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Datasheet for the decision
of 12 May 2022

Case Number: T 1967/19 - 3.5.03

Application Number: 09735847.7

Publication Number: 2279630

IPC: H04W4/06, H04L12/18, H04L29/06,
                             H04W76/00, H04L12/801

Language of the proceedings: EN

Title of invention:
Method, apparatus, and computer program product for providing
internet protocol multicast transport

Applicant:
Nokia Technologies Oy

Headword:
Pool-based GRE key selection/NOKIA

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - all requests (no)

Decisions cited:
T 0984/15

Case Number: T 1967/19 - 3.5.03

D E C I S I O N
of Technical Board of Appeal 3.5.03
of 12 May 2022

Appellant: (Applicant)	Nokia Technologies Oy Karakaari 7 02610 Espoo (FI)
Representative:	Ruuskanen, Juha-Pekka Page White & Farrer Bedford House John Street London WC1N 2BF (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 11 February 2019 refusing European patent application No. 09735847.7 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair	K. Bengi-Akyürek
Members:	J. Eraso Helguera
	R. Romandini

Summary of Facts and Submissions

I.   The appeal was lodged by the applicant against the
        decision of the examining division to refuse the
        present European patent application for, *inter alia,*
        lack of inventive step (Article 56 EPC) with respect to
        the independent claims of a main request and a first
        auxiliary request.

II.   During the examination proceedings, the examining
        division referred to the following prior-art document:

        D1:   WO 2008/040202 A1.

III.   Oral proceedings before the board were held on
        12 May 2022.

        The appellant requested that the decision under appeal
        be set aside and that a patent be granted on the basis
        of the claims of either of a **main request** and a **first
        auxiliary request**, both subject to the appealed
        decision and re-submitted with the statement of grounds
        of appeal.

        At the end of the oral proceedings, the board's
        decision was announced.

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

        "An apparatus (120) comprising:
        means for selecting a key for encapsulation of
        multicast data at a gateway device (120);
        means for communicating a message indicative of a
        multicast connection for a particular service from the
        gateway device to base stations (120, 140) in a

multicast-broadcast zone, the base stations (130, 140)
being joined to a same multicast tree in the
multicast-broadcast zone as the gateway device (120);
and

     means for establishing the multicast connection
with the base stations (130, 140) via a multicast data
path comprising a multicast tunnel associated with the
key; characterized wherein the means for selecting a
key for encapsulation is configured to select the key
by selecting a generic routing encapsulation key from a
multicast and broadcast service pool."

Claim 1 of the **first auxiliary request** reads as follows
(board's highlighting indicating amendments vis-à-vis
claim 1 of the main request):

     "An apparatus (120) comprising:
     means for selecting a key for encapsulation of
multicast data at a gateway device (120);
     means for communicating a message indicative of a
multicast connection for a particular service from the
gateway device to base stations (120, 140) in a
multicast-broadcast zone, the base stations (130, 140)
being joined to a same multicast tree in the
multicast-broadcast zone as the gateway device (120);
and
     means for establishing the multicast connection
with the base stations (130, 140) via a multicast data
path comprising a multicast tunnel associated with the
key; characterized wherein the means for selecting a
key for encapsulation is configured to select the key
by selecting a generic routing encapsulation key from a
multicast and broadcast service pool <u>reserved generic
routing encapsulation key address space</u>."

Reasons for the Decision

1.   MAIN REQUEST

        Claim 1 of the **main request** comprises the following
        limiting features (board's outline):

        An apparatus comprising:
        (a) means for selecting a key for encapsulation of
            multicast data at a gateway device;
        (b) means for communicating a message indicative of a
            multicast connection for a particular service from
            the gateway device to base stations in a
            multicast-broadcast zone, the base stations being
            joined to a same multicast tree in the
            multicast-broadcast zone as the gateway device;
        (c) means for establishing the multicast connection
            with the base stations via a multicast data path
            comprising a multicast tunnel associated with the
            key;
        (d) the means for selecting a key for encapsulation is
            configured to select the key by selecting a generic
            routing encapsulation (GRE) key from a multicast
            and broadcast service (MCBCS) pool.

1.1   Claim 1 – claim interpretation

1.1.1   Feature (d) requires *selecting* a GRE key as the key for
        encapsulation of multicast data. However, the claim
        does not mention the encapsulation of multicast data
        using the GRE protocol. In the applicant's favour, the
        board will interpret feature (c) as implying that the
        multicast tunnel *associated with* the key actually *uses*
        the GRE protocol for encapsulation.

1.1.2   Furthermore, the selection of a GRE key from a MCBCS
        pool in feature (d) does not necessarily mean that the
        pool is pre-defined or reserved in a consistent way in
        advance. Hence, it also encompasses embodiments where
        the pool is *dynamically* defined as more GRE keys are
        being added to it.

1.2   Claim 1 – inventive step (Article 56 EPC)

1.2.1   Using the wording of claim 1, document **D1** discloses
        (with reference to EP 2 061 266 A1, the English
        translation of D1 published in accordance with
        Article 153(4) EPC):

        An apparatus (Fig. 5: SGSN) comprising:
        (a) means for selecting a key ("the Tunnel End Point
            Identifier (TEID)") for encapsulation of multicast
            data at a gateway device ([0067]: "... the Tunnel
            End Point Identifier (TEID) may be assigned by the
            sending node (SGSN) ...");
        (b) means for communicating a message indicative of a
            multicast connection for a particular service from
            the gateway device to base stations in a
            multicast-broadcast zone ([0067]: "... (TEID) may
            be ... notified to all receiving nodes
            (NodeB+) ..."), the base stations being joined to a
            same multicast tree in the multicast-broadcast zone
            as the gateway device ([0073]: "... the NodeB+
            needs to send IGMP JOIN to join the multicast
            group.");
        (c) means for establishing the multicast connection
            with the base stations via a multicast data path
            comprising a multicast tunnel associated with the
            key ([0067]: "... all the receiving nodes identify
            the multicasting data flow using the same TEID.").

1.2.2   The board thus concurs with the examining division and
        the appellant that the subject-matter of claim 1
        differs from D1 in **feature (d)**.

1.2.3   The technical effects associated with **feature (d)** are
        the following:

        (i)   the use of GRE as encapsulation protocol
                results in <u>less overhead</u> than using GTP
                (8-12 bytes GRE header directly on top of
                IP as opposed to the 28 bytes required by
                GTP+UDP header used on top of IP),

        (ii)   the exclusive use of a subset of all the
                possible GRE keys ("pool") enables the
                identification of tunnels carrying MCBCS
                data in D1, irrespective of whether the
                underlying IP transport is *multicast* or
                <u>unicast</u>.

1.2.4   The objective technical problem can thus be framed as
        "how to improve the bandwidth-efficiency relating to
        the identification and use of the multicast tunnels of
        D1".

        The subject-matter of claim 1 does not involve an
        inventive step starting out from **D1** for the following
        reasons:

1.2.5   The skilled person in the field of 3GPP-based mobile
        networks would have immediately recognised that the *use*
        of GTP (i.e. the GPRS Tunnelling Protocol) in the
        multicast tunnels of D1 is a legacy from
        pre-3GPP/UMTS/WCDMA standards and that its replacement
        by GRE, well-known from Internet standards and readily
        available at the application's priority date, would

reduce the overhead created by the encapsulation
headers, improving thereby its bandwidth efficiency.

1.2.6   D1 explicitly discloses the use of a field of the GTP
         header, i.e. the "TEID", to identify a multicasting
         data flow. The skilled person adapting this teaching to
         the use of GRE would have naturally selected a data
         field of the GRE header, i.e. the GRE key, as
         corresponding tunnel identifier, given that this
         optional field was notoriously used as *tunnel
         differentiator* in GRE. Further considering that the
         claim does not define whether or not the pool is
         pre-defined before the allocation takes place (cf.
         point 1.1.2 above), the mere fact of allocating a
         number of GRE keys to a respective set of MCBCS flows
         would have already automatically created a "MCBCS pool"
         of GRE keys.

1.2.7   Even if the claim were to imply a pre-definition of the
         MCBCS pool, *reserving* a pool of identifiers from the
         available identifier space for multicast data was,
         generally speaking, a well-known measure in the field
         of packet-switched communications at the application's
         priority date (e.g. multicast IPv4 addresses are
         commonly selected in the range 224.0.0.0 through
         239.255.255.255, multicast addresses in IPv6 use the
         prefix ff00::/8). The trade-offs involved in applying
         the same measure to *tunnel endpoint identifiers*, e.g.
         GRE keys, would have also been apparent to the skilled
         person: ease of identification typically comes at the
         expense of the amount of identifiers available for
         non-multicast data. The choice would have been a
         straightforward trade-off decision in accordance with
         the circumstances, when adapting D1 to the use of GRE.

1.2.8   The appellant submitted that **feature (d)** enabled the
         solution to the problem of "operating a Multicast and
         Broadcast Service (MCBCS or MBMS) within a system which
         may not support conventional IP-M operations (for
         example where there is a unicast uplink available)".
         This was shown in the application with reference to one
         example strictly adhering to "3-way signalling" as in
         the current unicast setup and another with a "modified
         2-way signalling" approach. The appellant submitted
         that the board's preliminary opinion was incorrect in
         rejecting this as the objective technical problem.

         The board acknowledges that feature (d) is particularly
         useful when operating an MBMS within a system which may
         not support IP-M operations and has included this
         advantage in the technical effect identified in
         point 1.2.3 (ii) above. However, the *subjective*
         technical problem defined in the application considers
         the use of the GRE protocol as a given and the alleged
         contribution is limited to the *selection* of known GRE
         identifiers from an MCBCS pool. Conversely, D1 does not
         disclose the use of GRE keys. Thus, the *objective*
         technical problem must account for the technical
         contribution of *all* the distinguishing features, hence
         the reference to the technical effect identified in
         point 1.2.3 (i) above.

1.2.9   With respect to the board's objective technical problem
         and subsequent reasoning, the appellant first rejected
         that the skilled person would have immediately replaced
         the GTP used in the multicast tunnels of D1 with GRE.
         As argued by the board, GTP was a legacy standard-
         related approach and as such the skilled person would
         have been dissuaded from abandoning such a standard-
         related approach as it would possibly lead to issues
         when implementing the system within a suitable

standard-related network. Second, the board combined
two separate aspects of general knowledge, that of the
replacement of the GTP with GRE and then the
reservation of a pool of identifiers to tunnel endpoint
identifiers, with the teachings of D1. Account being
taken that the GRE keys were also used for
authentication purposes, this combination of additional
teachings over D1 would not have been obvious for the
skilled person at the time of filing and furthermore
could be seen to be an *ex-post facto* analysis as
regards the assessment of inventive step.

This is not convincing either. First, the skilled
person would have been well-aware that performing
obvious modifications to a technical specification
could result in a working device which does no longer
conform to the specification and, as a consequence,
cannot interoperate with legacy devices (see e.g.
T 984/15, Reasons 2.8). Second, the skilled person
choosing GRE as a straightforward alternative to GTP
would have been forced to find an equivalent in GRE to
the TEIDs of GTP used in D1 for the purpose of tunnel
identification. In this regard, the board cannot
identify any particular purpose associated with the GRE
keys according to the present application beyond the
well-established one, i.e. the differentiation of
tunnels which extend between the same tunnel endpoints.

1.3   It follows that the main request is not allowable under
         Article 56 EPC.

2.   FIRST AUXILIARY REQUEST

         Claim 1 comprises all the limiting features of claim 1
         of the main request and the following additional
         limitation (board's outline):

(e) the generic routing encapsulation key is selected from an MBMS pool <u>reserved [from the] generic routing encapsulation key address space</u>.

2.1   Claim 1 – inventive step (Article 56 EPC)

2.1.1   According to the appellant, **feature (e)** constitutes a clarification, referring back to the inventive-step discussion with respect to the main request.

2.1.2   However, this difference, interpreted as suggested by the appellant, has already been considered by the board in point 1.2.7 above for the assessment of inventive step as regards the subject-matter of claim 1 of the main request. Hence, the same reasons apply *mutatis mutandis* to the subject-matter of claim 1 of the first auxiliary request.

2.2   It follows that the first auxiliary request is not allowable under Article 56 EPC either.

3.   Since there is no allowable set of claims, 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