

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
13 February 2003 (13.02.2003)

PCT

(10) International Publication Number
WO 03/013060 A3

(51) International Patent Classification⁷: H04Q 7/38, 7/22, H04L 12/56

(21) International Application Number: PCT/US02/23887

(22) International Filing Date: 29 July 2002 (29.07.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data: 09/919,334 30 July 2001 (30.07.2001) US

(71) Applicant: STARENT NETWORKS CORPORATION
[US/US]; 30 International Place, Tewksbury, MA 01876 (US).

(72) Inventors: HARPER, Matthew, Hayden; 22 Ticklefancy Lane, Salem, NH 03079 (US). JANAKIRAMAN, Senthilnathan; 255 North Road N0. 158, Chelmsford, MA 01824 (US).

(74) Agents: REYES, Jason, A. et al.; Hale and Dorr LLP, 60 State Street, Boston, MA 02109 (US).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW.

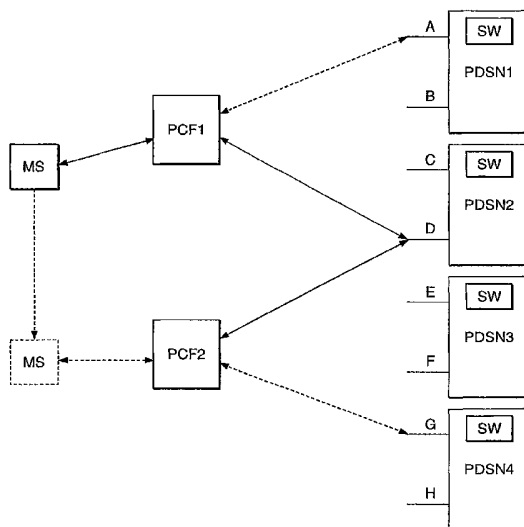
(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report

(88) Date of publication of the international search report:
6 November 2003

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: MANAGING PACKET DATA INTERCONNECTIONS IN MOBILE COMMUNICATIONS



(57) Abstract: Data interconnections are managed in a mobile communications network having multiple packet control function entities (PCFs) and multiple packet data serving nodes (PDSNs), wherein each PCF and PDSN communicates signaling messages according to a mobile signaling protocol. Information for a Mobile Subscriber (MS) is received. The MS is associated with a same one of the PDSNs when the MS moves from a first area covered by a first PCF to a second area covered by a second PCF. It is determined that a first PCF has issued a first connection request on behalf of an MS. As a result of the first connection request, a selection protocol is executed a first time to select a PDSN that corresponds to the MS. It is determined that a second PCF has issued a second connection request on behalf of the MS. The selection protocol is executed a second time to select the same PDSN that was selected as a result of the first connection request.



WO 03/013060 A3

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 02/23887

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04Q7/38 H04Q7/22 H04L12/56

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 7 H04L H04Q

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 practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 37103 A (NOKIA TELECOMMUNICATIONS OY ;HAUMONT SERGE (FI); KARI HANNU (FI);) 22 July 1999 (1999-07-22) abstract page 2, line 3 -page 3, line 10 page 10, line 10 -page 10, line 19 page 13, line 4 -page 13, line 6 ---	1,2,4-9, 11,16-18
X	WO 00 78080 A (NOKIA MOBILE PHONES LTD ;SEVANTO JARKKO (FI); SIVANANDAN MOHAN (FI) 21 December 2000 (2000-12-21) page 2, line 14 -page 2, line 18 ---	1,2,4-9, 11,16-18
X	WO 00 14981 A (MALMKVIST JONAS ;TELIA AB (SE)) 16 March 2000 (2000-03-16) abstract page 5, line 24 -page 5, line 30 --- -/--	10

Further documents are listed in the continuation of box C. Patent family members are listed in 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 document 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 14 April 2003	Date of mailing of the international search report 24 04 2003
--	--

Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Goller, W
--	---------------------------------

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/23887

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	WO 01 78322 A (ERICSSON TELEFON AB L M) 18 October 2001 (2001-10-18) abstract page 2, line 7 -page 3, line 28 page 4, line 12 -page 5, line 5 page 7, line 12 -page 9, line 18 ----	1-11, 16-18
X A	WO 00 41414 A (NOKIA NETWORKS OY ;PUUSKARI MIKKO (FI)) 13 July 2000 (2000-07-13) abstract page 3, line 4 -page 3, line 8 page 5, line 31 -page 5, line 35 page 3, line 12 -page 4, line 17 page 7, line 5 -page 7, line 22 ----	12-14 10,15
P,X	WO 01 67786 A (ERICSSON TELEFON AB L M) 13 September 2001 (2001-09-13) abstract page 3, line 30 -page 5, line 19 page 7, line 1 -page 10, line 2 ----	10
A	WO 01 50783 A (QUALCOMM INC) 12 July 2001 (2001-07-12) abstract page 3, line 9 -page 3, line 12 page 5, line 17 -page 6, line 24 page 8, line 21 -page 9, line 15 -----	1-9,11, 16-18

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 02/23887

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 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 fee, this Authority did not invite payment of any additional fee.
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.
- 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: 1-9,11,16-18

Method for maintaining PPP links between a mobile Terminal and a PDSN when an Inter-PCF handover is performed

2. Claim : 10

Mapping a mobile station identification number to a list of PDSN

3. Claims: 12-15

Directing a PCF to request a connection to a PDSN having a redirection address

INTERNATIONAL SEARCH REPORT

Int ... nal Application No

PCT/US 02/23887

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9937103	A	22-07-1999	FI 980062 A	15-07-1999
			AU 1969999 A	02-08-1999
			CN 1256053 T	07-06-2000
			EP 0966854 A1	29-12-1999
			WO 9937103 A1	22-07-1999
			JP 2001508276 T	19-06-2001
			ZA 9900213 A	13-07-1999
WO 0078080	A	21-12-2000	FI 991373 A	15-12-2000
			AU 5224300 A	02-01-2001
			EP 1192829 A1	03-04-2002
			WO 0078080 A1	21-12-2000
WO 0014981	A	16-03-2000	EE 200100142 A	17-06-2002
			EP 1112665 A1	04-07-2001
			NO 20010894 A	06-03-2001
			SE 9803045 A	10-03-2000
			WO 0014981 A1	16-03-2000
WO 0178322	A	18-10-2001	AU 6586001 A	23-10-2001
			WO 0178322 A2	18-10-2001
WO 0041414	A	13-07-2000	FI 982855 A	01-07-2000
			AU 3048200 A	24-07-2000
			EP 1142370 A1	10-10-2001
			WO 0041414 A1	13-07-2000
WO 0167786	A	13-09-2001	AU 3785301 A	17-09-2001
			AU 3961001 A	17-09-2001
			WO 0167706 A2	13-09-2001
			WO 0167786 A2	13-09-2001
WO 0150783	A	12-07-2001	AU 2769201 A	16-07-2001
			BR 0107407 A	25-02-2003
			CN 1394449 T	29-01-2003
			EP 1245123 A2	02-10-2002
			NO 20023223 A	02-09-2002
			WO 0150783 A2	12-07-2001