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04.05.16

|                                         |                                                                            |
|-----------------------------------------|----------------------------------------------------------------------------|
| Reference<br>W2364 EP                   | Application No./Patent No.<br>11858533.0 - 1505 / 2677705 PCT/JP2011078439 |
| Applicant/Proprietor<br>NEC Corporation |                                                                            |

**Communication**

The extended European search report is enclosed.

The extended European search report includes, pursuant to Rule 62 EPC, the supplementary European search report (Art. 153(7) EPC) and the European search opinion.

Copies of documents cited in the European search report are attached.

☒ 1 additional set(s) of copies of such documents is (are) enclosed as well.

**Refund of the search fee**

If applicable under Article 9 Rules relating to fees, a separate communication from the Receiving Section on the refund of the search fee will be sent later.

Should you wish to further prosecute this application in the examination phase, your attention is drawn to the provisions of Rule 70a EPC. An invitation to respond to the extended European search report will be issued shortly (R. 70(2) EPC).



The examination is being carried out on the **following application documents**

#### Description, Pages

1-24 filed with entry into the regional phase before the EPO

#### Claims, Numbers

1-8 filed with entry into the regional phase before the EPO

#### Drawings, Sheets

1/4-4/4 filed with entry into the regional phase before the EPO

Reference is made to the following documents; the numbering will be adhered to in the rest of the procedure.

- D1 "OpenFlow Switch Specification Version 1.0.0 ( Wire Protocol 0x01 )",INTERNET CITATION, 31 December 2009 (2009-12-31), pages 1-42, XP002719303,Retrieved from the Internet:URL:http://archive.openflow.org/documents/openflow-spec-v1.0.0.pdf [retrieved on 2014-01-27]
- D2 US 2010/161795 A1 (DERIDDER DARREN [CA] ET AL) 24 June 2010 (2010-06-24)
- D3 Henry C. J. Lee ET AL: "ICMP Traceback with Cumulative Path, an Efficient Solution for IP Traceback", In: "Correct System Design", 1 January 2003 (2003-01-01), Springer International Publishing, Cham 032548, XP055268616, ISSN: 0302-9743, ISBN: 978-3-642-23953-3, vol. 2836, pages 124-135, DOI: 10.1007/978-3-540-39927-8\_12,
- D4 WANG X ET AL: "TRACKING ANONYMOUS PEER-TO-PEER VOIP CALLS ON THE INTERNET", PROCEEDINGS OF THE 12TH. ACM CONFERENCE ON COMPUTER AND COMMUNICATIONS SECURITY. (CCS'05). ALEXANDRIA, VA, NOV. 7 - 11, 2005; [ACM CONFERENCE ON COMPUTER AND COMMUNICATIONS SECURITY], NEW YORK, NY : ACM, US, vol. CONF. 12, 7 November 2005 (2005-11-07), pages 81-91, XP001241622, DOI: 10.1145/1102120.1102133, ISBN: 978-1-59593-226-6

D5 US 2005/208947 A1 (BAHL PRADEEP [US]) 22 September 2005  
(2005-09-22)

D1 is seen as being known to the person skilled in the art (standard).

### **I. Clarity (Art. 84 EPC)**

The following subject matter is not clear.

I-1.1 Each invention should solve a problem. Reading the independent claims, even claim 7, it is unclear which problem is solved by encapsulating a packet with the same header, OpenFlow being state of the art and independent of whether a header is added to a packet or not. Hence, essential features (Art. 84 EPC with Rules 43(1) and (3) EPC) are missing.

I-1.2 Claim 2 (see also claim 5): Here again no problem is solved by transmitting two headers to a controller, NAP/NAPT being state of the art. Hence, essential features (Art. 84 EPC with Rules 43(1) and (3) EPC) are missing.

I-1.3 Claim 3 (see also claim 6) cites "said encapsulating module has ...  
- a function to translate the encapsulated packet to a packet to which only the header data at the head is given, and to hand to said switch."

This is not understood. What is meant by translating an encapsulated packet? In any case there is a header data at the head: this is always valid for a packet, encapsulated or not.

And finally, here again no problem is solved. Hence, essential features (Art. 84 EPC with Rules 43(1) and (3) EPC) are missing.

### **II. Inventive step (Article 56 EPC)**

Furthermore, the above-mentioned lack of clarity notwithstanding, the present application does not meet the requirements of Article 52(1) EPC, because the subject-matter of independent claims 1, 4, 7-8 does not involve an inventive step in the sense of Article 56 EPC.

## II-1 Independent claims

The document D1 is regarded as being the closest prior art to the subject-matter of claim 1 and discloses (the references in parentheses applying to this document):

A network system comprising:

- a switch having a function to process a reception packet based on a set entry of a flow table;

- a controller having a function to receive an inquiry of the packet from said switch, and to set the entry defining a rule and an operation to uniformly control packets to said flow table of said switch; and

~~an encapsulating module having a function to receive the packet from at least one of said switch and said controller and to encapsulate the packet by using a same header as a header of the packet.~~ **to forward the packet** (Features describing OpenFlow method: D1, section 2 eg.).

II-1.1 The subject-matter of independent claim 1 differs from that disclosure in that an **encapsulating** module having a function to receive the packet from at least one of said switch and said controller and **to encapsulate the packet by using a same header as a header of the packet.**

II-1.2 The indicated difference does not solve any problem, hence it cannot be inventive.

II-1.3 The argumentation of points II-1.1 to II-1.2 above applies also for claims 4, 7-8.

Note also, that a priori, there is no link between tracking via NAT/NAPT and OpenFlow. Hence, these topics can be treated independently.

## II-2 Dependent claims

Furthermore, the above-mentioned lack of clarity notwithstanding (see section I above), dependent claims 2-3 and 5-6 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the EPC with respect to inventive step in the sense of Article 56 EPC, the reasons being that in no case a problem is solved, see under section I above.

### **II-3 Conclusion**

Reading the description, it seems that a problem is solved, i.e. tracking a flow passing NAT, NAPT by using encapsulation. D2-D4 proposes many alternative solutions thereto, however none being comparable to the proposed one, as the exact mapping cannot be determined (no access to the translation engine). D5, abstract, however discloses to sending a binding update in case an address is changing, i.e. the idea to send somewhere information to allow a mapping between "old" and "new" address. This is in fact the most straightforward idea. Hence, the Applicant is asked to provide new claims with all essential features and a comment about advantages about its costly encapsulation related proposal instead of just sending a message with a mapping between these two addresses. Alternatively, SMTP could be used by a tracking tool to read out the translation table.

### **III. Further Comments**

- The features of the claims should be provided with reference signs placed in parentheses to increase the intelligibility of the claims (Rule 43(7) EPC, Guidelines, F-IV, 4.19).
- "incorporated by reference", p.24 , I.15 . Referring to the Guidelines, Part H-IV, 2.3.1, either the matter should explicitly be incorporated in the description if essential or otherwise be deleted.
- D2-D5 should be identified in the description and the relevant background art disclosed therein should be briefly discussed (Rule 42(1)(b) EPC).
- The applicant should furthermore bring the description into conformity with the amended claims, whereas:

- new subject-matter should not extend beyond the content of the application as originally filed (Article 123(2) EPC).
- all the described **embodiments** (description/figures) should fall within the scope of the claims to avoid rendering the claims unclear (Article 84 EPC). Inconsistencies should be removed (amending the claims/deleting "excess" subject-matter from the description, drawings/indicating in the description that the embodiments concerned do not form part of the invention but represents background art, see the Guidelines, F-IV, 4.3(iii)).
- Amendments should be made by filing replacement pages. Unnecessary recasting of the description should be avoided. An amended abstract is not required. The applicant should also take account of the requirements of Rule 50(1) EPC.
- In order to comply with the requirements of Rule 137(4) EPC, the applicant should **clearly identify the amendments** made, irrespective of whether they concern amendments by addition, replacement or deletion, and **indicate the passages of the application as filed on which these amendments are based** (see Guidelines H-III, 21). If the applicant considers it appropriate, these indications could be submitted in handwritten form on a copy of the relevant parts of the application as filed.

**Information on Search Strategy - Pilot phase (see OJ 2015, A86)**

The type of information contained in this sheet may change during the pilot for improving the usefulness of this new service.

Application Number

EP 11 85 8533

TITLE: NETWORK SYSTEM AND NETWORK FLOW TRACKING METHOD

APPLICANT: NEC Corporation

IPC CLASSIFICATION: H04L12/413, H04L12/46, H04L12/935, H04L12/741, H04L12/26

EXAMINER: Siebel, Christian

CONSULTED DATABASES: DOSYS, EPODOC, INET, NPL, WPI, XP3GPP, XPESP, XPETSI, XPI3E, XPI3ES, XPIEE, XPIETF, XPITU, XPMISC, XPRD, XPSPRNG

CLASSIFICATION SYMBOLS DEFINING EXTENT OF THE SEARCH:

IPC:

CPC: H04L43/026, H04L12/413, H04L12/4633, H04L49/3009, H04L45/745, H04L43/02/LOW

FI/F-TERMS:

KEYWORDS OR OTHER ELEMENTS FEATURING THE INVENTION:

Field: Network management

Aim: Flow tracking

Problem: Flow tracking in case a flow traverses NAT or NAPT

Solution: Enveloping the packet by an envelope, the envelope header being the same as the current header of the received packet. NAT, NAPT changes then only the envelope header. Both headers are available behind the NAT/NAPT for analysis purposes.

**SUPPLEMENTARY  
EUROPEAN SEARCH REPORT**

Application Number  
EP 11 85 8533

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                      |                                                   |                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Citation of document with indication, where appropriate, of relevant passages                                                                                                                                                                                                                                                                                        | Relevant to claim                                 | CLASSIFICATION OF THE APPLICATION (IPC)                                  |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Henry C. J. Lee ET AL: "ICMP Traceback with Cumulative Path, an Efficient Solution for IP Traceback"<br>In: "Correct System Design",<br>1 January 2003 (2003-01-01), Springer International Publishing, Cham 032548, XP055268616,<br>ISSN: 0302-9743<br>ISBN: 978-3-642-23953-3<br>vol. 2836, pages 124-135, DOI: 10.1007/978-3-540-39927-8_12,<br>* Section 1-2.3 * | 1-8                                               | INV.<br>H04L12/413<br>H04L12/46<br>H04L12/935<br>H04L12/741<br>H04L12/26 |
| A,D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | "OpenFlow Switch Specification Version 1.0.0 ( Wire Protocol 0x01 )",<br>INTERNET CITATION,<br>31 December 2009 (2009-12-31), pages 1-42, XP002719303,<br>Retrieved from the Internet:<br>URL:http://archive.openflow.org/documents/openflow-spec-v1.0.0.pdf<br>[retrieved on 2014-01-27]<br>* the whole document *                                                  | 1-8                                               | TECHNICAL FIELDS<br>SEARCHED (IPC)<br>H04L                               |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | US 2010/161795 A1 (DERIDDER DARREN [CA] ET AL) 24 June 2010 (2010-06-24)<br>* abstract *<br>* figure 3 *<br>* paragraph [0003] - paragraph [0006] *<br>* paragraph [0019] - paragraph [0021] *<br>* paragraph [0027] - paragraph [0037] *<br>-----<br>-/-                                                                                                            | 1-8                                               |                                                                          |
| The supplementary search report has been based on the last set of claims valid and available at the start of the search.                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                      |                                                   |                                                                          |
| Place of search<br>Berlin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                      | Date of completion of the search<br>27 April 2016 | Examiner<br>Siebel, Christian                                            |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>&amp; : member of the same patent family, corresponding document</p> |                                                                                                                                                                                                                                                                                                                                                                      |                                                   |                                                                          |

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EPO FORM 1503 03.82 (P04C04)

**SUPPLEMENTARY  
EUROPEAN SEARCH REPORT**

Application Number  
EP 11 85 8533

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                          |                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Citation of document with indication, where appropriate, of relevant passages                                                                                                                                                                                                                                                                                                                                                                                     | Relevant to claim                                        | CLASSIFICATION OF THE APPLICATION (IPC) |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p>WANG X ET AL: "TRACKING ANONYMOUS PEER-TO-PEER VOIP CALLS ON THE INTERNET", PROCEEDINGS OF THE 12TH. ACM CONFERENCE ON COMPUTER AND COMMUNICATIONS SECURITY. (CCS'05). ALEXANDRIA, VA, NOV. 7 - 11, 2005; [ACM CONFERENCE ON COMPUTER AND COMMUNICATIONS SECURITY], NEW YORK, NY : ACM, US, vol. CONF. 12, 7 November 2005 (2005-11-07), pages 81-91, XP001241622, DOI: 10.1145/1102120.1102133 ISBN: 978-1-59593-226-6<br/>* abstract *<br/>* Section 1 *</p> | 1-8                                                      |                                         |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p>US 2005/208947 A1 (BAHL PRADEEP [US])<br/>22 September 2005 (2005-09-22)<br/>* abstract *</p>                                                                                                                                                                                                                                                                                                                                                                  | 1-8                                                      |                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                          | TECHNICAL FIELDS SEARCHED (IPC)         |
| <p>The supplementary search report has been based on the last set of claims valid and available at the start of the search.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                          |                                         |
| Place of search<br><b>Berlin</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Date of completion of the search<br><b>27 April 2016</b> | Examiner<br><b>Siebel, Christian</b>    |
| <p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>&amp; : member of the same patent family, corresponding document</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                          |                                         |

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EPO FORM 1503 03.82 (P04C04)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 85 8533

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-04-2016

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
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|                                           |                     | US 2005208947 A1           | 22-09-2005          |
| -----                                     |                     |                            |                     |