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(54) **Title:** ENABLING MULTICAST FOR M2M SERVICE LAYER GROUP OPERATION

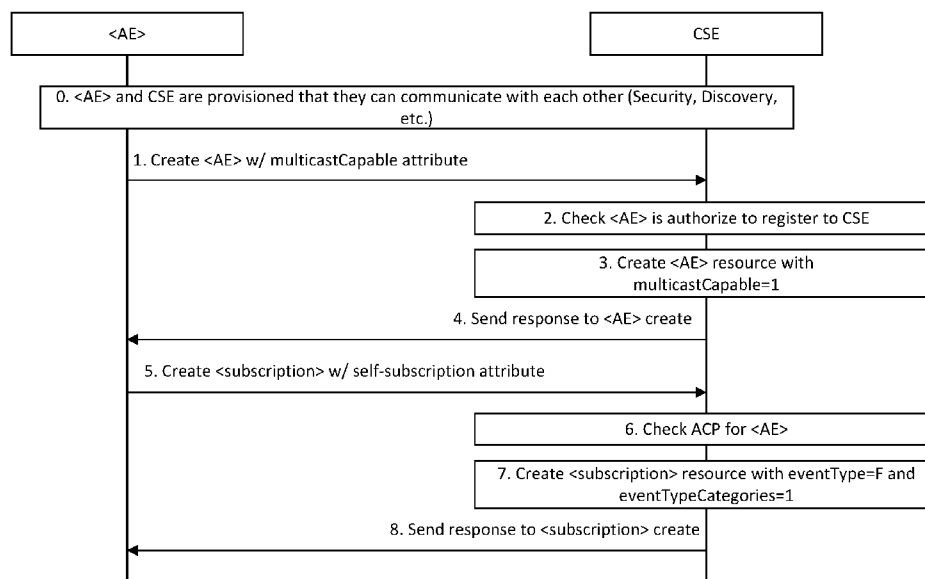


FIG. 23

(57) **Abstract:** Service layer multicast communications management may be achieved via indication by entities of multicast capabilities during service layer registration and self-subscription by the entities to the service layer. The service layer, or a managing application in communication with the service layer, may then maintain resources for multicast configurations, dynamically create multicast groups, and notify members via their self-subscription of the entities in the groups. The service layer may then further fan-out multicast messages, thereby allowing the originator of the multicast message to access recipients in multiple underlying networks without the need to configure communications directly. Fan-out may include unicasts to entities lacking multicast capabilities. Self-subscription may also be used, for example, in granting access control to a third party application.



(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, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, 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.

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INTERNATIONAL SEARCH REPORT

International application No PCT/US2017/056524

A. CLASSIFICATION OF SUBJECT MATTER INV. H04L12/18 ADD. H04W4/00				
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) H04L H04W				
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.		
X	US 2014/369251 A1 (ZHANG YONGJING [CN]) 18 December 2014 (2014-12-18) column 0003 - column 0006 paragraph [0090] - paragraph [0134]; figure 2 paragraph [0290] - paragraph [0305]; figure 7 <div style="text-align: center;">----- -/--</div>	1-7, 14, 15		
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.</td> <td style="width: 50%; border: none;"><input checked="" type="checkbox"/> See patent family annex.</td> </tr> </table>			<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> 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			
24 January 2018	06/04/2018			
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Fischer, Erik			

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2017/056524

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>"oneM2M; Functional Architecture (oneM2M TS-0001 version 2.10.0 Release 2)", ETSI TECHNICAL SPECIFICATION, EUROPEAN TELECOMMUNICATIONS STANDARDS INSTITUTE (ETSI), 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS ; FRANCE</p> <p>, vol. oneM2M, no. V2.10.0 5 October 2016 (2016-10-05), pages 1-421, XP014279927, Retrieved from the Internet: URL:http://www.etsi.org/deliver/etsi_ts/118100_118199/118101/02.10.00_60/ts_118101v021000p.pdf [retrieved on 2016-10-05] page 23, paragraph 5.2.1 Functional Architecture; figures 5.2.1-1 page 37, paragraph 6.2.6 Group Management - paragraph 6.2.6.2 Detailed Descriptions page 83, paragraph 8.3 Procedures for interaction with Underlying Net - page 84, paragraph 8.3.2 Description and Flows on Mcn Reference Point</p> <p style="text-align: center;">-----</p>	1-7, 14, 15
X,P	<p>ARC VICE CHAIR ET AL: "ARC 28 TS-0001 CR Pack", TP-2017-0090-ARC_28_TS-0001_CR_PACK.ZIP, ONEM2M</p> <p>, vol. Technical Plenary, TP 31 March 2017 (2017-03-31), pages 1-23, XP084021651, Retrieved from the Internet: URL:URL = http://member.onem2m.org/Application/documentapp/downloadimmediate/default.aspx?docID=21606 [retrieved on 2017-03-31] page 15, paragraph 10.2.7.x1.1 Multicast Group Information and <local - page 21, paragraph m 10.2.7.x2 Create <localMulticastGroup>; figures 10.2.7.x1.1-1</p> <p style="text-align: center;">-----</p>	1-7, 14, 15

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2017/056524

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.:

1-7, 14, 15

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: 1-7, 14, 15

Apparatus for providing a service layer entity. The apparatus receives indications of multicast capabilities provided by multiple entities; maintains one or more service layer resources for a multicast configuration and creates a service layer group by selecting members among the multiple entities based on their indications of multicast capabilities.

2. claims: 8-13, 16-20

Apparatus for provide a service layer entity. The apparatus receives self-subscription information, the self-subscription information being provided to the service layer entity and regarding a self-subscribing entity, the self-subscription information allowing a subscription whereby the service layer may send an unsolicited request to the self-subscribing entity and send the unsolicited request to the self-subscribing entity.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2017/056524

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
US 2014369251	A1	18-12-2014	CA 2859059 A1	11-07-2013
			CN 103200209 A	10-07-2013
			EP 2782367 A1	24-09-2014
			EP 3094117 A1	16-11-2016
			ES 2657805 T3	06-03-2018
			JP 5891551 B2	23-03-2016
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