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(54) Title: TRIANGLE LOOPBACK

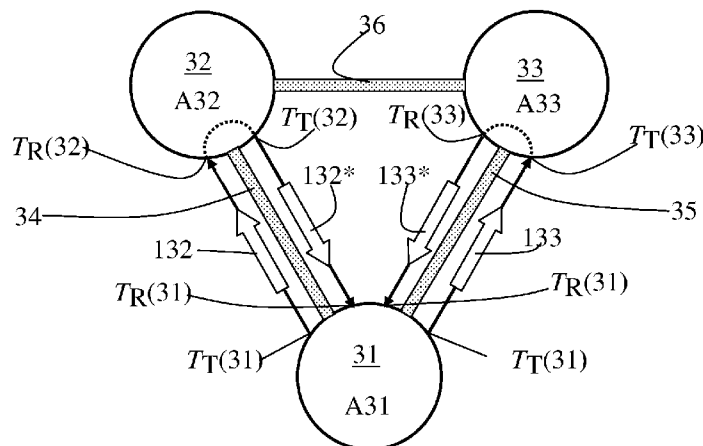


FIG 2A

(57) Abstract: A method of characterizing a communications channel between two communications nodes, the method comprising: determining at least one feature of a communications path between a first communications node and a second communications node; determining at least one feature of a communications path between the first communications node and a third communications node; transmitting at least one packet from the first node to propagate through the second and third nodes and return to the first node; and determining at least one feature of the communications channel between the second and third nodes responsive to receiving the packet at the first node, the at least one determined feature of the first node and the second node, and/or information comprised in the packet.



INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2014/063182

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H04L12/26 (2014.01)

CPC - H04L43/0852 (2014.11)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC(8) - H04L12/26; H04L12/56; H04L12/28; G01R31/08 (2014.01)

USPC - 370/236, 252; 709/223, 224

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
CPC - H04L43/0852; H04L47/283; H04W84/18 (2014.11) (keyword delimited)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatBase, Google Patents, Google Scholar.

Search terms used: propagation, link, transmission, round trip, delay, source, destination, intermediate, propagate, flood, broadcast

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/0007863 A1 (NAGHIAN) 12 January 2006 (12.01.2006) entire document	1-13
A	US 2007/0189187 A1 (RYU et al.) 16 August 2007 (16.08.2007) entire document	1-13
A	US 5,095,444 A (MOTLES) 10 March 1992 (10.03.1992) entire document	1-13
A	US 2007/0147385 A1 (DRUKE et al) 28 June 2007 (28.06.2007) entire document	1-13

 Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

22 January 2015

Date of mailing of the international search report

03 FEB 2015

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2014/063182

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
see extra sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-13

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/IB2014/063182

Continuation of Box III:

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-13, drawn to a method of characterizing a communications channel between two communications nodes.

Group II, claims 14-19, drawn to a method of determining packet loss rate between two communications nodes.

Group III, claim 20, drawn to a method of determining packet delay between two communications nodes.

The inventions listed as Groups I, II and III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of the Group I invention: determining at least one feature of a communications path between a first communications node and a second communications node as claimed therein is not present in the invention of Groups II and III. The special technical feature of the Group II invention: a method of determining packet loss rate between two communications nodes as claimed therein is not present in the invention of Groups I or III. The special technical feature of the Group III invention: time stamping the packet with a transmission time at which it is transmitted from one of the second and third nodes to the other of the second and third nodes and a reception time at which the packet is respectively received at the other of the nodes as claimed therein is not present in the invention of Groups I or II.

Groups I, II and III lack unity of invention because even though the inventions of these groups require the technical feature of a communications channel between communications nodes; and transmitting at least one packet from the first node to propagate through the second and third nodes and return to the first node, this technical feature is not a special technical feature as it does not make a contribution over the prior art.

Specifically, US 2007/0147385 A1 (DRUKE et al) 28 June 2007 (28.06.2007) teaches a communications channel between communications nodes (communication between two nodes using packets, Para. 35 and Fig. 3); and transmitting at least one packet from the first node to propagate through the second and third nodes and return to the first node (packets are transmitted sequentially from a primary node to a secondary node and the secondary node retransmits packets to the primary node, Paras. 35-36; communication may also occur between the primary, secondary and a third node, Para. 22 and Fig. 1).

Since none of the special technical features of the Group I, II or III inventions are found in more than one of the inventions, unity of invention is lacking.