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Datasheet for the decision of 7 July 2016

Case Number: T 1948/12 - 3.5.03

Application Number: 00306485.4

Publication Number: 1073308

IPC: H04Q11/00, H04J14/02

Language of the proceedings: EN

Title of invention:
Optical switch and protocols for use therewith

Applicant:
Rockstar Consortium US LP

Headword:
Optical switch/ROCKSTAR

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step (main and auxiliary request) - no

Decisions cited:

Catchword:

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Case Number: T 1948/12 - 3.5.03

D E C I S I O N
of Technical Board of Appeal 3.5.03
of 7 July 2016

Appellant: (Applicant)	Rockstar Consortium US LP 2201 Lakeside Boulevard Suite 1N-110 Richardson, TX 75082 (US)
Representative:	Mackenzie, Andrew Bryan Scott & York Intellectual Property Limited 45 Grosvenor Road St. Albans Hertfordshire AL1 3AW (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 31 January 2012 refusing European patent application No. 00306485.4 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	F. van der Voort
Members:	T. Snell
	P. Guntz

Summary of Facts and Submissions

I. This appeal is against the decision of the examining division refusing European patent application No. 00306485.4, with publication number EP 1073308.

II. The refusal was based on the ground that the subject-matter of claim 1 did not involve an inventive step having regard to the following document:

D2: Yuan et al, "Distributed Control in Optical WDM Networks", Conference Proceedings of the IEEE Military Communications Conference 1996 (MILCOM '96), McLean, VA, USA, 21-24 Oct. 1996, pages 100-104.

III. The appellant filed an appeal against the above decision. New sets of claims of respectively a main request and an auxiliary request were filed together with the statement of grounds of appeal.

Oral proceedings were conditionally requested.

IV. In a communication accompanying a summons to oral proceedings, the board gave a detailed preliminary opinion that, inter alia, the subject-matter of claim 1 of the main and auxiliary requests respectively did not involve an inventive step having regard to the combination of D2 with the following document cited in the European Search Report:

D3: Chunming Qiao et al, "Wavelength Reservation Under Distributed Control", Advanced Applications of Lasers in Materials Processing/Broadband Optical Networks/ Smart Pixels/Optical MEMs and Their Applications, IEEE/ LEOS 1996 Summer Topical Meetings, pages 45-46.

V. In a letter of reply, the appellant withdrew the request for oral proceedings and requested "a decision based on the papers in the file".

VI. The board infers from the written proceedings that the appellant requests that the impugned decision be set aside and that a patent be granted on the basis of claims of a main request or, in the alternative, claims of an auxiliary request, both requests as filed with the statement of grounds of appeal.

VII. Claim 1 of the main request reads as follows:

"A method of establishing a data connection between first and second terminal switching nodes (400, 802—822) in an optical network (800), the network (800) comprising said terminal switching nodes (400, 802—822) and a plurality of other switching nodes (400, 802—822) interconnected by multi-wavelength optical links (830-858), the method comprising:
identifying a path comprising a set of links (830-858) and wavelengths for transporting data between the first and second terminal switching nodes via one or more intermediate switching nodes prior to reserving a wavelength on at least one link (830-858) of the path; and being characterized by:
at each intermediate switching node connected to a respective ingress link (830-858) and a respective egress link (830-858) in the identified path,
switching the optical signals arriving on the respective ingress link (830-858) over to the respective egress link (830-858) and performing wavelength conversion if the wavelengths occupied on the respective ingress and egress links (830-858) are different."

VIII. Claim 1 of the auxiliary request reads as follows:

"A method of establishing a data connection between first and second terminal switching nodes (400, 802-822) in an optical network (800), the network (800) comprising said terminal switching nodes (400, 802—822) and a plurality of other switching nodes (400, 802—822) interconnected by multi-wavelength optical links (830-858), the method comprising:
identifying a path comprising a set of links (830-858) and wavelengths for transporting data between the first and second terminal switching nodes via one or more intermediate switching nodes prior to reserving a wavelength on at least one link (830-858) of the path, by sending an initial CONNECTION REQUEST message to the first terminal switching node (400, 802—822) upon initially requesting said data connection, the method comprising, at each current switching node (400, 802—822) connected in said path between a previous switching node (400, 802—822) and/or a next switching node (400, 802—822) by respective optical links (830-858):
receiving messages from the previous or next switching node (400, 802—822);
if the message is a CONNECTION_REQUEST message, then:
if the current switching node (400, 802—822) is not the first terminal switching node (400, 802—822), identifying and storing an available wavelength on the link (830-858) between the current and previous switching nodes (400, 802—822); and
if the current switching node (400, 802—822) is the second terminal switching node (400, 802—822), establishing a connection using the available wavelength and sending a CONNECTION_CONFIRM message to the previous switching node, otherwise forwarding the CONNECTION_REQUEST message to the next switching node

(400, 802—822); and
if the message is a CONNECTION_CONFIRM message, then: establishing a connection using the previously stored available wavelength;
and if the current switching node is not the first terminal switching node (400, 802—822), sending a CONNECTION_CONFIRM message to the previous switching node (400, 802—822); and
at each intermediate switching node connected to a respective ingress link (830-858) and a respective egress link (830-858) in the identified path, switching the optical signals arriving on the respective ingress link (830-858) over to the respective egress link (830-858) and performing wavelength conversion if the wavelengths occupied on the respective ingress and egress links (830-858) are different."

Reasons for the Decision

1. *Procedural matters*

1.1 This decision relies partly on document D3 which was cited in the European Search Report. The board introduced this document by virtue of its discretionary power under Article 114(1) EPC. The appellant neither objected to its inclusion in the proceedings nor made any written response to the board's case set out in the communication accompanying the summons to oral proceedings, on which this decision is based.

1.2 Given that the appellant withdrew the request for oral proceedings and requested "a decision based on the papers in the file" (cf. point V above), the board is

in a position to issue a decision in compliance with Article 113(1) EPC.

2. Main request - claim 1 - inventive step

2.1 The present application relates generally to switching in optical networks using wavelength division multiplexing (WDM).

2.2 As is disclosed in the closest prior art document D2, WDM can be applied in two ways: path multiplexing (PM) and link multiplexing (LM). In a network supporting PM, the same wavelength is used for all links along a path, whereas, in an LM-based network, the wavelength can change from one link of the path to the next, which requires wavelength conversion devices in each switching node (cf. e.g. D2, page 100, left-hand col., 2nd paragraph). Present claim 1 is concerned with establishing a connection in an LM-based network.

2.3 Using the wording of claim 1, D2 discloses a method of establishing a data connection between first and second terminal switching nodes in an optical network, the network comprising said terminal switching nodes and a plurality of other switching nodes interconnected by multi-wavelength optical links (WDM, cf. page 100, "Introduction", 2nd paragraph), the method comprising: identifying a path comprising a set of links and wavelengths for transporting data between the first and second terminal switching nodes via one or more intermediate switching nodes prior to reserving a wavelength on at least one link of the path (cf. page 102, left-hand col., lines 2 to 9); and, at each intermediate switching node connected to a respective ingress link and a respective egress link in the identified path, switching the optical signals arriving

on the respective ingress link over to the respective egress link (idem).

2.4 Claim 1 further includes the step of, at each intermediate switching node connected to a respective ingress link and a respective egress link in the identified path:

"performing wavelength conversion if the wavelengths occupied on the respective ingress and egress links are different".

2.5 Clearly, this feature reflects the fact that the method uses link multiplexing (LM). With respect to LM, D2 states that "Although the protocols are described in this paper for PM, they can easily be modified to apply to LM" (cf. page 100, right-hand col., lines 17 and 18), and "In WDM networks supporting LM, wavelength conversion devices are needed .." (cf. page 100, left-hand col., penultimate sentence). Consequently, D2 suggests the use of LM and wavelength conversion in the nodes.

In the statement of grounds of appeal (page 2, fourth paragraph), the appellant argued that this hint alone was not sufficient to be considered as an enabling disclosure of an LM-based network ("without any guidance as to how ... one would do this"). For the sake of argument, the board accepts this argument.

2.6 The technical problem to be solved starting out from D2 may therefore be considered as being to adapt the known method of establishing a data connection to LM.

2.7 In seeking a solution to this problem, the skilled person would be aware of document D3 which is from the

same technical field. D3 discloses details of a wavelength reservation scheme applicable to either PM or LM (cf. D3, page 45, section 1).

2.8 The solution disclosed in D3 is the following (cf. page 45, section 3): "A basic distributed scheme is as follows. A reservation packet (RESV) is sent by a source node to its destination node. It visits each intermediate node and reserves a suitable wavelength available on each link along the way[2]. Upon receiving RESV, the destination node sends a positive acknowledgement (ACK) back to the source following the reverse of the route that RESV took, triggering switch reconfigurations needed to establish the connection. The source will send a release packet (RELS) to the destination to tear down the connection." The footnote [2] referred to in this section reads: "In LM, any wavelength is suitable but in PM, only the same wavelength as the one reserved in the previous links is.".

By incorporating the solution for LM disclosed in D3, the skilled person would arrive at the subject-matter of claim 1 without inventive skill.

2.9 As mentioned above, the appellant did not reply to the board's argument based on a combination of D2 and D3. However, in the statement of grounds of appeal, it was argued that the problem to be solved should not contain pointers to the solution, i.e. should not use hindsight. In the appellant's view, the objective technical problem in the present case when starting out from D2 was to increase the efficiency of the network.

2.10 The board agrees that the problem should not contain pointers to the solution. However, the board disagrees

with the appellant's formulation of the problem, since the problem can be formulated much more specifically when starting out from D2 without being based on hindsight, given that D2 includes a pointer to apply the method to LM.

2.11 The appellant further argued that the protocols of D2 would require substantial redesign. The structure of the probe packets would need to be modified to include data relating to the free wavelengths for each link along the path, wavelength converters would need to be included at each intermediate node, and the network controller would need to be configured to perform the necessary conversions. To make such substantial modifications to a protocol, which had already been acknowledged as particularly efficient, was thus improbable without the application of hindsight.

2.12 The board notes however that the only modification actually claimed is to perform wavelength conversion at the intermediate switching nodes, which, without requiring hindsight, the board considers to be obvious for the reasons set out above, it being noted that wavelength conversion is inherent to LM.

2.13 The appellant finally argued that D2 taught that PM networks were preferable, since they "avoid the need for wavelength converters" and that the remark that the protocols might be applied to LM networks seemed to be a throwaway comment without any guidance as to how to do this. Therefore, the skilled person would not modify the network in D2 to include wavelength converters.

2.14 The board can however find no teaching in D2 that PM networks are preferable. The skilled person knows that LM networks have other advantages, despite the

increased complexity. For example, connectivity is improved since it is not necessary that a common wavelength be available on all the links on a path. The board also does not accept that the reference to LM is a throwaway remark. As to there being no guidance in D2, the board notes once again that claim 1 includes no technical features beyond wavelength conversion in the intermediate nodes, and that, in any case, a technical solution is available from D3. The board therefore finds the appellant's arguments unconvincing.

2.15 Consequently, the board concludes that the subject-matter of claim 1 of the main request does not involve an inventive step (Articles 52(1) and 56 EPC).

3. Auxiliary request - claim 1 - inventive step

3.1 Claim 1 of the auxiliary request differs from claim 1 of the main request in that it includes the features of former claim 8, which was based on claim 29 as originally filed. These added features define in more detail the protocol for reserving wavelengths, using "CONNECTION_REQUEST" and "CONNECTION_CONFIRM" messages exchanged between nodes.

3.2 In the view of the board, D3 (cf. the passage quoted earlier) discloses essentially the same reservation scheme for LM as claimed in claim 1 of the auxiliary request, whereby RESV and ACK messages in D3 correspond to "CONNECTION_REQUEST" and "CONNECTION_CONFIRM" messages respectively. In this respect, available wavelengths are reserved as the RESV message passes from source to destination, and the connection is established using those wavelengths when the ACK message passes from the destination back to the source.

3.3 Consequently, the subject-matter of claim 1 of the auxiliary request does not involve an inventive step (Articles 52(1) and 56 EPC).

3.4 The appellant did not respond to the above objection raised in the communication accompanying the summons to oral proceedings.

4. Conclusion

As neither request is allowable, it follows that the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

G. Rauh F. van der Voort

Decision electronically authenticated