the trade-off between the consistency supported by the RDBMS and the performance provided by the NoSQL data store.

Moreover, the **appellant** argued that the claimed subject-matter achieved at least the same technical effect of improving throughput as the system proposed in document D1 (point I.4.7 of the grounds), but in a different manner. Consequently, all of the distinguishing features were relevant for assessing inventive step. The appellant identified distinguishing features over D1 and argued that those distinguishing features contributed to solving the technical problem of "how to improve a performance in a system using the CacheGenie of D1" while ensuring data consistency in a distributed database system. The solution involved an inventive step, as the skilled person would not arrive at the claimed subject-matter in an obvious manner.

8. The **Board does not agree with the Examining Division's identification of technical and non-technical features in claim 1.**

9. The Examining Division considered NoSQL data stores such as "column stores" and "key-value stores" as data structures not contributing to the solution of a technical problem.

As correctly stated in the application, paragraphs [0019] and [0032], NoSQL data stores including key-value stores and column stores are non-relational database management systems. **A database management system is not a data structure, but a software system for storing, retrieving and processing data which typically uses various data structures for the efficient management of data.** Hence, these systems are **not merely static memory configurations, they implement methods operating on the data and the data structures to query the data**, for example. Thus, the reasoning of the contested decision is not convincing.

Moreover, the Examining Division identified database management systems as being technical, but considered the features specific for relational database management systems to be non-technical. As **the technical function of a database management system is, at least to a substantial part, determined by the data model supported by the system (e.g. the relational model of data), the Board sees no reason why relational database management systems should be non-technical, if it is accepted that database management systems in general are technical.** Since an RDBMS specifically supports the relational model of data, this has technical consequences with respect to the way data can be stored in and processed by the database management system. Hence, the Board does not agree with the reasoning of the Examining Division.

However, for the avoidance of doubt, the Board notes that its position is **not that all features implemented in (relational) database management systems contribute by virtue of this fact alone and independent of their nature to the technical character of an invention**. For example, **a feature of a database management system for accounting costs related to the use of the system by different users may be regarded as being non-technical.**

10. In its decision, point 3.2, the Examining Division also argued that the claimed procedural steps did not pertain to the internal functioning of the computer and did not serve an adequately defined technical purpose.

10.1 In its statement of grounds of appeal, the **appellant** argued that claim 1 explicitly defined an "adequately defined technical purpose", namely determining whether to forward a query to a NoSQL data store or to an RDBMS by monitoring database queries issued by an application, and identifying data tables with query patterns that are suitable to be managed by the NoSQL data store. This provided, in particular, an adequately defined technical purpose for the mathematical feature of a linear combination defined in claim 1.

10.2 In order to assess the issue whether and to which extent claim 1 contributes to the solution of a technical problem, the Board considers it to be appropriate to **review some decisions of the boards of appeal in the field of information systems.**

11. A first group of decisions concerns **inventions related to accessing data in database management systems and, in particular, the processing of structured queries for this purpose.**

11.1 In decision T 1242/04 (OJ EPO 2007, 421), the invention according to claim 10 related to a system for providing product-specific data in a service station. In point 4.3 of the reasons, the decision states the following:

"In assessing inventive step, only the features which contribute to the solution of the technical problem need to be taken into account (see T 641/00, OJ EPO 2003, 352). In independent claim 10 these are:

- a central database for storing and providing data
- an archive store for archiving data files retrievable via their assigned identification codes which comprise changes to the specific product in sequential data file versions
- user interfaces assigned to service stations and connectable to the archive store by telecommunication for the retrieval of data files, and
- a computer-assisted program which communicates with the central database and the archive store in order to generate new and/or updated data files and store them in the archive store.

In contrast, the data file data sequentially stored in the archive store, like the equipment data in the central database, has no functional character within the meaning of T 1194/97 (see in particular paragraph 3.3; OJ EPO 2000, 525), since **a defect in this data has no effect on the functional capacity of the system.** [...]"

Hence, this decision **identified not only the central database for storing and providing data as a feature contributing to the solution of a technical problem (in combination with the other listed features), but also the computer program communicating with this central database and an archive store.**

11.2 Decision T 279/05 of 5 October 2007 concerned an **invention** related to **determining airline seat availability.** The invention involved a mixture of technical aspects, e.g. servers, and non-technical aspects, e.g. airline seat availability and yield management. Consequently, the decision relied on the so-called COMVIK approach (see decision T 641/00, OJ EPO 2003,

352) to assess inventive step for mixed inventions. In points 3 and 4 of its reasons, decision T 279/05 states the following: "The technical field is computer engineering, and database querying in particular. [...] However, method claim 1 (and apparatus claim 19) presently on file limits the invention to a technical aspect, namely having a travel planning system server submitting the queries to the availability system as well as storing the responses and performing the prediction of availability."

As evident from the cited reasons, the competent Board considered **database querying to be a technical field.**

11.3 The **invention** in decision T 862/05 of 20 February 2008 related to an **electronic sales and service support system intended for banks**. In point 2 of its reasons, the decision states the following (underlining added):

"The Board considers the technical features of claim 1 to be the following:

- a central database,
- means for inputting data into the central database,
- means for searching the database and identifying records,
- workstations with or without a graphic user interface,
- telecommunication links, and
- means for building structured queries. [...]"

It follows that the competent Board regarded **a central database, means for searching this database and means for building structured queries as technical features of the invention.**

11.4 In decision T 658/06 of 25 November 2010, the **invention** concerned **recording and managing bonus points for telephone users**. In point 4 of its reasons, the decision states (in German):

"Das beanspruchte Verfahren zum Betreiben eines Bonusbearbeitungssystems verwendet ein Telekommunikationsnetz und umfasst Datenbankoperationen (Listenabfragen, Datenvergleiche, bedingte Speichervorgänge etc). Es weist daher den erforderlichen technischen Charakter auf [...]"

Hence, the competent Board considered **database operations ("Datenbankoperationen") as conferring a technical character on the claimed method.**

11.5 The **invention** in decision T 1500/08 of 4 November 2011 related to the **automatic generation of formally specified structured queries for a database management system based on the user input received**. The invention maintained a number of query strings containing placeholders that could be substituted when generating a query on the basis of the

input received from the user. When compared with the prior art, the question of inventive step for auxiliary request 2 in this case came down to the following: Would it have been obvious to the skilled person to modify the teaching of the prior art so that only the operators (in a query string) were substituted before transmission to the database server? The technical effect was that, sometimes, a previous search could be reused by the database server (see reasons 5.8 and 5.9). Hence, the competent **Board considered the reuse of database queries to be technical.**

11.6 According to the background section of the patent application underlying decision T 963/09 of 5 June 2014, conventional database systems typically provided a general auditing facility that recorded an audit trail containing general information about the user and the query issued. These auditing facilities recorded information only as to which tables were accessed, not whether certain records inside a given table were accessed. This table-level auditing tended to generate a large number of false audit records, because many accesses to a given table did not touch sensitive data.

The **invention** aimed to **enable selective auditing of accesses to tables of a relational database system, said system comprising a database server and a client.** This was achieved by including in each table an "auditing flag" indicating whether auditing was enabled for that table. Upon receipt of a database query from the client, the database server checked the auditing flags of the tables accessed by the query to see for which tables the access should be audited. If auditing was enabled, the database server modified the query by inserting into the query "monitoring logic", which caused audit records to be created "for rows in relational tables that are accessed by the query and that satisfy an auditing condition". The modified query was then processed and the query result was returned to the client. The selectivity of the auditing resided in the use of the auditing condition, which was a declaratively specified condition such as "salary > 1,000,000".

The appellant in that case explained that the invention allowed row-based selective auditing to be performed based on an auditing condition that referred to fields which were not included in the query result returned to the client. The competent Board accepted that the claimed solution to the **problem of implementing selective auditing could not be regarded, without documentary evidence, as a mere obvious possibility and concluded that the claimed subject-matter involved an inventive step.** Evidently, the competent **Board considered database accesses in general (see point 7.6 of the reasons) and the specific implementation of row-based selective auditing in an RDBMS, in particular, to be technical.**

11.7 In decision T 104/12 of 8 September 2016, the **invention** concerned a **method of extracting data using a database view query from an online transaction processing system to a data sink.** In point 3.8 of the reasons, the competent Board acknowledged that **implementing the execution of a database view query was a technical problem.**

11.8 Decision T 1965/11 of 24 March 2017 concerned the **optimisation of structured queries to an RDBMS in the presence of materialised views.** It was known that the query optimisation component of a relational database management system attempted to find a query execution plan for a structured query, which precisely defined the data to be retrieved but did not define at all how the system should retrieve the data, i.e. how the query was to be executed. In point 5.3 of its reasons, the decision states the following:

"The **invention** makes it possible to **find low-cost query execution plans that make use of the available materialised views in order to improve query performance** [...] Moreover, in order to explore the search space for such low-cost query execution plans, it proposes integrating the materialised views into the table of alternatives during the plan exploration stage. For this integration, it is necessary to match query plans with materialised views in order to identify useful plan alternatives for such views. The **invention teaches using query graphs for the matching in order to substantially reduce the complexity of extracting operator trees which encode a specific join order**. In the technical context of query optimisation in relational database systems, this teaching is based on further technical considerations and solves the problem of providing a technically feasible implementation, in particular one that achieves an acceptable time complexity for query optimisation in relational database systems."

This decision makes it clear that **query optimisation in an RDBMS is considered as contributing to the technical character of the invention**.

12. As one may see some similarity between querying database management systems by means of structured query languages and searching databases by means of information retrieval systems, the Board also reviews some decisions in the field of information retrieval.

Computer-implemented systems for information retrieval support searching for information in a document, searching for documents themselves, and also searching for metadata that describe data such as texts, images or sounds. First, a user enters a query into the system. Queries are attempts to formulate the user's information need. For example, the system may allow a user to input search terms as a query in web search engines, or the user may select an exemplary document and submit the query to find similar documents. User queries are matched against the information stored in a database, for example using an index structure.

In information retrieval, the query typically has no precise semantics (e.g. it uses just natural language to describe the user's information need in an informal manner). Hence, an information retrieval system typically attempts to find best matches, i.e. the data items are selected based on their estimated relevance to the query. Innovation in this field may concern the way how relevance is determined, often by calculating a similarity between the user's information need expressed in the query and the objects in the database.

12.1 Decision T 1569/05 of 26 June 2008 concerned an **information retrieval system for retrieving images using textual descriptions of the images as searchable metadata**. A mathematical model of meaning was used to identify the semantic similarity of words. In points 3.5 to 3.7 of the reasons, the competent Board stated:

"In the Board's view, **neither the mathematical model of meaning according to D3 nor the modified model according to the invention are within the technical area, since only the meaning of the words determines how they are represented, stored and selected, and since mathematical algorithms completely define the processing**. In this respect the present invention is similar to the case T 52/85 - Listing of semantically related expressions/IBM (not published in OJ EPO), where the deciding board held that **automatically generating a list of expressions semantically related to an input linguistic expression is basically not of a**

technical nature but a matter of the meaning of those expressions, ie of their abstract linguistic information content. [...]

A technical aspect can therefore at most be seen in the application of these models for retrieving data in a computer database, such retrieval being normally considered to have technical character. [...]

In the present case the retrieving step produces a different result than the prior art for the sole reason that the semantic subspace used for the retrieval has been scaled down. Hence, the only principles that have been modified concern the search for the image description closest in meaning to the desired description (keyword). They do not concern the search performed within the database to retrieve the image corresponding to the input data.

This distinguishes the present invention from the subject-matter considered in decision T 1351/04 - File search method/FUJITSU (not published in OJ EPO). In that case the **board saw a technical effect in 'the control of the computer along the path leading to the desired data'** (point 7.2). In the present case, however, the search is not primarily for a certain data location but for certain words having a given lexical meaning. On the basis of these words the computer finds the associated images, but how this is done is not part of the invention."

Hence, the competent **Board confirmed that retrieval from a database was normally considered as having technical character.** However, it **regarded the mathematical model of meaning used to define and calculate the similarity of images via their textual descriptions as non-technical.**

12.2 In its decision T 1316/09 of 18 December 2012, point 2 of the reasons, the competent Board considered a **method or a combination of methods of text classification per se as not producing any relevant technical effect or providing a technical solution to any technical problem.**

12.3 In decision T 309/10 of 19 June 2013, the invention concerned the archival and retrieval of documents. The competent **Board considered that the core method of retrieval could well be performed without the technical aid of a computer and by a librarian solving the non-technical problem of storing and locating books** (see reasons 9 and 10). The argument that librarians would not, or could not, maintain the information required in their head, so that the invention did not amount to the automation of a mental act, was not accepted (see reasons 16). Moreover, in its reasons, point 15, the decision states the following:

"The appellant has argued that the **invention makes the retrieval of relevant documents easier and more accurate. That argument bears on the non-technical problem of librarianship.** The same advantage accrues to any library, regardless of its technological substrate; regardless, indeed, of whether or not there is a technological substrate at all. The Board does consider that **retrieval and accuracy might, in some circumstances, be technical issues.** [...]"

12.4 Decision T 598/14 of 6 November 2014 concerned a method for generating, from an input set of documents, **a word replaceability matrix defining semantic similarity between words occurring in the input document set.** The word replaceability matrix was used for

determining document similarity and for enhancing search queries for retrieval of information from the document set. The competent **Board considered the distinguishing features of the claimed invention over the prior art as non-technical aspects which could not contribute to inventive step.**

In particular, the distinguishing features corresponded to a **change in the mathematical model used for calculating the probability that a first word of a pair is semantically suitable as a replacement for the second word of the pair.** The mathematical model used was based on determining fuzzy sets by taking into account, for each word or term, word sequences with a predetermined number of words of the context of the term. The **considerations underlying these distinguishing features were that, in text documents, words which had similar meanings or were related were more likely to occur in the same or similar phrases or context than unrelated words. These considerations were of a purely linguistic nature** and had to be ignored when assessing inventive step. In point 2.3 of the reasons, the competent Board stated the following:

"In the **invention, the linguistic aspects are translated into the mathematical model.** The Board considers that the **translation of linguistic considerations into a mathematical model with the aim of enabling the linguistic analysis to be done automatically by a computer can be seen as involving, at least implicitly, technical considerations.** This is also in line with decision T 1177/97, point 3, last paragraph, or opinion G 3/08, "Programs for computers", OJ EPO 2011, 10, points 13.2 and 13.3. However, according to G 3/08, point 13.5, **this is not enough to guarantee the technical character of subject-matter otherwise excluded from patentability under Article 52(2) and (3) EPC.** The technical character would have to be established on the basis that those considerations constituted "further technical considerations".

The Board is convinced that **no such "further technical considerations" can be found** in the present case. As explained above, the translation simply reflects the linguistic aspects in the mathematical model. The modified model for semantic similarity results in a different set of words being considered to be semantically suitable as a replacement for each word. **According to established case law, such linguistic aspects do not have a technical character."**

Moreover, the competent Board refused a request for referral of a question to the Enlarged Board of Appeal, stating that "in the Board's view there is clear established case law on the question of patentability of mathematical methods or methods for information retrieval based on semantic similarity, and the application of that case law is harmonised" (reasons 3.6; emphasis added by the present Board).

12.5 Decision T 2230/10 of 3 July 2015 states in its reasons, point 3.10, the following: "**The Board [...] does not accept that the algorithm is based on technical considerations in that it has been purposively designed with a view to the relevance to the user of the search results obtained, as this relates to the cognitive content of the returned documents.**"

Hence, this decision **regarded certain considerations relating to the cognitive content of the documents as non-technical.**

13. The Board summarises the situation with respect to the technicality of query processing in database management systems and information retrieval systems as follows:

Structured declarative queries, which are used for retrieving data managed in a relational database management system, normally have precise, formally defined semantics, i.e. the query precisely describes the data that is to be retrieved, and the database management system then retrieves the specified data set as a result. Relational database management systems typically execute such queries by determining an efficient query execution plan based on cost estimates for the necessary internal operations of the computer system (e.g. in terms of main memory accesses, hard disk accesses, central processing unit resources). Such **database management systems are software platforms for the centralised control of data** ("central database"). **Features of these platforms often have a technical character, as they have been designed based on engineering considerations concerning the efficient exploitation of the computer system as a technical system.**

Information retrieval systems typically have to formally calculate a semantic similarity of documents, which is typically regarded as involving non-technical considerations and being based on subjective criteria and the content (semantics) of the documents to be retrieved.

In view of the above, there is **no contradiction in the case law relating to retrieval of data from database management systems and to information retrieval**. Rather, the different judgments of the technical character of the features of these systems reflect the different kinds of considerations in the different fields.

14. The above review of relevant case law leaves **no doubt that the boards of appeal have in the past judged that many aspects of processing structured queries in database management systems are to be regarded as technical.**

The **Board agrees with the appellant that claim 1 adequately defines a system solving a technical problem.** In particular, improving the efficiency of executing structured queries to, or improving the throughput of, an RDBMS by automatically managing the data in various data stores with different properties and exploiting the different performance characteristics of these data stores for enhanced query processing solves a technical problem.

The Board also reviewed whether the Guidelines for Examination in the EPO may have misled the Examining Division. However, even in the November 2018 version of the Guidelines, there are, with respect to database systems, only pointers that **features specifying how an information model is stored in a relational database can make a technical contribution (G-II, 3.6.2), and that an index structure in a database constitutes functional data (G-II, 3.6.3).**

15. In the present case, a further issue that may have led the Examining Division to wrong conclusions when it identified technical and non-technical features is that claim 1 refers, in the context of its ranking feature, to a linear combination, i.e. a mathematical formula (see features E3a and E3b of claim 1). The **Examining Division considered the ranking feature as an abstract procedural step, which is non-technical.**

16. For the assessment of the technical character of a method comprising a mathematical feature, the Board considers it appropriate to review how the relevant provisions in Article 52(2)(a) and (3) EPC are to be interpreted.

17. Article 52(2)(a) EPC codifies that "mathematical methods" are not to be regarded as inventions within the meaning of Article 52(1) EPC. Article 52(3) EPC stipulates that the patentability of the subject-matter or activities referred to in Article 52(2) EPC is to be excluded only to the extent to which a European patent application or European patent relates to such subject-matter or activities as such.

...

In view of the above analysis, the Board has no doubts that methods relating to pure mathematics are excluded from patentability by their very nature. This interpretation is consistent with the context given by Article 52(1) EPC, as inventions in all fields of technology always concern the real world and are not merely theoretical, abstract subject-matter or activities. This interpretation is also consistent with the object and purpose of the relevant provisions in Article 52 EPC, as the legislative history clearly shows the aim to exclude "mathematical theories" from patentability, and as the Board considers that the expression mathematical theories at least encompasses pure mathematics.

19.3 With respect to applied mathematics, it is well known that mathematics is an important tool in particular for describing subject-matter or activities using mathematically precise formal expressions, not only in technical fields but also in non-technical fields such as economics.

In the Board's view, the context provided in Article 52(1) EPC, i.e. the limitation of inventions to all fields of technology, makes it clear that **methods applying mathematics in a non-technical field are generally excluded from patentability** (unless they use technical means, see decision T 258/03, EPO OJ 2004, 575, headnote I, according to which a method involving technical means is an invention within the meaning of Article 52(1) EPC). **However, where mathematical features of an invention contribute to the solution of a technical problem, such mathematical features cannot be ignored when assessing inventive step.**

The Board's interpretation of Article 52(2)(a) and (3) EPC with respect to "mathematical methods as such" is consistent with the object of the provisions. As evident from the legislative history, the Swiss delegation tried, successfully at first but ultimately in vain, to achieve an exclusion of all applications of mathematics, including applications solving a technical problem, by omitting the limitation "as such" for mathematical methods. Hence, the present wording of Article 52(2)(a) and (3) EPC, which excludes mathematical methods only "as such", enshrines in the convention that mathematical methods applied to solve a technical problem are patent eligible.

For the avoidance of doubt, the Board notes that a method consisting solely of a mental act, even if it involves mathematical steps directed to solve a technical problem, remains a method for performing a mental act as such (not using particular technical means) and is excluded

from patentability under Article 52(2)(c) and (3) EPC, i.e. all exclusions from patentability have to be overcome by a claimed activity or subject-matter.

19.4 The case law of the boards of appeal with respect to mathematical methods has established the following (see e.g. Case Law of the Boards of Appeal of the EPO, 8th edition 2016, I.A.2.2.2 and the decisions cited therein): purely abstract or intellectual methods are not patentable. However, **even if the idea underlying an invention may be considered as residing in a mathematical method, a claim directed to a technical process in which the method is used does not seek protection for the mathematical method "as such". If a method which is not per se "technical" (e.g. a mathematical method) is used in a technical process, and this process is carried out on a physical entity by some technical means implementing the method and provides as its result a change in that entity, it contributes to the technical character of the invention as a whole.**

This may be summarised in that **mathematical aspects contributing to the solution of a technical problem have to be considered when assessing inventive step** (see e.g. decisions T 208/84, OJ EPO 1987, 14; T 107/87 of 26 April 1991; T 154/04, OJ EPO 2008, 46, point 5(C) of the reasons; T 1227/05, OJ EPO 2007, 574; T 1326/06 of 30 November 2010; T 650/13 of 2 October 2018). The Board's interpretation of Article 52(2)(a) and (3) EPC with respect to "mathematical methods as such" is thus entirely consistent with the established case law of the boards of appeal.

20. The contested decision concerns a so-called mixed invention, containing technical and non-technical features, in particular a method comprising mathematical aspects which is computer-implemented and thus uses technical means. Hence, the question arises whether its mathematical aspects contribute to the solution of a technical problem.

20.1 In the present case, as the **mathematical features concerning the linear combination, E3a and E3b of claim 1, contribute to the automatic determination of which data tables are to be managed by which type of database management system, they play an essential role in the technical functioning of the system and consequently serve the overall technical purpose of claim 1.** Furthermore, these **features are based on technical considerations concerning the functioning of the database technology used. Hence, they contribute to the solution of a technical problem and have to be taken into account when assessing inventive step.**

21. The Examining Division had also argued that the effects of different execution times and data consistency levels achieved were not "further" technical effects (see decision T 1173/97, OJ EPO 1999, 609). For example, different execution times were an inherent side effect of any different computer programming, as according to the Guidelines G-II, 3.3, last paragraph, the increased speed or efficiency of a method based on an improved algorithm was not sufficient on its own to establish the technical character of the method.

The cited passage from the November 2016 version of the Guidelines, which was valid when the contested decision was taken, reads:

"The increased speed or efficiency of a method based on improved algorithms is not sufficient on its own to establish a technical character of the method (see T 1227/05). Characteristics such as speed and efficiency are inherent in both technical and non-technical methods. For

example, if a sequence of auction steps leads to price determination more quickly than some other auction method, that does not necessarily imply that the auction steps contribute to the technical character of the method (see T 258/03)."

21.1 In the proceedings before the Examining Division and in the statement of grounds of appeal, the appellant argued that the Examining Division ignored the case law and misinterpreted the Guidelines, which were based on decision T 1227/05. This decision concerned the situation where the speed comparison regarding the claimed subject-matter was made with respect to 'conceivable' methods. By contrast, in the present case, the speed comparison was made with respect to a particular prior art, i.e. document D1.

21.2 Cited decision T 1227/05 states in its reasons, point 3.2.5, the following: "As it is always possible to conceive of a slower reference method, a mere speed comparison is not a suitable criterion for distinguishing between technical and non-technical procedural steps. If, for example, a sequence of auction steps leads to price determination more quickly than some other auction method, that does not necessarily imply that the auction steps contribute to the technical character of the method (see T 258/03)."

The Board agrees with this decision that certain characteristics, such as speed and efficiency, are inherent in both technical and non-technical methods. In particular, it agrees with decision T 1227/05 that a mere speed comparison is not a suitable criterion for distinguishing between technical and non-technical procedural steps.

However, if an enhanced speed or efficiency of a claimed computer-implemented method is the result of "further" technical considerations which are adequately reflected in the claimed method, the Board would normally consider such an improvement as contributing to the solution of a technical problem and also as a technical effect of the claimed method (see decisions T 2330/13 of 9 May 2018, reasons 5.7.5; T 318/10 of 2 September 2014, reasons 5.9; T 1965/11 of 24 March 2017, reasons 5.1; T 817/16 of 10 January 2019, reasons 3.12).

Consequently, in the present case, it has to be considered whether an improvement in the processing speed is based on "further" technical considerations, i.e. technical considerations going beyond the abstract formulation of algorithms or beyond "merely" finding a computer algorithm to carry out some procedure (see opinion G 3/08, OJ EPO 2011, 10, points 13.5 and 13.5.1 of the reasons). With respect to the abstract formulation of algorithms, the Board considers that the formulation and formalisation of algorithms is an intellectual activity not necessarily involving technical considerations. However, program development may involve technical considerations relating to the specific internal functioning of the computer as a technical system, which are then typically to be regarded as "further" technical considerations within the meaning of opinion G 3/08, reasons 13.5.1.

Moreover, it is well established that a computer-implemented method - independent of its specific implementation in a computing device - may serve a technical purpose, i.e. may contribute to solving a technical problem outside the computer system, such as controlling an electro-mechanical device or a chemical process, and thus may contribute to the technical character of the invention (see e.g. decision T 26/86, OJ EPO 1988, 19). The Board shares this view. To avoid any doubt in this respect, **the Board considers that technical considerations**

relating to the solution of such a technical problem outside the computer system qualify as "further" technical considerations that may be reflected in a computer-implemented method.

21.3 The Board is convinced that its approach to dealing with enhanced speed and efficiency as effects of computer-implemented inventions is fully consistent with decision T 258/03, which was cited in decision T 1227/05, since an improved speed due to the use of a different auction method is not based on "further" technical considerations, for example relating to the internal operation of the computer system, but rather on business considerations concerning a different auctioning method.

21.4 In its statement of grounds of appeal (points I.4.4 and I.4.5), the appellant argued that, in the present case, the improved performance required "further" technical considerations. According to the claimed subject-matter, two query patterns, namely an aggregation pattern and a key-select pattern, were defined to identify queries suitable to be processed by a NoSQL data store (see features E2a and E2b of claim 1). The invention ranked tables based on the claimed linear combination, which used the percentage of read queries of a table and the percentages of queries of the table which matched the aggregation or key-select pattern, respectively (see features E3, E3a and E3b of claim 1). According to features C and E4, the ranking was used to automatically determine which data tables were to be managed by a relational or a non-relational database management system. If a received query was for a table managed by the NoSQL data store, then the query was automatically translated to application programming interface calls for the NoSQL data store and forwarded to the NoSQL data store (see features E5 to E7 of claim 1).

21.5 The **Board agrees with the appellant that the claimed system is based on "further" technical considerations that concern a specific manner of improving response times for queries by automatically using different data stores, relational database management systems and NoSQL data stores, to manage data tables.**

The skilled person implementing the claimed system, an expert in database management systems, needs to have a detailed understanding of the manner in which the different kinds of database management systems manage data and how they process queries matching a key-select pattern or an aggregation pattern, for example. The performance implications of the use of different types of data stores for executing queries according to the different query patterns need to be considered. As the different data stores operate with different consistency levels, it has to be decided which data stores are best suited to store which data tables in view of the consistency level that is acceptable for the queries on the data tables. For this purpose, the claimed system monitors and parses queries to determine the percentage of read queries and the percentage of queries matching the various query patterns for the data tables.

The application explicitly discloses that the different data stores provide different consistency levels, and that these different consistency levels are relevant for the achievable performance. Hence, the **skilled person has to consider the technical constraints resulting from the use of different data stores with different consistency levels**. This is explained in the following.

Normally, the processing logic of an application accessing an RDBMS is described and implemented from the point of view of a logical single-user system, i.e. a system in which,

from a logical point of view, only one user has exclusive access to the data in a database. However, in the actual operation of the database management system, the shared database is accessed concurrently, e.g. in order to achieve a higher system throughput. This concurrent access may lead to corruption of the database because updates to shared data may be lost, for example.

It is well known that mechanisms to automatically protect shared data against corruption due to concurrent access, such as support for transactions with the ACID property, may be implemented in database management systems. For this purpose, a database management system may support different consistency levels as built-in mechanisms for technical reasons. Lower consistency levels supported by database management systems can then be used to increase the performance of queries, provided that such lower consistency levels are still acceptable. Hence, there is a need to distinguish between the consistency demanded by a particular application and the consistency levels supported by database management systems, which are software platforms that support such consistency levels as built-in mechanisms for technical reasons that are not determined by the specific needs of a particular application.

It follows that the **Board does not share the Examining Division's conclusion that achieving data consistency levels was a "result of human requirement" and independent of any technical necessity.**

21.6 In view of the above, the Board considers that the computer-implemented features of claim 1 involve "further" technical considerations, as it is necessary to consider the technical properties of the implementations of query processing in different kinds of database management systems. In particular, it can be convincingly argued that the claimed system, using a NoSQL data store and an RDBMS, provides a performance improvement over an RDBMS as sole data store, and that this improvement is a consequence of the above discussed "further" technical considerations, which are adequately reflected in the claimed data consistency management system. Consequently, the Board agrees with the appellant that the features of claim 1 considered as non-technical by the Examining Division contribute to the technical effect of improved performance for querying data stored in an RDBMS.

22. In sum, the **Board considers that all the features of the claimed system contribute to improving system throughput and query response times by automatically managing data using various data stores having different technical properties, and thus contribute to the solution of a technical problem.**

23. As the Examining Division's reasoning for lack of inventive step is not convincing, the contested decision is to be set aside.

T 0737/14 (Authorisation system / SECOREN) of 9.7.2019

European Case Law Identifier: ECLI:EP:BA:2019:T073714.20190709
AUTHORISATION SYSTEM

Inventive step - authorisation of the access terminal rather than the user

**Inventive step - (no
Inventive step - part of the business scenario)**

Catchwords:

The proper application of the COMVIK approach requires a thorough analysis of the business constraints when formulating the problem to be solved before investigating what the skilled person would have done to solve it. The failure to reflect all aspects of the business method in the problem to be solved led the examining division to argue unconvincingly that the inconvenient distinguishing feature of authorising the access terminal was an alternative

Application number: 08709562.6
IPC class: G06Q 20/00
Applicant name: Secoren Limited

Cited decisions: T 0641/00, T 1463/11

Board: 3.5.01

<https://www.epo.org/law-practice/case-law-appeals/pdf/t140737eu1.pdf>

Claim 1 reads:

An authorisation system comprising:

an authorisation server (140);

an account server (120) for storing account data relating to a plurality of accounts;

an access terminal (100), including:

a token reader (106) for inputting token data from a selected one of a plurality of tokens, the token data identifying one of the plurality of accounts; and input means (108) for inputting transaction data;

wherein the access terminal (100) is operable: to receive token data from the token reader (106) and to receive transaction data from the input means (108); to transmit to the account server (120) a first transaction request containing the token data and the transaction data; and to transmit to the authorisation (140) server a second transaction request including access terminal identification data identifying the access terminal;

the account server (120) is operable to receive the first transaction request; to process the token data to generate account identification data, the account identification data being associated with a portion of the account data; and to transmit a third transaction request to the authorisation server, the third transaction request including the transaction data;

the authorisation server (140) is operable to receive the second transaction request and to receive the third transaction request; to process the transaction data and the access terminal identification data to determine whether the access terminal (100) is authorised to enable the transaction; and, if applicable, to transmit to the account server (120) an authorisation request to indicate that the access terminal is authorised; and

in response to receipt of the authorisation request from the authorisation server, the account server (120) is operable to process the transaction data and to modify the account data associated with the account identification data in dependence on the processing.

1. Background

1.1 The **invention concerns an authorisation system for authorising a transaction on an account.** Looking at Figure 7, there are three entities in this system: an access terminal 100, an account server 120, and an authorisation server 140. The access terminal sends a first transaction request 204 to the account server that forwards this, as the third transaction request 208, to the authorisation server. The access terminal also sends a second transaction request 206, including a terminal identifier, to the authorisation server. Based on the transaction data, the authorisation server determines whether the access terminal is authorised to enable the transaction, and sends the response 210 to the account server that carries out the transaction on the account.

1.2 **The independent claims do not define what sort of transaction is processed by the system. As it turned out, this caused some difficulties in the assessment of the invention, both in examination and appeal proceedings.**

2. The decision under appeal

2.1 The examining division saw the invention basically as a conventional transaction processing system running a "generic three party transaction authorisation protocol" involving a trusted third party. In such a system, the third party typically receives two messages; one from the account owner and one from the party that performs the transaction settlement. **To prevent fraudulent transactions, the third party authorises the transaction only if it is confirmed by the account owner.**

2.2 D1 discloses (Figure 1) such a transaction processing system, for online shopping. The customer sends a purchase request 1, including credit card details, to an e-retailer. The e-retailer forwards the credit card details 2 to a credit card issuer who checks them and returns an authorisation 3. The e-retailer then sends a message 4 to a web site administered by a third party. The message comprises sufficient information to identify the customer. In order to authorise the purchase, the customer must log on 5 to the authorisation web site using a password. Once the customer has logged on, a message 6 is sent from the authorisation web site to the e-retailer. Alternatively (Figure 2), it is the credit card issuer, that, in the same way, uses the authorisation website to make sure that the transaction is not a fraudulent one.

2.3 The examining division found that the customer's terminal in D1 corresponded to the access terminal in claim 1, and that the combination of the credit card issuer and the e-retailer mapped to the account server. The authorisation website in D1 was equated with the

authorisation server in claim 1. As a result, the examining division identified the following differences between the invention in claim 1 and D1:

a) The access terminal in claim 1 had a token reader for inputting the credit card data.

b) The authorisation server in claim 1 determined, based on access terminal identification data, whether the access terminal (rather than the user) was authorised to enable the transaction.

2.4 The examining division considered that it would have been obvious to use a reader to input the credit card data. Thus, feature a) did not provide an inventive step. The **Board agrees with this finding**. Also, since feature a) has no synergy with feature b), it is justified to assess the two features separately.

2.5 Concerning feature b), the examining division argued that the identification of the access terminal rather than the user was a well known alternative available to the skilled person, and that the **choice was "governed by business constraints"**. Alternatively, it could be seen as an obvious security measure, on top of the identification of the user.

2.6 The **examining division did not say what the business constraints were**. That is unfortunate, because the **business constraints are key in this case**. The Board does not see any technical reason, given the on-line purchasing scenario in D1, why the skilled person would have identified the access terminal, whether as an alternative to the identification of the user, or as an additional measure. As the appellant argued, the access terminal simply does not play any role in this scenario.

3. The transaction scenario in the invention

3.1 It is clear that **the transaction scenario in the invention is crucial to the question of inventive step because this sets the framework of the technical problem given to the skilled person to solve** (see e.g. T 1463/11 - Universal merchant platform/CARDINALCOMMERCE, points 12 and 13). In the communication, the Board raised the question what that scenario was in view of the widely different embodiments disclosed in the application. The appellant neither replied, nor attended the oral proceedings. Thus, the Board has to find a reasonable interpretation based on the examples in the application.

3.2 The claims cover the example of the transaction scenario, in which the access terminal is used to load money onto a custom pre-paid credit card. Also, the appellant's arguments in the grounds of appeal focus on this scenario.

3.3 According to the description, a customer who wants to load money onto a pre-paid card goes to a conventional point-of-sale system (access terminal) and swipes the card (see page 10, lines 5 to 11). The customer also presents funds, corresponding to the amount that he wants to load onto the card, to the point-of-sale system that acts as an agent.

The point-of-sale system requests that the credit card issuer or processor credit the pre-paid card with the specified amount. This corresponds to the claimed first transaction request to the

account server. The account server redirects the details of the swipe to a third party computer system for authorisation (lines 32 to 34). This corresponds to the claimed third transaction request to the authorisation server. The point-of-sale system also transmits details of the transaction and identification of the access terminal to the third party computer system (page 11, lines 6 to 11). This corresponds to the second transaction request to the authorisation server.

3.4 At first glance, it may appear that the third party is there just to authorise the agent on behalf of the credit card issuer/processor (account server). However, the description goes on to state (page 11, lines 11 to 15):

"In this embodiment, when a user presents funds to an agent, no transfer of funds occurs between the agent and the credit card issuer or processor, but funds are instead provided by the third party to the credit card issuer. The funds are then reimbursed by the agent to the third party in due course. **The authorisation process can be used to ensure that only transactions from trustworthy agents are processed.**"

In the Board's assessment, this means that the role of the third party is actually to guarantee the money vis-à-vis the credit card issuer. In other words, the third party is not only acting as the authorisation server, but also as a financial middleman between the agent and the credit card issuer/processor. It follows that, since the third party needs to recover the funds from the agent, it has to trust the agent. The description suggests that this idea allows a third party to offer a new type of financial service using existing point-of-sale systems (page 11, lines 2 and 3) without requiring a bank account (lines 16 and 17).

4. Inventive step

4.1 **The Board takes the view that the pre-paid scenario, including the relationship between the point-of-sale/agent, the credit card issuer/processor, and the third party, is a business idea.** According to decision T 641/00 - Two identities/COMVIK, **this type of subject-matter cannot contribute to inventive step.** Instead, as mentioned above, it is considered to be part of the problem that the skilled person has to solve.

4.2 In the Board's view this case is a good example of why the **proper application of the COMVIK approach requires a thorough analysis of the business constraints when formulating the problem to be solved before investigating what the skilled person would have done to solve it.** *The failure to reflect all aspects of the business method in the problem to be solved led the examining division to argue unconvincingly that the inconvenient distinguishing feature of authorising the access terminal was an alternative whose choice was governed by unspecified business constraints.*

4.3 Instead, the skilled person should have been given the problem of implementing a business model on the conventional transaction processing system, as exemplified in D1, in which the third party carries the financial risk and needs to safeguard itself from fraud and recover the funds from the agent. The skilled person would have assigned the necessary technical means, namely an access terminal at the side of the agent, an account server at the side of the credit card issuer/processor, and an authorisation server that carries out the task of the third party. The functions performed by those entities in claim 1 follow directly from the

business scenario. Since the third party needs to safeguard itself, rather than the agent, from fraud, the skilled person would realise that the third party has to authorise the agent. Performing the authorisation based on the terminal identifier of the access terminal would have been an obvious implementation.

4.4 Furthermore, as already concluded in point 2.4 above, the skilled person would have provided the terminal with a card reader for reading the card data.

4.5 Thus, the Board judges that subject-matter of **claim 1 lacks an inventive step** (Article 56 EPC).
