(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

REVISED VERSION

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
27 December 2012 (27.12.2012)

WIPO | PCT

(10) International Publication Number
WO 2012/177723 A9

(51) International Patent Classification:
H04W 40/22 (2009.01) *H04W 40/24* (2009.01)
H04W 40/26 (2009.01)

(21) International Application Number:
PCT/US2012/043286

(22) International Filing Date:
20 June 2012 (20.06.2012)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
13/164,708 20 June 2011 (20.06.2011) US

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report (Art. 21(3))*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

[Continued on next page]

(54) Title: REDIRECTING TRAFFIC VIA TUNNELS TO DISCOVERED DATA AGGREGATORS

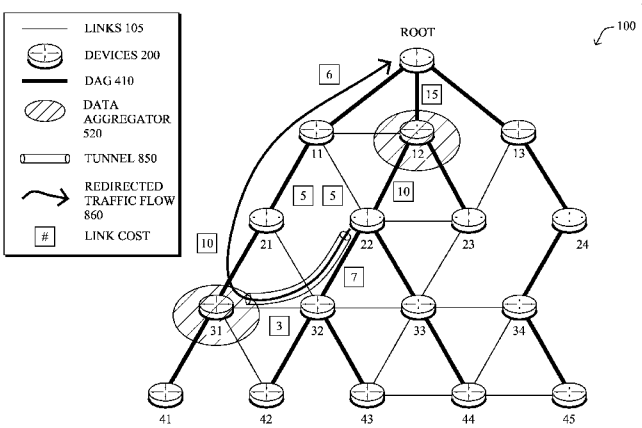


FIG. 8

(57) Abstract: In one embodiment, a data aggregator discovery (DAD) message may be distributed by an associated data aggregator, the DAD message identifying the initiating data aggregator, and comprising a recorded route taken from the data aggregator to a receiving particular node as well as a total path cost for the particular node to reach a root node of the DAG through the recorded route and via the data aggregator. The receiving particular node determines a path cost increase (PCI) associated with use of the data aggregator based on the total path cost as compared to a DAG-based path cost for the particular node to reach the root node via the DAG. If the PCI is below a configured threshold, the particular node may redirect traffic to the data aggregator as source-routed traffic according to the recorded route. The traffic may then be aggregated by the data aggregator, accordingly.

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(88) **Date of publication of the revised international search report**:

28 February 2013

(15) **Information about Correction**:
see Notice of 28 February 2013

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/043286

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04W40/22 H04W40/26 H04W40/24
ADD.

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)
H04W H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GOYAL M ET AL: "Reactive Discovery of Point-to-Point Routes in Low Power and Lossy Networks; draft-ietf-roll-p2p-rpl-03.txt", REACTIVE DISCOVERY OF POINT-TO-POINT ROUTES IN LOW POWER AND LOSSY NETWORKS; DRAFT-IETF-ROLL-P2P-RPL-03.TXT, INTERNET ENGINEERING TASK FORCE, IETF; STANDARDWORKINGDRAFT, INTERNET SOCIETY (ISOC) 4, RUE DES FALAISES CH- 1205 GENEVA, SWITZERLAND, no. 3, 13 May 2011 (2011-05-13), pages 1-22, XP015075738, the whole document --- -/--	1-22

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* 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	Date of mailing of the international search report
23 November 2012	03/01/2013

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Schneider, Gernot

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GNAWALI P LEVIS STANFORD UNIVERSITY O: "The Minimum Rank Objective Function with Hysteresis; draft-ietf-roll-minrank-hysteresis-of-03.t xt", THE MINIMUM RANK OBJECTIVE FUNCTION WITH HYSTERESIS; DRAFT-IETF-ROLL-MINRANK-HYSTERESIS-OF-03.T XT, INTERNET ENGINEERING TASK FORCE, IETF; STANDARDWORKINGDRAFT, INTERNET SOCIETY (ISOC) 4, RUE DES FALAISES CH- 1205 GENEVA, SWITZERLAND, no. 3, 4 May 2011 (2011-05-04), pages 1-10, XP015075600, the whole document --- WINTER T ET AL: "RPL: IPv6 Routing Protocol for Low power and Lossy Networks; draft-ietf-roll-rpl-19.txt", RPL: IPV6 ROUTING PROTOCOL FOR LOW POWER AND LOSSY NETWORKS; DRAFT-IETF-ROLL-RPL-19.TXT, INTERNET ENGINEERING TASK FORCE, IETF; STANDARDWORKINGDRAFT, INTERNET SOCIETY (ISOC) 4, RUE DES FALAISES CH- 1205 GENEVA, SWITZERLAND, no. 19, 14 March 2011 (2011-03-14), pages 1-163, XP015074831, the whole document	1-22
A	US 2007/153707 A1 (THUBERT PASCAL [FR] ET AL) 5 July 2007 (2007-07-05) the whole document	1-22

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/043286

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 additional 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 an 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.:

1-22

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-22

   The claims are directed to compare a path cost between a hierarchical path and a non-hierarchical path to the root.

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2. claims: 23, 24

   The claims a directed to different reporting groups, based on the the data aggregator.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2012/043286

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007153707 A1	05-07-2007	EP 1969775 A2	17-09-2008
		EP 1969776 A2	17-09-2008
		US 2007153707 A1	05-07-2007
		US 2007153764 A1	05-07-2007
		US 2008212494 A1	04-09-2008
		WO 2007081567 A2	19-07-2007