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**Datasheet for the decision
of 7 December 2023**

Case Number: T 1502/20 - 3.5.03

Application Number: 09727342.9

Publication Number: 2274684

IPC: H04L29/08, H04N7/173,
H04N21/472, H04N21/258,
H04N21/222, H04N21/231

Language of the proceedings: EN

Title of invention:

Handling long-tail content in a content delivery network (CDN)

Applicant:

Level 3 Communications, LLC

Headword:

Popular CDN resources/LEVEL 3 COMMUNICATIONS

Relevant legal provisions:

EPC Art. 56

EPC R. 111(2)

RPBA 2020 Art. 12(4), 12(6), 11

Keyword:

Inventive step - main and 1st auxiliary requests (no):
arguments relating to "non-technical prejudice fallacy"
Admittance of requests filed on appeal - 2nd and 3rd auxiliary
requests (no): should have been filed earlier + "fresh case"
Remittal to the examining division (no): no substantial
procedural violation and no other "special reason"

Decisions cited:

T 1670/07



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Case Number: T 1502/20 - 3.5.03

D E C I S I O N
of Technical Board of Appeal 3.5.03
of 7 December 2023

Appellant: Level 3 Communications, LLC
(Applicant) 1025 Eldorado Boulevard
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Representative: Marks & Clerk LLP
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 7 February 2020
refusing European patent application
No. 09727342.9 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair K. Bengi-Akyürek
Members: J. Eraso Helguera
C. Heath

Summary of Facts and Submissions

I. The appellant lodged an appeal against the decision of the examining division to refuse the present European patent application for lack of inventive step (Article 56 EPC) with respect to a main request and a first auxiliary request.

II. The appealed decision referred *inter alia* to the following prior-art document:

D1: US 2008/0071859 A1.

III. Oral proceedings before the board were held on 7 December 2023.

The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims of one of four requests:

- the **main request** and the **first auxiliary request** on which the appealed decision is based, both re-submitted with the statement of grounds of appeal and
- a **second** and a **third auxiliary request**, both filed for the first time with the statement of grounds of appeal.

As an auxiliary measure, the appellant requested that the board remit the case to the examining division for further prosecution.

IV. Claim 1 of the **main request** reads as follows:

"A method of content delivery in a content delivery network comprising at least a first tier of servers, the method comprising:

at a first server (108) in said first tier of servers, obtaining a request from a client (106) for a resource;

if said resource is available at said first server (108) or at a peer of said first server (108), serving (504) the resource to the client (106) from the first server (108);

otherwise, if said resource is not available at said first server (108) or at a peer of said first server (108), determining (506) whether said resource is to be served based on its popularity; and

when it is determined that said resource is not to be served based on its popularity, obtaining the resource at said first server (108) and serving (504) the resource to the client (106) from the first server (108); and

when it is determined that said resource is to be served based on its popularity:

determining whether said resource is popular, and

if the resource is determined to be popular, then said first server (108) obtaining (526) said resource and said first server (108) serving (528) the resource to the client (106), otherwise,

if the resource is determined not to be popular, directing (522, 524) said client (106) to a second

server, said second server not in said first tier of servers, and

said second server serving the resource to the client (106)."

Claim 1 of the **first auxiliary request** reads as follows:

"A method of content delivery in a content delivery network comprising at least a first tier of edge servers and a plurality of parent servers forming a second tier of servers, said parent servers being distinct from said edge servers, the method comprising:

at an edge server (108) in said first tier of servers, obtaining a request from a client (106) for a resource;

if said resource is available at said edge server (108) or at a peer of said edge server (108), serving (504) the resource to the client (106) from the edge server (108);

otherwise, if said resource is not available at said edge server (108) or at a peer of said edge server (108), determining (506) whether said resource is to be served based on its popularity; and

when it is determined that said resource is not to be served based on its popularity, obtaining the resource at said edge server (108) and serving (504) the resource to the client (106) from the edge server (108); and

when it is determined that said resource is to be served based on its popularity:

determining whether a current popularity value for said resource exceeds a first predetermined popularity threshold;

if the current popularity value does not exceed the first predetermined popularity threshold, directing (522) said client (106) to a content provider's origin server or a cache associated with said origin server, said origin server or the cache associated with said origin server serving the resource to the client (106);

if the current popularity value does exceed the first predetermined popularity threshold, determining whether said resource is popular by determining whether the current popularity value for said resource exceeds a second predetermined popularity threshold which is greater than the first predetermined popularity threshold; and

if the resource is determined to be popular based on the current popularity value exceeding the second predetermined popularity threshold, then said edge server (108) obtaining (526) said resource and said edge server (108) serving (528) the resource to the client (106), otherwise,

if the current popularity value exceeds the first predetermined popularity threshold but does not exceed the second predetermined popularity threshold, directing (524) said client (106) to a parent server of the plurality of parent servers, said parent server not in said first tier of edge servers, and

said parent server serving the resource to the client (106)."

Claim 1 of the **second auxiliary request** reads as follows:

"A method of content delivery in a content delivery network comprising at least a first tier of edge servers and a plurality of parent servers forming a second tier of servers, said parent servers being distinct from said edge servers, the method comprising:

at an edge server (108) in said first tier of servers, obtaining a request from a client (106) for a resource;

if said resource is available at said edge server (108) or at a peer of said edge server (108), serving (504) the resource to the client (106) from the edge server (108);

otherwise, if said resource is not available at said edge server (108) or at a peer of said edge server (108), determining (506) based, at least in part, on a name used to request the resource, the name corresponding to one or more servers, whether popularity of said resource is to be used to determine where the resource will be served from; and

in response to determining that where said resource is to be served from is not to be determined based on its popularity, obtaining the resource at said edge server (108) and serving (504) the resource to the client (106) from the edge server (108);

and

in response to determining, based at least on the name used to request the resource, that where said resource is to be served from is to be determined based on its popularity:

determining whether a current popularity value for said resource exceeds a first predetermined popularity threshold;

if the current popularity value does not exceed the first predetermined popularity threshold:

redirecting (514, 522), by the edge server (108), said client (106) to a content provider's origin server or a cache associated with said origin server, said origin server or the cache associated with said origin server serving the resource to the client (106);

if the current popularity value does exceed the first predetermined popularity threshold:

determining whether said resource is popular by determining whether the current popularity value for said resource exceeds a second predetermined popularity threshold which is greater than the first predetermined popularity threshold; and

if the resource is determined to be popular based on the current popularity value exceeding the second predetermined popularity threshold, then said edge server (108) obtains said resource from the origin server or a parent server, and caches (526) said resource, and said edge server (108) serves (528) the resource to the client (106),

otherwise, if the current popularity value exceeds the first predetermined popularity threshold but does not exceed the second predetermined popularity threshold:

redirecting (524), by the edge server, said client (106) to a parent server of the plurality of parent servers, said parent server in the second tier of servers, and

said parent server serving the resource to the client (106)."

Claim 1 of the **third auxiliary request** reads as follows:

"A method of content delivery in a content delivery network comprising at least a first tier of edge servers and a plurality of parent servers forming a second tier of servers, said parent servers being distinct from said edge servers, the method comprising:

at an edge server (108) in said first tier of servers, obtaining a request from a client (106) for a resource;

if said resource is available at said edge server (108) or at a peer of said edge server (108), serving (504) the resource to the client (106) from the edge server (108);

otherwise, if said resource is not available at said edge server (108) or at a peer of said edge server (108), determining (506) based, at least in part, on a name used to request the resource, the name corresponding to one or more servers, whether popularity of said resource is to be used to determine where the resource will be served from, wherein said determining (506) comprises ascertaining whether the resource has been designated to use the popularity service; and

in response to determining that said resource is not designated and that where said resource is to be served from is not to be determined based on its popularity, obtaining the resource at said edge server (108) and serving (504) the resource to the client (106) from the edge server (108);

and

in response to determining, based at least on the name used to request the resource, that said resource is designated and that where said resource is to be served from is to be determined based on its popularity:

determining whether a current popularity value for said resource exceeds a first predetermined popularity threshold;

if the current popularity value does not exceed the first predetermined popularity threshold:

redirecting (514, 522), by the edge server (108), said client (106) to a content provider's origin server or a cache associated with said origin server, wherein said origin server or associated cache is not comprised in either of the first or second tier of servers, said origin server or the cache associated with said origin server serving the resource to the client (106);

if the current popularity value does exceed the first predetermined popularity threshold:

determining whether said resource is popular by determining whether the current popularity value for said resource exceeds a second predetermined popularity threshold which is greater than the first predetermined popularity threshold; and

if the resource is determined to be popular based on the current popularity value exceeding the second predetermined popularity threshold, then said edge server (108) obtains said resource from the origin server or a parent server, and caches (526) said resource, and said edge server (108) serves (528) the resource to the client (106),

otherwise, if the current popularity value exceeds the first predetermined popularity threshold but does not exceed the second predetermined popularity threshold:

redirecting (524), by the edge server, said client (106) to a parent server of the plurality of parent servers, said parent server in the second tier of servers, wherein said parent server recognises the request as a redirect, cache fills the resource from the origin server, and serves the resource to the client (106)."

Reasons for the Decision

1. MAIN REQUEST

This main request is identical to the one underlying the appealed decision.

1.1 *Claim 1 - inventive step (Article 56 EPC)*

1.1.1 The board concurs with the appealed decision that prior-art document **D1** could indeed be used as a starting point for assessing inventive step. Using the wording of claim 1, document D1 discloses the following features (board's outline):

A method of content delivery in a content delivery network (CDN) comprising at least a first tier of servers ("edge servers"), the method comprising:

- (a) at a first server ("selected best or optimal edge server") in said first tier of servers, obtaining a request from a client for a resource ("objects")

(Fig. 3(a), step 300; [0025]: "... a client, requesting one or more objects, to an edge server in the network ... the client is directed to an optimal edge server ...");

- (b) if said resource is available at said first server or at a peer of said first server, serving the resource to the client from the first server (Fig. 3(a), step 310; [0026]: "... if so, serves (at 205, 310) the object to the requesting client 140 ...");
- ~~(c) if said resource is not available at said first server or at a peer of said first server, determining whether said resource is to be served based on its popularity;~~
- ~~(d) when it is determined that said resource is not to be served based on its popularity, obtaining the resource at said first server and serving the resource to the client from the first server;~~
- ~~(e) when it is determined that said resource is to be served based on its popularity;~~
- (f) determining whether said resource is popular (Fig. 3(a), step 315; [0027]: "... a check is initiated (at 315) for the edge server to determine whether the requested object is popular ..."),
- ~~(g) if the resource is determined to be popular, then said first server obtaining said resource and said first server serving the resource to the client,~~
- (h) if the resource is determined not to be popular, directing said client to a second server ("parent

(or origin) server"), said second server not in said first tier of servers (Fig. 3(a), step 325; [0029]: "... the selected edge server directs (at 210, 320) the requesting client 140 to a parent server 120 ..."),

(i) said second server serving the resource to the client (Fig. 3(a), step 345; [0029]: "... a parent server that ... is able to serve (at 215, 345) the requested object to the client ...").

1.1.2 The subject-matter of claim 1 thus differs from the disclosure of D1 in **features (c) and (d)** ("difference 1" in Reasons 15.1 of the appealed decision) and in **features (e) and (g)** ("difference 2" in Reasons 15.1 of the appealed decision). This corresponds in substance to the respective feature analysis carried out by the examining division in Reasons 15.1 of the appealed decision, on the one hand, and by the appellant in section II of the statement of grounds of appeal, on the other hand. For the avoidance of doubt, the board expressly acknowledges that features (f), (h) and (i) as disclosed by D1 do not have features (c) and (e) as pre-conditions.

1.1.3 As to the technical effect associated with these distinguishing features, the appellant submitted that they improved the efficiency of the provided service. Specifically, they led to a method in which the resources were always served from the "first server", with the sole exception of less popular resources for which - in addition - "popularity" was to be considered. The possibility to "override" the popularity measures for specific resources further provided higher control, fewer checks and quicker deliveries with less delay. So, the appellant framed the objective technical problem as "how to modify D1 to

improve the efficiency of the provided service in the CDN". Having the "first server" obtain and serve specific - yet "unpopular" - resources was in fact counter-intuitive. The skilled person starting from D1 could not have introduced these features without the use of hindsight.

1.1.4 These arguments fail to convince the board, since:

(a) Claim 1 does not indicate what kind of cache-filling policy - if any - the "first server" applies or how the "first server" is actually to be pre-populated - if at all - with resources. Although the first server "obtains" and "serves", according to claimed **features (d) and (g)**, a resource "which was not available at said first server or at a peer of said first server", it cannot be implied that such resource will necessarily be available at said first server for subsequent requests, i.e. "cached". Nor can it be assumed that the mere content delivery over the "first server" - without the ulterior benefits of caching - will necessarily be quicker and with less delay. On the contrary, for those resources associated with popularity measures, **features (c) and (e)** impose an additional processing burden when compared with a *mandatory* popularity evaluation as could be known from D1.

(b) The pre-condition defined by **feature (c)**, i.e. whether or not to override the popularity measures, can be motivated or triggered merely by administrative (i.e. non-technical) considerations rather than by technical ones. The present application itself corroborates this conclusion (see e.g. paragraph [0062]; board's emphasis: "...

A rule base may be used to augment and/or override the popularity measures for certain resources. The rules in the rule base may be static or dynamic and may be set by the CDN **administrator** and/or the **subscriber**. For example, a subscriber may **not want to pay** for certain content to be served from the edge, regardless of its popularity, and may set a rule accordingly ..."; paragraph [0067]: "... the **CDN operator** and/or the **subscriber** may specify ... content that is to be managed **based on its popularity**, rather than simply always being served from a cache."

- (c) The argument that it was counter-intuitive that the "first server" obtains and serves "unpopular" resources (which is, in the board's view, part of the *administrative* requirement) and that the skilled person would therefore not have introduced those features into the system of D1 without the use of hindsight is redolent of the so-called "**non-technical prejudice fallacy**" established in **T 1670/07**. In other words, the argument that non-technical aspects (such as mere administrative requirements) are a reason for not modifying the prior art cannot be accepted because the question is simply how the *implementation* of the distinguishing feature would be done rather than whether the skilled person would consider that aspect (cf. T 1670/07, Reasons 16). Hence, also here, there is no *technical* reason why the skilled person would not have considered modifying the various parts of the system of D1, at least to the extent claimed, to solve the objective problem posed (see point 1.1.5 below).

1.1.5 Overall, it follows from the above that the claimed use of a "first server" or an "edge server" on the basis of "popularity", as it appears in the independent claims, can only be considered as a mere *administrative* constraint. As such, it can e.g. be set by an operator on the basis of their subjective perceptions. Thus, the distinguishing features (c), (d), (e) and (g) are associated with administrative, i.e. non-technical, considerations or requirements. Hence, applying the well-established COMVIK approach, the underlying non-technical aim can legitimately be incorporated into the objective technical problem as a constraint that has to be met. As a consequence, in the present case, the objective technical problem may be framed as "how to modify or adapt the system of D1 so that a selected first server always serves requested resources irrespective of their popularity and that the rest of first servers always serve 'popular' resources".

1.1.6 The administrative requirements, once set, would have readily led the skilled person to the introduction of an additional check as to whether popularity is to be considered at a given first server (i.e. features (c), (d) and (e)) and to the configuration of said first server to obtain the resource at the server and serve it to the client from that server as per features (d) and (g) without the involvement of any inventive skills.

1.2 In view of the above, the main request is not allowable under Article 56 EPC.

2. FIRST AUXILIARY REQUEST

Claim 1 of the first auxiliary request differs from claim 1 of the main request in that

(j) the first server is an edge server;

(k) the second server is a parent server;

and in that features (f), (g) and (h) are replaced by the following features:

(l) determining whether a current popularity value for said resource exceeds a first predetermined popularity threshold;

(m) if the current popularity value does not exceed the first predetermined popularity threshold, directing said client to a content provider's origin server or a cache associated with said origin server, said origin server or the cache associated with said origin server serving the resource to the client;

(n) if the current popularity value does exceed the first predetermined popularity threshold, determining whether said resource is popular by determining whether the current popularity value for said resource exceeds a second predetermined popularity threshold which is greater than the first predetermined popularity threshold;

(o) if the resource is determined to be popular based on the current popularity value exceeding the second predetermined popularity threshold, then said edge server obtaining said resource and said edge server serving the resource to the client,

(p) if the current popularity value exceeds the first predetermined popularity threshold but does not exceed the second predetermined popularity threshold, directing said client to a parent server

of the plurality of parent servers, said parent server not in said first tier of edge servers.

2.1 *Claim 1 - inventive step (Article 56 EPC)*

2.1.1 The appellant submitted that the introduction of numerical values associated with "popularity" made the claimed subject-matter even more technical. So, the claim now defined three categories of content - "rare", "medium", "very popular" - in relation to its popularity.

2.1.2 Yet the board considers that additional features (l) to (p) are still associated with mere administrative considerations. Notably, the added terms "current popularity value" and "first/second predetermined popularity threshold" do not necessarily correspond to (automatically) *measured* parameters. Administrative criteria are also quantified using numerical values and thresholds. At any rate, the objective technical problem as formulated in point 1.1.5 above and the observations on its solution indicated in point 1.1.6 above still apply to claim 1 of the first auxiliary request.

2.2 The first auxiliary request is therefore not allowable under Article 56 EPC either.

3. SECOND AND THIRD AUXILIARY REQUESTS

Claim 1 of the **second auxiliary request** differs from claim 1 of the first auxiliary request in the following amended features:

(c') if said resource is not available at said first

server or at a peer of said first server,
determining based, at least in part, on a name used
to request the resource, the name corresponding to
one or more servers, whether popularity of said
said resource is to be used to determine where the
resource will be served from;

(d') in response to determining that where said resource
is to be served from is not be determined based on
its popularity, obtaining the resource at said
first server and serving the resource to the client
from the first server;

(e') in response to determining, based at least on the
name used to request the resource, that where said
resource is to be served from is to be determined
based on its popularity:

(m') if the current popularity value does not exceed the
first predetermined popularity threshold:
redirecting, by the edge server, said client to a
content provider's origin server or a cache
associated with said origin server, said origin
server or the cache associated with said origin
server serving the resource to the client;

(o') if the resource is determined to be popular based
on the current popularity value exceeding the
second predetermined popularity threshold, then
said edge server obtains said resource from the
origin server or a parent server, and caches said
resource and said edge server serves the resource
to the client,

(p') if the current popularity value exceeds the first

predetermined popularity threshold but does not exceed the second predetermined popularity threshold:

redirecting, by the edge server, said client to a parent server of the plurality of parent servers, said parent server in the second tier of servers,

Claim 1 of the **third auxiliary request** comprises all the limiting features of claim 1 of the second auxiliary request, with the following amendments:

(c'') if said resource is not available at said first server or at a peer of said first server, determining based, at least in part, on a name used to request the resource, the name corresponding to one or more servers, whether popularity of said said resource is to be used to determine where the resource will be served from, wherein said determining comprises ascertaining whether the resource has been designated to use the popularity service;

(d'') in response to determining that said resource is not designated and that where said resource is to be served from is not be determined based on its popularity, obtaining the resource at said first server and serving the resource to the client from the first server;

(e'') in response to determining, based at least on the name used to request the resource, that said resource is designated and that where said resource is to be served from is to be determined based on its popularity:

(p'') if the current popularity value exceeds the first

predetermined popularity threshold but does not exceed the second predetermined popularity threshold:

redirecting, by the edge server, said client to a parent server of the plurality of parent servers, said parent server in the second tier of servers, wherein said parent server recognises the request as a redirect, cache fills the resource from the origin server,

3.1 *Admittance into the appeal proceedings (Article 12(6) RPBA, second sentence, 2020)*

3.1.1 The appealed decision was based on different claim requests, the **second and third auxiliary requests** having been submitted with the statement of grounds of appeal. The appellant did not demonstrate that this part of the appeal case (i.e. the part relating to these auxiliary requests) was "admissibly raised and maintained" in the preceding examination proceedings, as required by Article 12(4) RPBA 2020. In consequence, it is an "amendment" which may be admitted only at the discretion of the board, which shall exercise its discretion in view of, *inter alia*, the complexity of the amendment, the suitability of the amendment to address the issues which led to the appealed decision, and the need for procedural economy.

3.1.2 The appellant's case presented in its statement of grounds of appeal with respect to the newly filed auxiliary requests was based on the presence of additional limitations which had been introduced during the examination proceedings into the claim request filed with the letter dated 6 October 2016. However, these limitations were not maintained in the claim requests subsequently filed on which the appealed

decision is based. In addition to this, the appellant introduced *further features* allegedly extracted from the description of the application as filed, i.e. paragraphs [0043] and [0044] for the second and third auxiliary requests and paragraphs [0040], [0034], [0037], [0074] and [0047] for the third auxiliary request, thereby generating a "fresh case".

- 3.1.3 The board considers that these requests *could* and *should* have already been filed before the examining division during the first-instance oral proceedings at the latest. In this regard, the board also notes that after having been summoned by the examining division, the appellant decided to withdraw the request for oral proceedings, thereby foregoing an opportunity to timely address further issues as regards inventive step during oral proceedings and potentially address them by filing new requests upon which the examining division could have ruled. The purpose of appeal proceedings is not to examine subject-matter which is substantially different from that considered by the department of first instance. Rather, the primary object of appeal proceedings is to review in a judicial manner the correctness of the appealed decision (cf. Article 12(2) RPBA 2020).
- 3.1.4 The appellant submitted that it could not have filed these claim requests earlier for several reasons. Firstly, the appellant had commercial priorities and budgets which prevailed over the rules of the EPO. Secondly, this was the first opportunity for the appellant to react to the examining division's erroneous argumentation in the appealed decision.
- 3.1.5 The board observes that the line of argumentation developed by the examining division in Reasons 15 and

16 of the appealed decision derives from the objection raised in point 2 of the annex to the summons to the first-instance hearing. In particular, the examining division identified the same distinguishing features and the same corresponding technical effects in claim 1 of the main request in view of D1. And the appellant reacted indeed by filing the first auxiliary request prior to the date scheduled for the oral proceedings before the examining division. Already at this point in time the appellant could indeed have filed the second and third auxiliary requests.

3.2 In conclusion, the board did not admit the second and third auxiliary requests into the appeal proceedings (Article 12(6), second sentence, RPBA 2020).

4. *Request for remittal of the case*

4.1 The appellant submitted that the board had identified several flaws in the inventive-step reasoning appearing in the appealed decision. For instance, the examining division had not correctly identified the distinguishing features in view of D1 and the technical effect associated therewith. Thus, the appellant neither obtained a properly reasoned decision nor was fully heard on the reasons for refusal. The appellant requested that the board remit the case to the examining division to re-examine the case under the "guidance" given by the board.

4.2 The board diverged indeed from the examining division's reasoning, albeit not from its conclusions. In particular, in Reasons 15.1 of the appealed decision, the examining division had identified "partial problems": features (c) and (d) ("difference 1) had "no guaranteed technical effect" and feature (g)

("difference 2") constituted "a straightforward alternative option". Differently, the board associates all the distinguishing features (c), (d), (e) and (g) with administrative, i.e. non-technical, considerations or requirements (see point 1.1.5 above). But this does not mean that the appealed decision was not reasoned within the meaning of Rule 111(2) EPC. Rather, such divergence is to be considered - at most - as an error of judgement. The board finds no fundamental procedural deficiency in the examination proceedings and can decide the whole case. Particularly, the board cannot see any "special reasons" for remitting the case to the examining division (Article 11 RPBA 2020). It is in fact not uncommon for a Board of Appeal to take a different stance on issues of patentability than the examining or opposition division. If this was considered as an exceptional reason for a remittal, most cases would have to be remitted. A different or erroneous approach to the assessment of novelty or inventive step is not a flaw of procedure that would deprive a party of being properly heard and thus amount to a *procedural* violation.

5. Since there is no allowable claim request on file, the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chair:



B. Brückner

K. Bengi-Akyürek

Decision electronically authenticated