



- (51) **International Patent Classification:**
H04L 29/06 (2006.01) *H04W 12/06* (2009.01)
- (21) **International Application Number:**
PCT/US2016/038447
- (22) **International Filing Date:**
21 June 2016 (21.06.2016)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
14/748,031 23 June 2015 (23.06.2015) US
- (71) **Applicant: MICROSOFT TECHNOLOGY LICENSING, LLC** [US/US]; Attn: Patent Group Docketing (Bldg. 8/1000), One Microsoft Way, Redmond, Washington 98052-6399 (US).
- (72) **Inventors: BAILEY, Guillaume;** Microsoft Technology Licensing, Llc, Attn: Patent Group Docketing (Bldg. 8/1000), One Microsoft Way, Redmond, Washington 98052-6399 (US). **MAHENDRU, Kshitij;** Microsoft Technology Licensing, Llc, Attn: Patent Group Docketing (Bldg. 8/1000), One Microsoft Way, Redmond, Washington 98052-6399 (US). **WU, Jun;** Microsoft Technology Licensing, Llc, Attn: Patent Group Docketing (Bldg. 8/1000), One Microsoft Way, Redmond, Washington 98052-6399 (US). **ZARIC, Vlado;** Microsoft Technology Licensing, Llc, Attn: Patent Group Docketing (Bldg. 8/1000), One Microsoft Way, Redmond, Washington 98052-6399 (US).

- (74) **Agents: MINHAS, Sandip et al.;** Microsoft Corporation, Attn: Patent Group Docketing (Bldg. 8/1000), One Microsoft Way, Redmond, Washington 98052-6399 (US).
- (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, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, 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.
- (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, ST, 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, LI, 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, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

[Continued on next page]

(54) **Title:** LEARNED ROVING AUTHENTICATION PROFILES

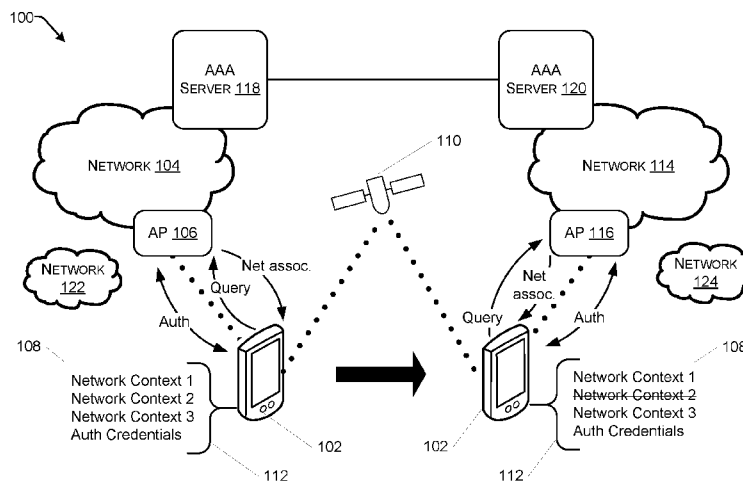
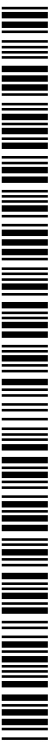


FIG. 1

(57) **Abstract:** Disclosed herein are systems and methods for determining learned associations between authentication credentials and network contextual data, such as may be utilized in a network that supports network roving. A mobile device attempts to rove to a visited network using authentication credentials associated with another network, based at least in part on first contextual information associated with the other network and second contextual information associated with the visited network indicating that the visited network is part of a common association of networks that supports roving internetworking between the networks of the common association.





Published:

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

2 February 2017

- *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))*

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2016/038447

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04L29/06 H04W12/06
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)
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, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	EP 1 465 385 A1 (LUCENT TECHNOLOGIES INC [US]) 6 October 2004 (2004-10-06) abstract; figures 1,4 paragraph [0005] - paragraph [0006] paragraph [0012] sentence 40, paragraph 39	1,7 2-6,8-11
X A	WO 2014/176539 A1 (INTERDIGITAL PATENT HOLDINGS [US]) 30 October 2014 (2014-10-30) abstract paragraph [0040] - paragraph [0052] paragraph [0065] - paragraph [0067] paragraph [0232] - paragraph [0241]	1-3,5-11 4
	----- -/--	

Further documents are listed in the continuation of Box C.

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 13 December 2016	Date of mailing of the international search report 21/12/2016
---	--

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 Figiel, Barbara
--	---

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2016/038447

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Markus Jakobsson ET AL: "Implicit Authentication for Mobile Devices", USENIX Workshop on Hot Topics in Security (HotSec) 2009, 11 August 2009 (2009-08-11), XP055012369, Retrieved from the Internet: URL: http://www.parc.com/content/attachments/Jakobsson-Shi-HotSec09.pdf [retrieved on 2011-11-17] the whole document	1-11
A	----- EP 2 352 323 A1 (TELEFONICA SA [ES]) 3 August 2011 (2011-08-03) abstract paragraph [0009] - paragraph [0019]	1-11
X	----- US 2011/130117 A1 (FAN JAMES [US] ET AL) 2 June 2011 (2011-06-02) figure 3 -----	12-15

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2016/038447

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.:

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: 1-11

how a client device lacking access to usable authentication credentials can authenticate to the visited network.

2. claims: 12-15

how the profile server can provide the mobile device with authentication credentials

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2016/038447

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
EP 1465385	A1	06-10-2004	AT 368347 T	15-08-2007
			CN 1534921 A	06-10-2004
			DE 602004007708 T2	30-04-2008
			EP 1465385 A1	06-10-2004
			JP 4615239 B2	19-01-2011
			JP 2004304804 A	28-10-2004
			KR 20040086587 A	11-10-2004
			US 2004193712 A1	30-09-2004

WO 2014176539	A1	30-10-2014	CN 105144656 A	09-12-2015
			EP 2989770 A1	02-03-2016
			JP 2016525807 A	25-08-2016
			KR 20160004363 A	12-01-2016
			TW 201541977 A	01-11-2015
			US 2016087957 A1	24-03-2016
			WO 2014176539 A1	30-10-2014

EP 2352323	A1	03-08-2011	AR 073915 A1	09-12-2010
			BR PI0919779 A2	08-12-2015
			EP 2352323 A1	03-08-2011
			ES 2337437 A1	23-04-2010
			PA 8846501 A1	26-05-2010
			US 2011239276 A1	29-09-2011
			UY 32193 A	31-05-2010
WO 2010046515 A1	29-04-2010			

US 2011130117	A1	02-06-2011	US 2011130117 A1	02-06-2011
			US 2014155038 A1	05-06-2014
