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(54) **DATA RECEIVING METHOD AND DEVICE FOR APPLICATIONS PROVIDING AN IPTV COMMUNICATIONS SERVICE**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

5,774,668 A * 6/1998 Choquier G06F 9/505
370/480
5,774,713 A * 6/1998 Yokota G06F 9/4443
(Continued)

FOREIGN PATENT DOCUMENTS

CN 1620129 A 5/2005
CN 1685323 A 10/2005
(Continued)

OTHER PUBLICATIONS

Digital Video Broadcasting (DVB); Transport of MPEG-2 TS Based DVB Services over IP Based Networks ETSI TS 102 034 V1.3.1 EBU-UER (Oct. 2007).*
(Continued)

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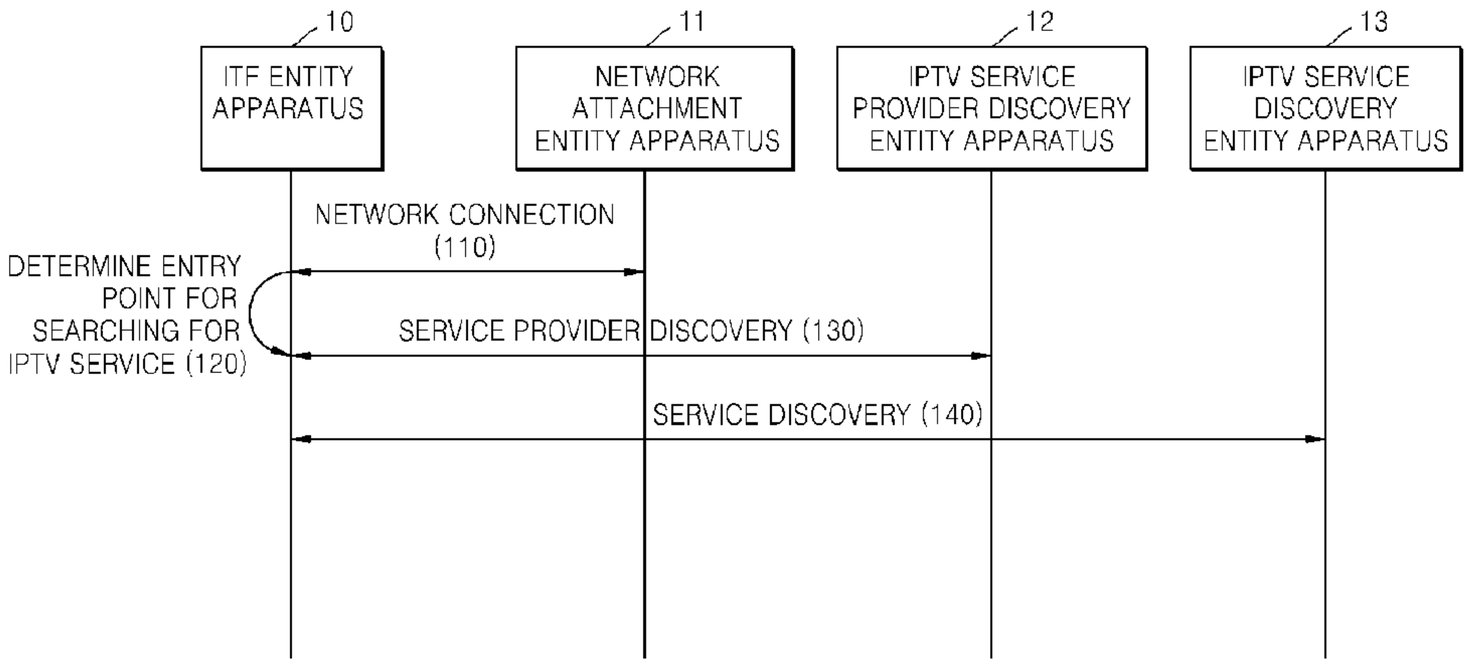
(57) **ABSTRACT**

A method and apparatus for receiving an application for providing an Internet protocol television (IPTV) communication service. The method includes: acquiring IP address information for initiating an IPTV service provider discovery at an entry point for searching for a service provider; receiving information regarding an IPTV service provider from an IPTV service provider discovery entity apparatus by using the IP address information; and acquiring information regarding the application for providing the IPTV communication service based on the information regarding the IPTV service provider.

13 Claims, 12 Drawing Sheets



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(56) **References Cited**

U.S. PATENT DOCUMENTS

5,914,746	A *	6/1999	Matthews, III	H04N 5/44543 348/731
6,035,304	A *	3/2000	Machida	H04N 21/4331
6,185,611	B1	2/2001	Waldo et al.	
6,594,693	B1	7/2003	Borwankar	
6,757,745	B1 *	6/2004	Hamann et al.	709/250
7,400,725	B1	7/2008	Yumiba et al.	
7,409,208	B1 *	8/2008	Clare et al.	455/419
7,466,810	B1 *	12/2008	Quon et al.	379/201.01
7,581,228	B2 *	8/2009	Turgeman	H04N 21/235 719/321
7,797,060	B2 *	9/2010	Grgic	G05B 19/042 700/19
7,865,888	B1 *	1/2011	Qureshi et al.	717/168
7,917,407	B1 *	3/2011	Reed et al.	705/26.62
8,359,626	B1 *	1/2013	Rey et al.	725/140
8,554,874	B2 *	10/2013	Toulemont	G06F 17/30899 709/218
8,645,487	B2	2/2014	Sung et al.	
2002/0010798	A1 *	1/2002	Ben-Shaul et al.	709/247
2002/0160752	A1 *	10/2002	Hook	G06F 8/61 455/412.1
2002/0196268	A1 *	12/2002	Wolff et al.	345/718
2003/0005132	A1 *	1/2003	Nguyen et al.	709/229
2003/0105718	A1	6/2003	Hurtado et al.	
2003/0217369	A1 *	11/2003	Heredia	H04N 7/162 725/152
2004/0002987	A1 *	1/2004	Clancy	H04N 5/44543
2004/0103428	A1	5/2004	Seok et al.	
2004/0120344	A1	6/2004	Sato et al.	
2004/0230695	A1 *	11/2004	Anschutz et al.	709/232
2004/0255302	A1	12/2004	Trossen	
2005/0090235	A1 *	4/2005	Vermola	H04H 20/57 455/414.3
2005/0096753	A1 *	5/2005	Arling et al.	700/11
2005/0108757	A1 *	5/2005	Lee	H04N 7/17309 725/50
2005/0177592	A1 *	8/2005	Burzynski	G06F 17/30327
2005/0210035	A1 *	9/2005	Kester et al.	707/10
2005/0210513	A1 *	9/2005	Szucs et al.	725/80
2006/0019618	A1 *	1/2006	Seppala	H04H 60/72 455/121
2006/0039354	A1 *	2/2006	Rao et al.	370/352
2006/0085816	A1	4/2006	Funk et al.	
2006/0117342	A1	6/2006	Park et al.	
2006/0174252	A1 *	8/2006	Besbris et al.	719/330
2006/0184989	A1 *	8/2006	Slothouber	G06F 17/30861 725/110
2006/0209857	A1	9/2006	Hicks, III	
2006/0212878	A1 *	9/2006	Park et al.	719/319
2006/0218586	A1 *	9/2006	Pohjolainen et al.	725/39
2006/0253560	A1 *	11/2006	Aaltonen	H04H 60/31 709/223
2006/0259628	A1 *	11/2006	Vadlapudi et al.	709/227
2006/0259927	A1	11/2006	Acharya et al.	
2006/0271667	A1 *	11/2006	Clow et al.	709/223
2006/0290775	A1 *	12/2006	Horii et al.	348/14.01
2006/0291412	A1 *	12/2006	Naqvi	H04M 7/123 370/328
2007/0058569	A1 *	3/2007	McMenamin	H04L 29/06027 370/254
2007/0064637	A1	3/2007	Lee et al.	
2007/0081523	A1 *	4/2007	Mishra	H04L 29/06027 370/352
2007/0088836	A1 *	4/2007	Tai	H04M 7/128 709/227
2007/0100981	A1 *	5/2007	Adamczyk	H04L 69/18 709/223
2007/0121584	A1 *	5/2007	Qiu	H04M 3/42042 370/352
2007/0140150	A1 *	6/2007	Beck et al.	370/279
2007/0140299	A1 *	6/2007	Hofmann	H04L 29/06 370/486
2007/0143444	A1	6/2007	Kamiya et al.	
2007/0162931	A1	7/2007	Mickle et al.	
2007/0169108	A1 *	7/2007	Guillorit	G06F 9/44521 717/174
2007/0206773	A1	9/2007	Branam	
2007/0208834	A1 *	9/2007	Nanamura	G06F 9/46 709/220
2007/0220558	A1 *	9/2007	Jung et al.	725/62
2007/0240200	A1	10/2007	Han	
2007/0250908	A1	10/2007	Sim et al.	
2007/0277172	A1 *	11/2007	Kawakami et al.	718/100
2007/0283402	A1 *	12/2007	Yu	H04H 20/93 725/114
2007/0288627	A1 *	12/2007	Abella et al.	709/224
2008/0002674	A1 *	1/2008	Lubbers	H04L 29/12066 370/352
2008/0066095	A1	3/2008	Reinoso	
2008/0072254	A1 *	3/2008	Jung et al.	725/39
2008/0127255	A1 *	5/2008	Ress	H04N 7/17318 725/38
2008/0141285	A1	6/2008	Lee et al.	
2008/0148318	A1 *	6/2008	Jung	H04H 60/72 725/54
2008/0168124	A1 *	7/2008	Lee	H04N 7/17318 709/201
2008/0172701	A1 *	7/2008	Hong	H04N 7/17318 725/87
2008/0172706	A1 *	7/2008	Robinson et al.	725/109
2008/0178248	A1 *	7/2008	Kim et al.	725/134
2008/0184328	A1 *	7/2008	Kim et al.	725/151
2008/0212937	A1	9/2008	Son	
2008/0235744	A1 *	9/2008	Hong	H04H 60/72 725/109
2008/0244710	A1 *	10/2008	Foti	H04L 63/0853 726/4
2008/0256232	A1 *	10/2008	Fleury et al.	709/224
2009/0005891	A1 *	1/2009	Batson et al.	700/94
2009/0017796	A1 *	1/2009	Foti	455/414.1
2009/0052413	A1 *	2/2009	Boyacigiller et al.	370/338
2009/0061872	A1 *	3/2009	Hicks	455/436
2009/0077181	A1 *	3/2009	Chen	709/206
2009/0094330	A1 *	4/2009	McQuaide et al.	709/205
2009/0100147	A1 *	4/2009	Igarashi	H04N 7/17309 709/218
2009/0100181	A1 *	4/2009	Bengtsson	709/229
2009/0106801	A1 *	4/2009	Horii	725/91
2009/0119699	A1 *	5/2009	Crassous et al.	725/25
2009/0125628	A1 *	5/2009	Dahlen	H04L 67/16 709/227
2009/0164642	A1 *	6/2009	Foti	H04L 65/1069 709/227
2009/0175296	A1 *	7/2009	P et al.	370/466
2009/0180484	A1	7/2009	Igarashi	
2009/0183211	A1	7/2009	Yan et al.	
2009/0187956	A1 *	7/2009	Sommer	H04N 7/173 725/106
2009/0222514	A1	9/2009	Igarashi	
2009/0222858	A1 *	9/2009	Hjelm et al.	725/47
2009/0225760	A1 *	9/2009	Foti	370/400
2009/0228945	A1 *	9/2009	Yaussy	725/110
2009/0228949	A1 *	9/2009	Benjes et al.	725/152
2009/0235317	A1	9/2009	Igarashi	
2009/0245267	A1 *	10/2009	Igarashi et al.	370/401
2009/0248794	A1 *	10/2009	Helms	H04L 12/2861 709/203
2009/0307307	A1 *	12/2009	Igarashi	H04N 7/17309 709/203
2010/0330970	A1 *	12/2010	Skog et al.	455/415

(56) **References Cited**

U.S. PATENT DOCUMENTS

FOREIGN PATENT DOCUMENTS

CN	1798112	A	7/2006	
CN	1839631	A	9/2006	
CN	1852411	A	10/2006	
CN	101060532	A	10/2007	
CN	101155191	A	4/2008	
EP	1 182 819	A1	2/2002	
EP	1 235 431	A1	8/2002	
EP	1 331 785	A1	7/2003	
EP	1667454	A1	6/2006	
EP	1679896	A1	7/2006	
EP	1696668	A1	8/2006	
EP	2 000 915	A2	12/2008	
EP	2 000 917	A1	12/2008	
JP	2002-366835	A	12/2002	
JP	2007-272868	A	10/2007	
KR	10-2001-0025456	A	4/2001	
KR	20010050795	A	6/2001	
KR	20010080210	A	8/2001	
KR	10-2006-0025746	A	3/2006	
KR	10-2006-0025748	A	3/2006	
KR	10-2006-0066096	A	6/2006	
KR	10-2006-0103621	A	10/2006	
KR	10-2006-0120650	A	11/2006	
KR	10-2007-0032103	A	3/2007	
KR	10-2007-0053090	A	5/2007	
KR	10-2007-0061228	A	6/2007	
KR	10-2007-0061555	A	6/2007	
KR	10-0754221	B1	9/2007	
KR	10-2007-0100069	A	10/2007	
KR	10-2007-0105164	A	10/2007	
KR	1020070105628	A	10/2007	
KR	10-2007-0119351	A	12/2007	
KR	10-2008-0010862	A	1/2008	
KR	10-2008-0017662	A	2/2008	
KR	10-0818300	B1	3/2008	
KR	10-0837705	B1	6/2008	
WO	0024192	A1	4/2000	
WO	WO 00/19708	A2 *	4/2000	..... H04N 5/00
WO	01/15423	A1	3/2001	
WO	WO 2002/054697	A1 *	7/2001	..... H04L 29/00
WO	WO 2004/059502	*	12/2003	..... G06F 15/16
WO	2006/061434	A1	6/2006	
WO	2006/122024	A2	11/2006	
WO	WO 2007/078070	A1 *	12/2006	..... H04N 5/50
WO	2007/032652	A1	3/2007	
WO	2007/102547	A1	9/2007	
WO	2007/102550	A1	9/2007	
WO	2007/105460	A1	9/2007	
WO	WO 2008/082346	A1 *	10/2007	..... H04L 29/06
WO	WO 2007139572	A1 *	12/2007	..... H04N 7/17318
WO	WO 2008/084965	*	7/2008	..... H04N 5/93
WO	WO 2008/084965	A1 *	7/2008	..... H04N 5/93
WO	WO 2008084965	A1 *	7/2008	..... H04N 5/93

OTHER PUBLICATIONS

Open IPTV Forum—Functional Architecture—V 1.0 (Sep. 2007).*
Digital Video Broadcasting (DVB); Transport of MPEG-2 TS Based DVB Services over IP Based Networks ETSI TS 102 034 V1.3.1 EBU-UER (Oct. 2007) ("DVB-IP").*
ETSI, Service Layer Requirements to Integrate NGN Services and IPTVETSI TS 181 016 V2.0.0 (Nov. 2007).*
Stienstra: "Technologies for DVB Services on the Internet", Proceedings of the IEEE, vol. 94, No. 1, Jan. 2006, pp. 228-236.*
Ensor et al "Blending IPTV Services", IPTV Wiorkshop, Int'l WWW Conf., Edinburgh Scotland, May 2006.*
Friedrich et al , Evolution of Next Generation Networks towards an integrated platform for IMS-based IPTV services, (SAINTW'07), IEEE, 2007.*
Friedrich et al, Next Generation IPTV services for an extended IMS architecture, (ISADS'07), IEEE 2007.*
ETSI Digital Video Broadcasting (DVB); Transport of MPEG-2 TS Based DVB Services over IP Based Networks ETSI TS 102 034 V1.3.1 EBU-UER (Oct. 2007) ("DVB-IP").*
ETSI, TS 300 468 v 1.8.1, Digital Video Broadcasting: Specification for Service Information (SI) in DVB systems (Oct. 2007).*
RFC 2782—DNS SRV (Feb. 2000).*
ETSI, TS 300 468 v 1. 8.1, Digital Video Broadcasting: Specification for Service Information (SI) in DVB systems, (Oct. 2007).*
ETSI DTS 02049 V0.0.9 "IPTV architecture: Dedicated subsystem for IPTV functions in NGN", (Sep. 2007).*
ITU-T Focus Group on IPTV, Classifications of IPTV service and its meaning, FG IPTV-ID-0026, Jul. 2006.*
ETSI TISPAN, IPTV Architecture;Dedicated subsystem for IPTV functions, ETSI TS 182 028 V2.0.0 (Jan. 2008).*
ETSI, Service Layer Requirements to Integrate NGN Services and IPTV, ETSI TS 181 016 V2.0.0 (Nov. 2007).*
UPnP Device Architecture 1.0 , UPnP Forum (Jul. 2006).*
Open IPTV Forum, Functional Architecture—V 1.1, (Jan. 15, 2008).*
ITU-T Focus Group on IPTV, FG IPTV-ID-0026, "Classifications of IPTV service and its meaning", 1st FG IPTV meeting: Geneva, Jul. 2006.*
ITU-T Focus Group on IPTV FG IPTV-DOC-0135, "IPTV service scenarios", 5th FG IPTV meeting, Malta. Jul. 2007.*
ITU-T Focus Group on IPTV FG IPTV-DOC-0194, "IPTV Middleware, Applications and Content Platforms", 7th FG IPTV meeting, Malta. Dec. 2007.*
ITU-T Focus Group on IPTV, FG IPTV-DOC-0198, "Standards for IPTV Multimedia Application Platforms", 7th FG IPTV meeting, Malta. Dec. 2007.*
Evain, The Multimedia Home Platform—an overview, EBU Technical Review, Spring 1998.*
Piesing: The DVB Multimedia Home Platform (MHP) and Related Specifications, Proceedings of the IEEE, vol. 94, No. 1, Jan. 2006, pp. 237-247.*
Reimers, DVB—The Family of International Standards for Digital Video Broadcasting, Proceedings of the IEEE, vol. 94, No. 1, Jan. 2006, pp. 173-182.*
ETSI TS 102 034 V1.3.1 Digital Video Broadcasting (DVB); Transport of MPEG-2 TS Based DVB Services over IP Based Networks, (Oct. 2007).*
ETSI TS 181 016 V2.0.0, "Service Layer Requirements to Integrate NGN Services and IPTV" (Nov. 2007).*
ETSI TS 182 028 V2.0.0 "TISPAN, IPTV Architecture: Dedicated subsystem for IPTV functions" (Jan. 2008).*
DVB, Digital Video Broadcasting (DVB); Multimedia Home Platform (MHP) Specification 1.2, DVB Doc. A107, 2007.*
ETSI TS 183 063 V0.0.6 "IMS based IPTV" (Nov. 2007).*
ETSI TS 102 471 V1.2.1 "DVB IP Datacast over DVB-H: ESG" (Nov. 2006).*
OCAP Profile 1.0, OC-SP-OCAP1.0-101-011221, OCAP 2001.*
Stienstra, Technologies for DVB Services on the Internet, Proceedings of the IEEE, vol. 94, No. 1, Jan. 2006.*
RFC2782, DNS SRV, IETF, Feb. 2000.*
International Search Report for PCT/KR2009/001556 issued Nov. 11, 2009 [PCT/ISA/210].
Written Opinion for PCT/KR2009/001556 issued Nov. 11, 2009 [PCT/ISA/237].
Communication dated Oct. 17, 2011 from the Mexican Institute of Industrial Property in counterpart Mexican application No. MX/a/2010/008642.
Communication dated Dec. 31, 2011 issued by the State Intellectual Property Office of P.R. China in counterpart Chinese Patent Application No. 200980104286.5.
Communication dated Feb. 28, 2013 issued by the State Intellectual Property Office of P.R. China in counterpart Chinese Patent Application No. 200980110455.6.
Communication dated Jan. 5, 2013 issued by the State Intellectual Property Office of P.R. China in counterpart Chinese Patent Application No. 200980126539.9.
Communication dated Jan. 15, 2014, issued by the European Patent Office in counterpart European Application No. 08855589.1.

(56) **References Cited**

OTHER PUBLICATIONS

Communication dated Jan. 28, 2014, issued by the European Patent Office in counterpart European Application No. 09704767.4.
Nishimoto et al.; "Advanced Conditional Access System for Digital Broadcasting Receivers Using Metadata", IEEE Transactions on Broadcasting, Sep. 2007, vol. 53, No. 3, pp. 697-702.
"Broadcast and On-line Services: Search select, and rightful use of content on personal storage systems(TV-Anytime); Part 2:Phase 1-System description", European Broadcasting Union, Nov. 2007, pp. 1-127.
Communication dated Apr. 3, 2014, issued by the European Patent Office in counterpart European Application No. 09723898.4.
Communication dated Mar. 20, 2012, issued by the State Intellectual Property Office of the People's Republic of China in counterpart Chinese Application No. 200980103120.1.
Search Report dated Jun. 22, 2009, issued by the International Searching Authority in counterpart International Application No. PCT/KR2009/000370.
Written Opinion dated Jun. 22, 2009, issued by the International Searching Authority in counterpart International Application No. PCT/KR2009/000370.
Search Report dated Jul. 10, 2009, issued by the International Searching Authority in counterpart International Application No. PCT/KR2009/000549.
Written Opinion dated Jul. 10, 2009, issued by the International Searching Authority in counterpart International Application No. PCT/KR2009/000549.
Communication dated Nov. 5, 2012, issued by the State Intellectual Property Office of the People's Republic of China in counterpart Chinese Application No. 200880117209.9.
Communication dated Sep. 29, 2011, issued by the European Patent Office in counterpart European Application No. 09704867.2.
Search Report dated Aug. 18, 2009, issued by the International Searching Authority in counterpart International Application No. PCT/KR2009/000323.
Written Opinion dated Aug. 18, 2009, issued by the International Searching Authority in counterpart International Application No. PCT/KR2009/000323.
Communication, dated Apr. 16, 2014, issued by the State Intellectual Property Office of P.R. China in counterpart Chinese Patent Application No. 200980109747.8.
Communication, dated Jun. 11, 2014, issued by the European Patent Office in counterpart European Patent Application No. 09711644.6.
Beck, Andre, et al., "IMS and IPTV Service Blending—Lessons and Opportunities," Journal of the Institute of Telecommunications Professionals, Jan. 1, 2007, pp. 1-6, http://www.icin.co.uk/files/programmes/Session8A-2.pdf.
Communication dated May 3, 2013 issued by the State Intellectual Property Office of P.R. China in counterpart Chinese Patent Application No. 200880117209.9.
Communication, dated Jun. 8, 2013, issued by the State Intellectual Property Office of P.R. China in counterpart Chinese Patent Application No. 200980111266.0.
Communication, dated Jul. 11, 2013, issued by the European Patent Office in counterpart European Patent Application No. 09723898.4.
"Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IPTV Architecture; IPTV functions supported by the IMS subsystem," ETSI TS 182 027 V2.0.0, ETSI, Feb. 29, 2008, 7 pages.
"IPTV architecture Dedicated subsystem for IPTV functions in NGN," Draft ETSI DTS 02049 V0.0.9, ETSI, Sep. 2007, pp. 1-37.
Stallard, Paul, et al., "DVB thoughts on Service Discovery and Selection," The Internet Society, Feb. 10, 2003, pp. 1-11.
"Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); IMS based IPTV Stage 3 Specification," ETSI TS 183 063 V0.0.6, ETSI, Nov. 2007, pp. 1-81.
Communication, dated Aug. 3, 2012, issued by the Indonesian Patent Office in counterpart Indonesian Applicatio No. W-00201003224.
Communication, dated Jul. 3, 2012, issued by the State Intellectual Property Office of P.R. China in counterpart Chinese Application No. 200980109747.8.
Communication, dated Jun. 27, 2012, issued by the State Intellectual Property Office of P.R. China in counterpart Chinese Application No. 200980104286.5.
Communication, dated Jun. 8, 2012, issued by the State Intellectual Property Office of P.R. China in counterpart Chinese Application No. 200980111266.0.
International Search Report, dated Aug. 28, 2009, issued by the International Searching Authority in counterpart International Application No. PCT/KR2009/000737.
International Search Report, dated Feb. 23, 2010, issued by the International Searching Authority in counterpart International Application No. PCT/KR2009/004126.
International Search Report, dated Jul. 14, 2009, issued by the International Searching Authority in counterpart International Application No. PCT/KR2008/006932.
International Search Report, dated Nov. 5, 2009, issued by the International Searching Authority in counterpart International Application No. PCT/KR2009/001325.
Communication dated Jan. 21, 2015 issued by the Korean Intellectual Property Office in counterpart Korean Patent Application No. 10-2009-7015542.
Communication dated Feb. 13, 2015 issued by the Korean Intellectual Property Office in counterpart Korean Patent Application No. 10-2009-7015543.
Communication dated Mar. 23, 2015 issued by the Korean Intellectual Property Office in counterpart Korean Patent Application No. 10-2009-7006208.
Communication dated Mar. 23, 2015 issued by the Korean Intellectual Property Office in counterpart Korean Patent Application No. 10-2009-7006209.
IPTV Architecture—Dedicated Subsystem for IPTV Functions in NGN, European Telecommunications Standards Institute(ETSI) TS 182 028 V2.0.0(Jan. 17, 2008); 38 pgs.
Transport of MPEG-2 TS Based DVB Services Over IP Based Networks,European Telecommunications Standards Institute(ETSI) TS 102 034 V1.3.1(Oct. 29, 2007); 128 pgs.
Communication dated Oct. 28, 2014 issued by the Korean Intellectual Property Office in counterpart Korean Patent Application No. 10-2008-0044013.
Communication dated Dec. 16, 2014 issued by the Indian Intellectual Property Office in counterpart Indian Patent Application No. 961/MUMNO/2010.
Communication dated Nov. 14, 2014 issued by The State Intellectual Property Office of P.R. China in counterpart Chinese Patent Application No. 200980109747.8.
Communication, dated Dec. 23, 2013, issued by the State Intellectual Property Office of the People's Republic of China in counterpart Chinese Application No. 200980111266.0.
Communication, dated Jan. 29, 2014, issued by the European Patent Office in counterpart European Application No. 09723546.9.
Communication, dated Mar. 3, 2014, issued by the European Patent Office in counterpart European Application No. 09707306.8.
Communication issued on Jan. 19, 2015 by the European Patent Office in related Application No. 09704767.4.
Communication dated Apr. 30, 2015, issued by the Korean Intellectual Property Office in counterpart Korean Application No. KR 10-2008-0044013.
Communication dated May 18, 2015, issued by the Korean Intellectual Property Office in counterpart Korean Application No. KR 10-2009-0045471.
"Open IPTV Forum—Functional Architecture—V 1.0 Open IPTV Forum Confidential Copyright 2007 Members of the Open IPTV Forum", Sep. 20, 2007, Total 103 pages, XP 55094424, URL: http://www.oipf.tv/docs/OIPF-Ti-R1-Functional Architecture-V1 0-2007-09-20.pdf.
Communication dated May 20, 2015, issued by the European Patent Office in counterpart European Application No. 09800581.2.
Communication dated Jul. 2, 2015, issued by the European Patent Office in counterpart European Application No. EP 08855589.1.

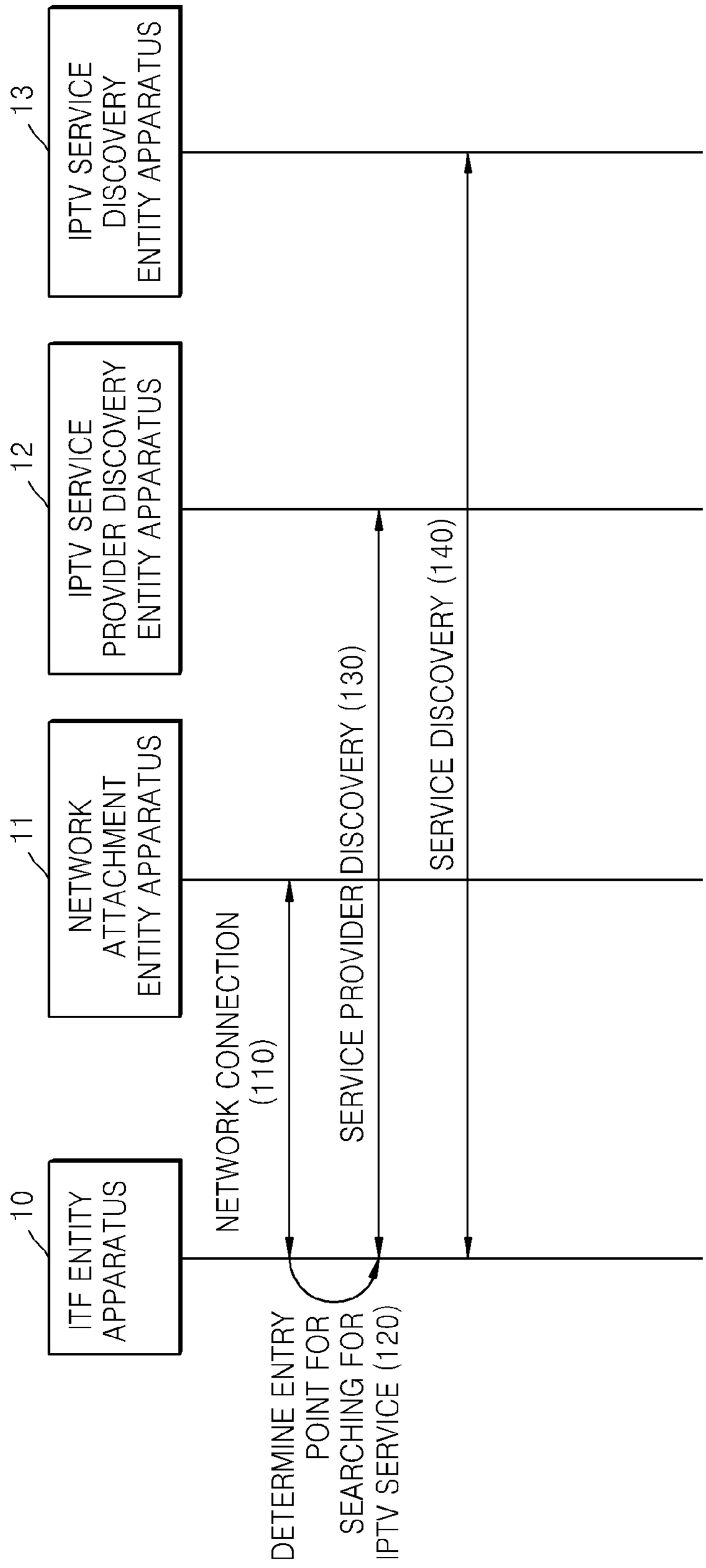
(56) **References Cited**

OTHER PUBLICATIONS

Communication issued Sep. 17, 2014; in related Korean Patent Application No. 10-2008-0114751.
Communication issued Jul. 2, 2014; in related Chinese Patent Application No. 200980111266.0.
Communication dated Oct. 28, 2014, issued by the Korean Intellectual Property Office in counterpart Korean Application No. 10-2008-0044013.
Communication dated Nov. 14, 2014, issued by the State Intellectual Property Office of P.R. China in counterpart Chinese Application No. 200980109747.8.
Communication dated Oct. 28, 2015 issued by the State Intellectual Property Office of P.R. China in counterpart Chinese Patent Application No. 200980109747.8.
Communication dated Sep. 23, 2015 issued by Korean Intellectual Property office in counterpart Korean Patent Application No. 10-2009-7006209.
Communication dated Sep. 17, 2015 issued by Korean Intellectual Property office in counterpart Korean Patent Application No. 10-2009-7006208.
Communication dated Dec. 28, 2015 issued by Korean Intellectual Property Office in counterpart Korean Patent Application No. 10-2009-0045471.

* cited by examiner

FIG. 1


ITF ENTITY APPARATUS
10
NETWORK ATTACHMENT ENTITY APPARATUS
11
IPTV SERVICE PROVIDER DISCOVERY ENTITY APPARATUS
12
IPTV SERVICE DISCOVERY ENTITY APPARATUS
13
NETWORK CONNECTION (110)
SERVICE PROVIDER DISCOVERY (130)
SERVICE DISCOVERY (140)
DETERMINE ENTRY POINT FOR SEARCHING FOR IPTV SERVICE (120)

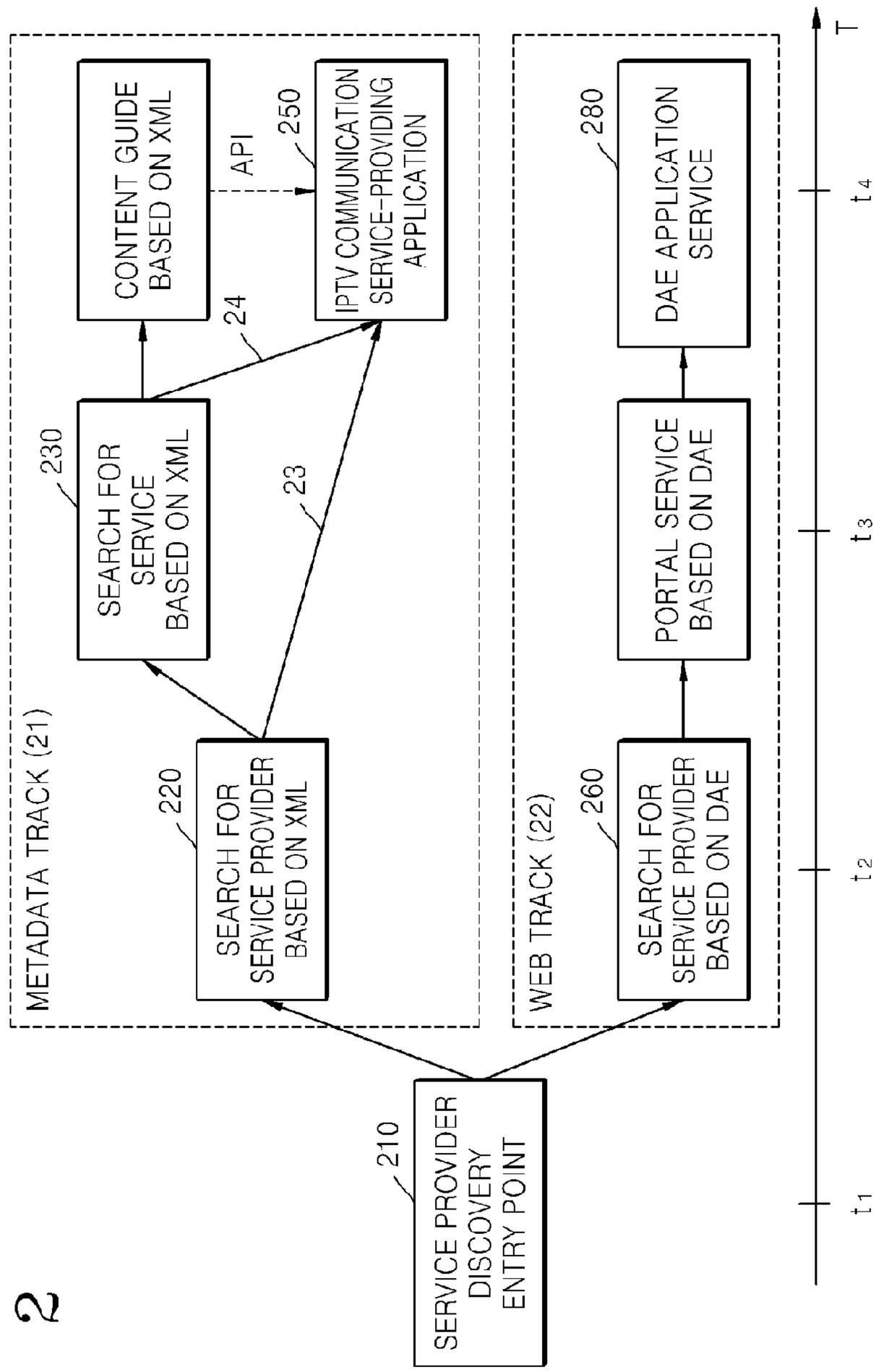

SERVICE PROVIDER DISCOVERY ENTRY POINT
210
METADATA TRACK (21)
SEARCH FOR SERVICE PROVIDER BASED ON XML
220
SEARCH FOR SERVICE BASED ON XML
230
CONTENT GUIDE BASED ON XML
API
IPTV COMMUNICATION SERVICE-PROVIDING APPLICATION
250
24
23
WEB TRACK (22)
SEARCH FOR SERVICE PROVIDER BASED ON DAE
260
PORTAL SERVICE BASED ON DAE
DAE APPLICATION SERVICE
280
T
t1
t2
t3
t4
t1 – ENTRY FOR SEARCHING FOR SERVICE PROVIDER
t2 – SERVICE PROVIDER DISCOVERY
t3 – SERVICE DISCOVERY
t4 – SERVICE ACCESS

FIG. 2

FIG. 3

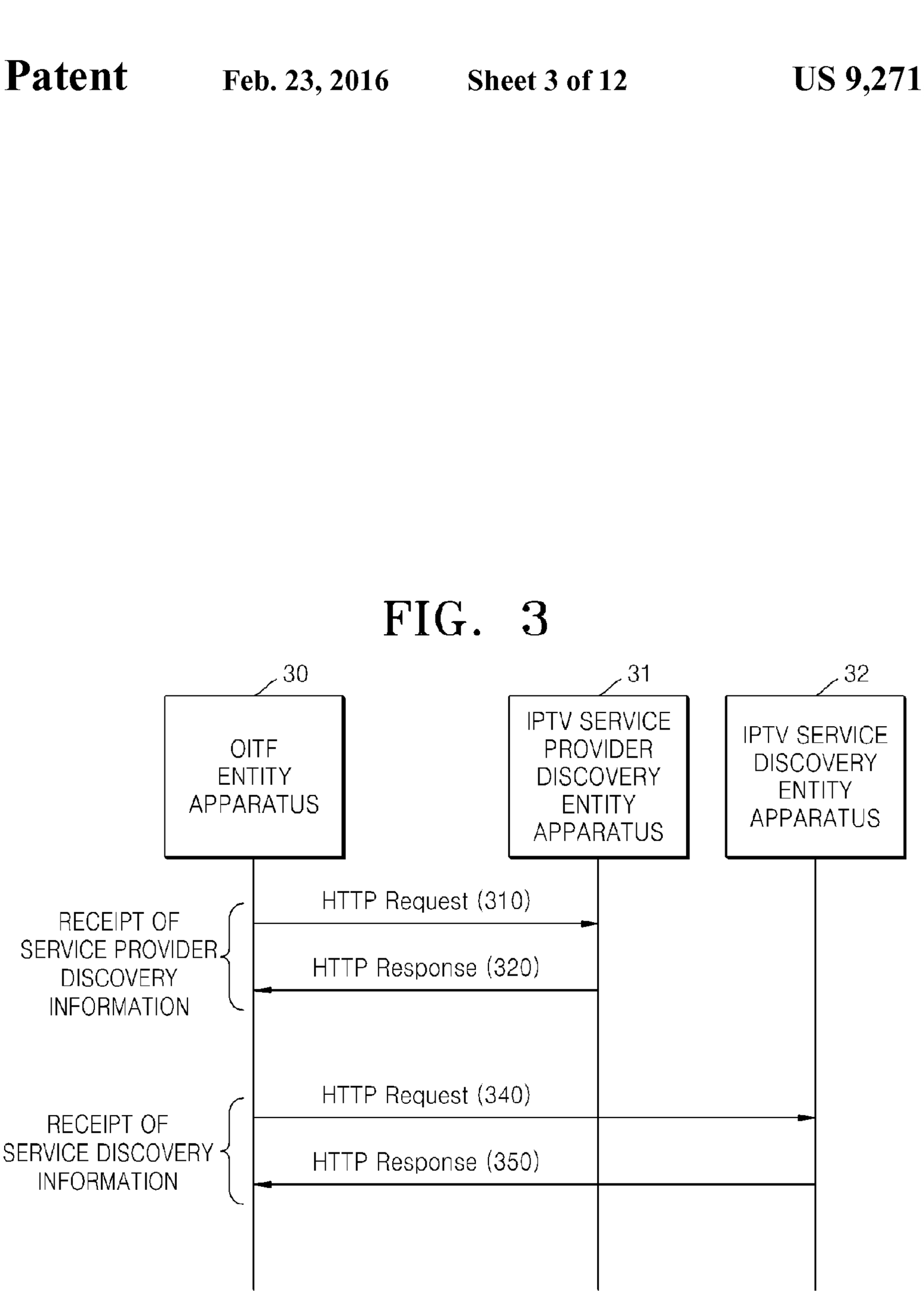

30
31
32
OITF ENTITY APPARATUS
IPTV SERVICE PROVIDER DISCOVERY ENTITY APPARATUS
IPTV SERVICE DISCOVERY ENTITY APPARATUS
HTTP Request (310)
HTTP Response (320)
RECEIPT OF SERVICE PROVIDER DISCOVERY INFORMATION
HTTP Request (340)
HTTP Response (350)
RECEIPT OF SERVICE DISCOVERY INFORMATION

FIG. 4

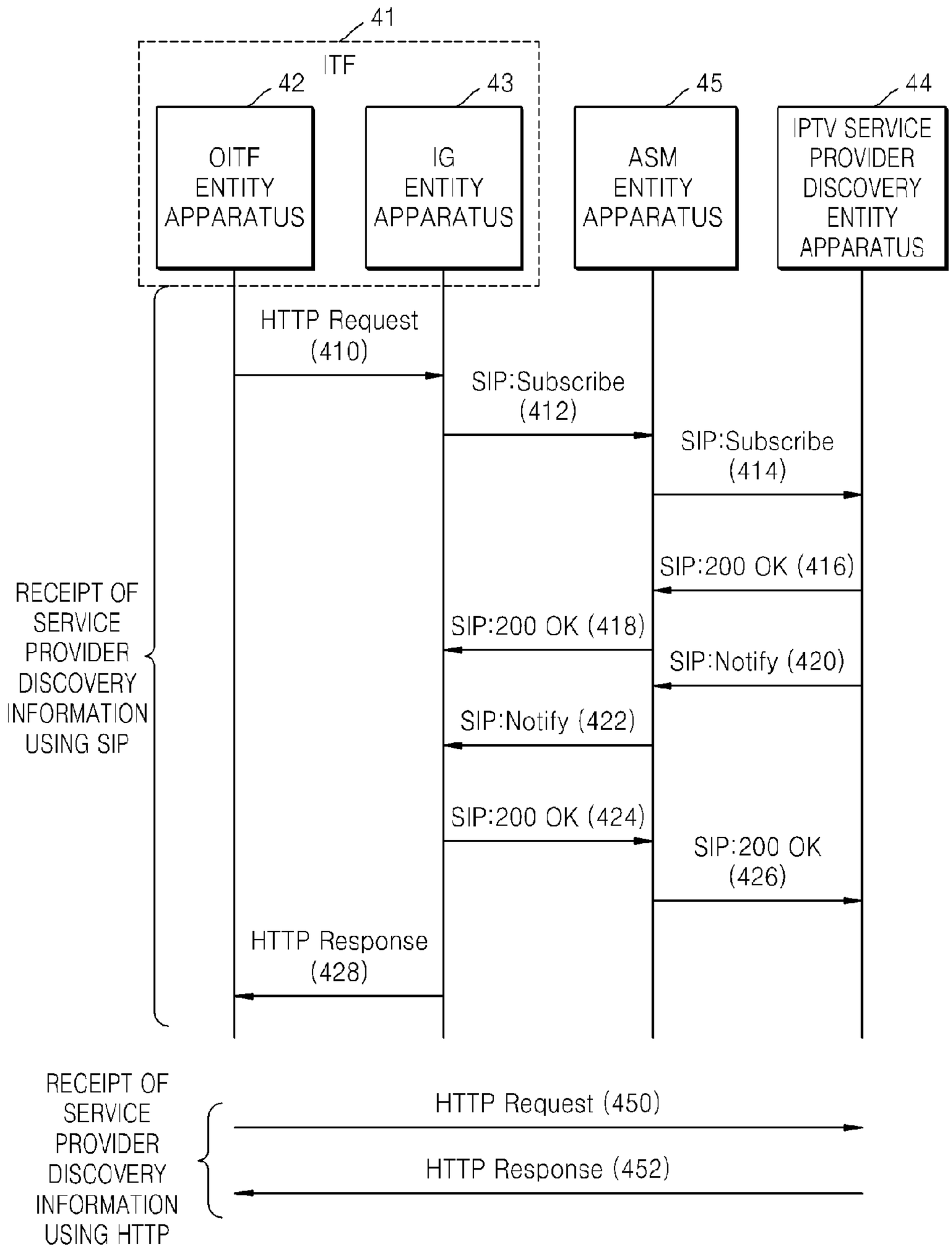

41
ITF
42
OITF ENTITY APPARATUS
43
IG ENTITY APPARATUS
45
ASM ENTITY APPARATUS
44
IPTV SERVICE PROVIDER DISCOVERY ENTITY APPARATUS
HTTP Request (410)
SIP:Subscribe (412)
SIP:Subscribe (414)
SIP:200 OK (416)
SIP:200 OK (418)
SIP:Notify (420)
SIP:Notify (422)
SIP:200 OK (424)
SIP:200 OK (426)
HTTP Response (428)
RECEIPT OF SERVICE PROVIDER DISCOVERY INFORMATION USING SIP
HTTP Request (450)
HTTP Response (452)
RECEIPT OF SERVICE PROVIDER DISCOVERY INFORMATION USING HTTP

FIG. 5

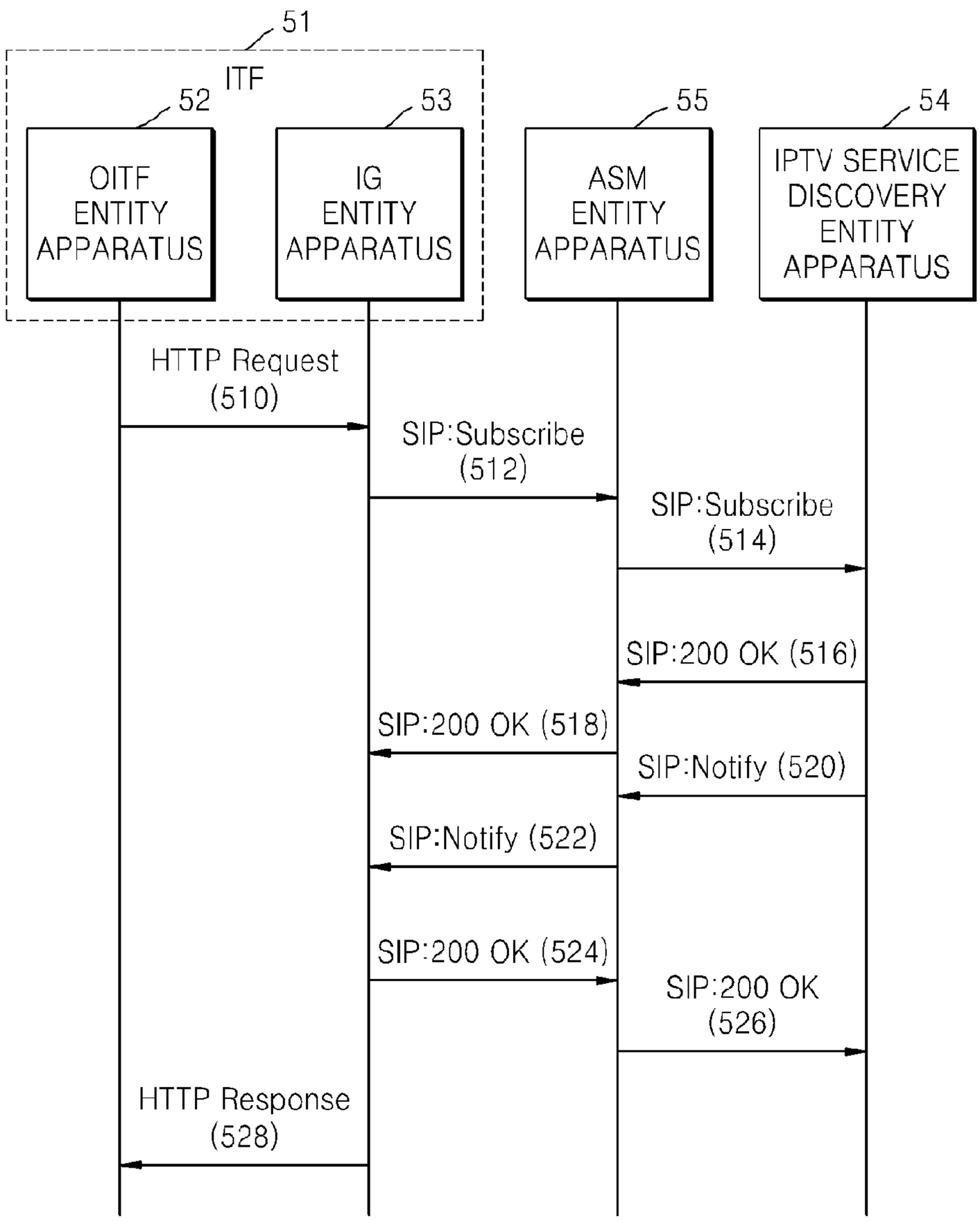

51
ITF
52
53
55
54
OITF ENTITY APPARATUS
IG ENTITY APPARATUS
ASM ENTITY APPARATUS
IPTV SERVICE DISCOVERY ENTITY APPARATUS
HTTP Request (510)
SIP:Subscribe (512)
SIP:Subscribe (514)
SIP:200 OK (516)
SIP:200 OK (518)
SIP:Notify (520)
SIP:Notify (522)
SIP:200 OK (524)
SIP:200 OK (526)
HTTP Response (528)

FIG. 6

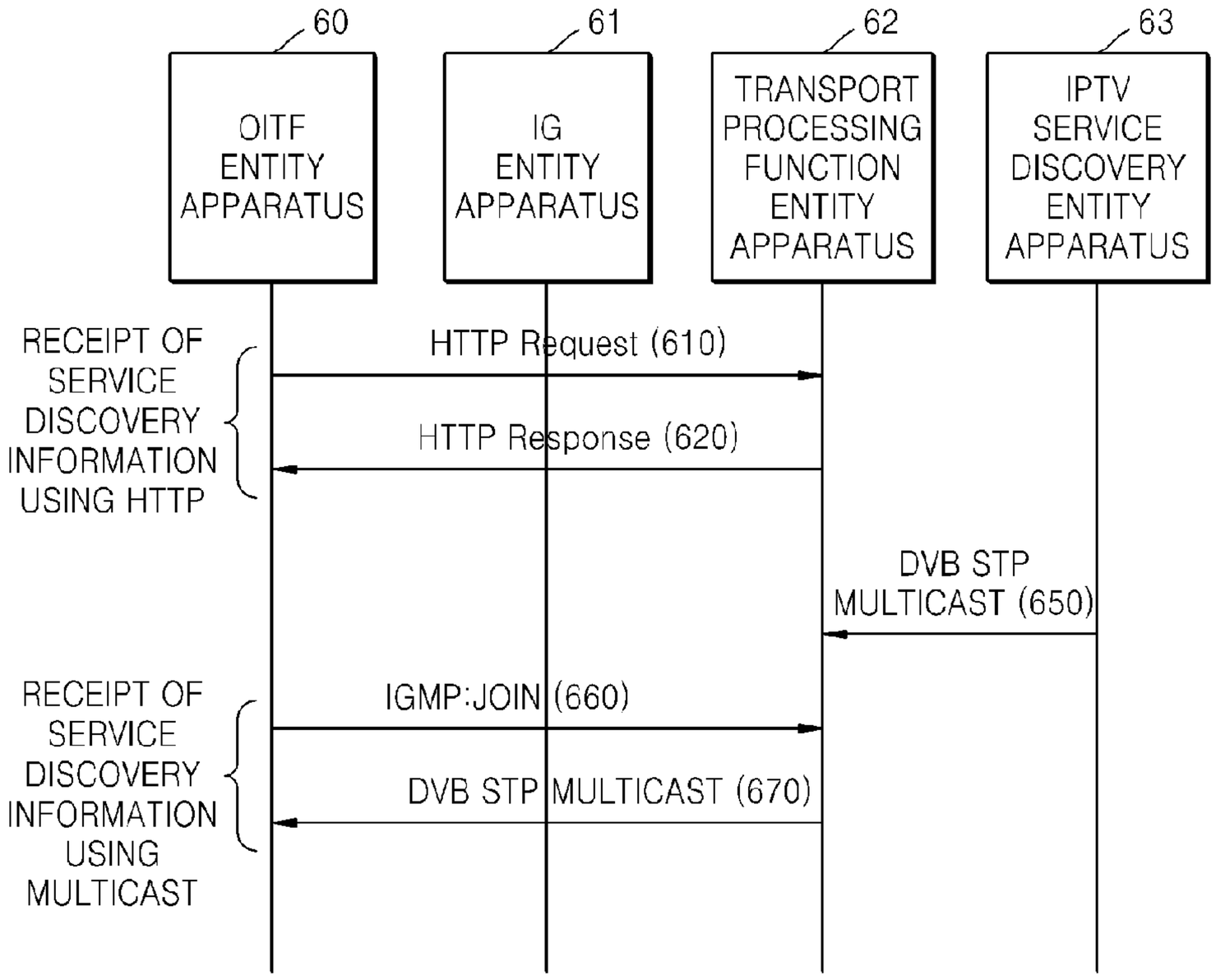

60
61
62
63
OITF ENTITY APPARATUS
IG ENTITY APPARATUS
TRANSPORT PROCESSING FUNCTION ENTITY APPARATUS
IPTV SERVICE DISCOVERY ENTITY APPARATUS
RECEIPT OF SERVICE DISCOVERY INFORMATION USING HTTP
HTTP Request (610)
HTTP Response (620)
DVB STP MULTICAST (650)
RECEIPT OF SERVICE DISCOVERY INFORMATION USING MULTICAST
IGMP:JOIN (660)
DVB STP MULTICAST (670)

FIG. 7

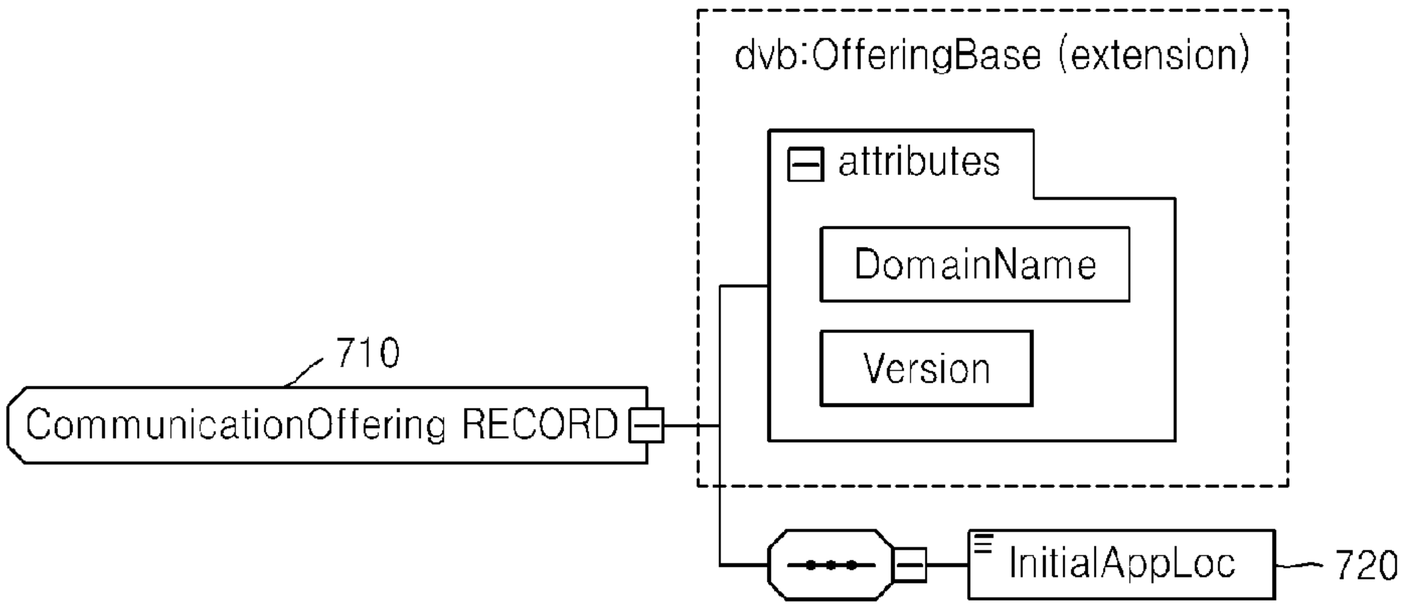

dvb:OfferingBase (extension)
attributes
DomainName
Version
710
CommunicationOffering RECORD
InitialAppLoc
720

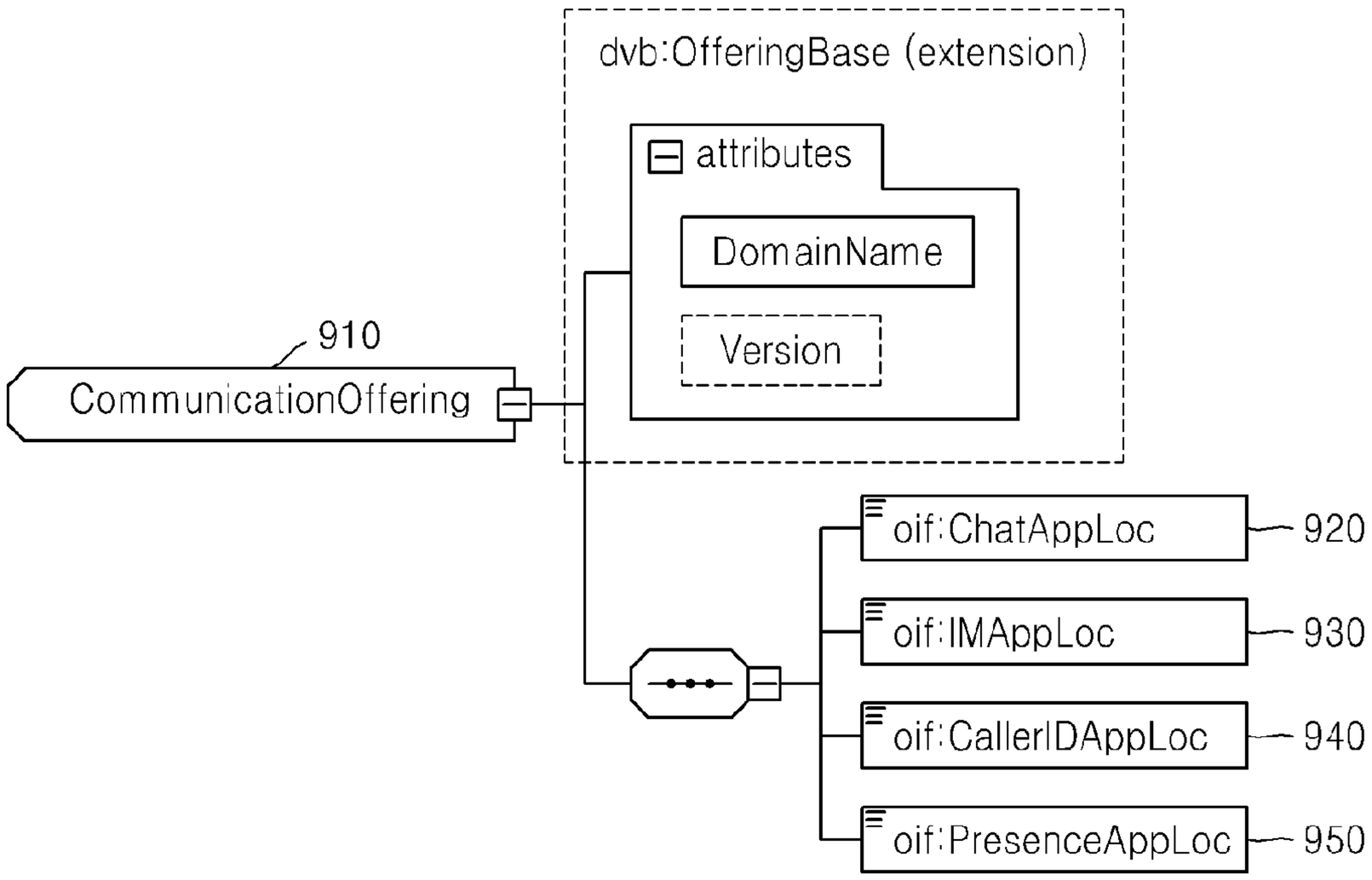
FIG. 8A

```
<xs:element name="ServiceDiscovery">
<xs:complexType>
        <xs:choice>
<xs:element name="BroadcastDiscovery"
type="dvb:BroadcastOffering" maxOccurs="unbounded"/>
<xs:element name="CoDDiscovery"
type="dvb:CoDOffering" maxOccurs="unbounded"/>

. . .

<xs:element name="CommunicationDiscovery"          — 810
type="tns:CommunicationOffering"/>
        </xs:choice>
<xs:attribute name="Version" type="dvb:Version" use="optional"/>
</xs:complexType>
</xs:element>
```

FIG. 8B

```
<xs:complexType name="CommunicationOffering">
<xs:complexContent>
<xs:extension base="dvb:OfferingBase">
<xs:sequence>
<xs:element name="InitialAppLoc" type="xs:anyURI"/>  — 820
</xs:sequence>
</xs:extension>
</xs:complexContent>
</xs:complexType>
```

FIG. 9


dvb:OfferingBase (extension)
attributes
DomainName
Version
910
CommunicationOffering
oif:ChatAppLoc
920
oif:IMAppLoc
930
oif:CallerIDAppLoc
940
oif:PresenceAppLoc
950

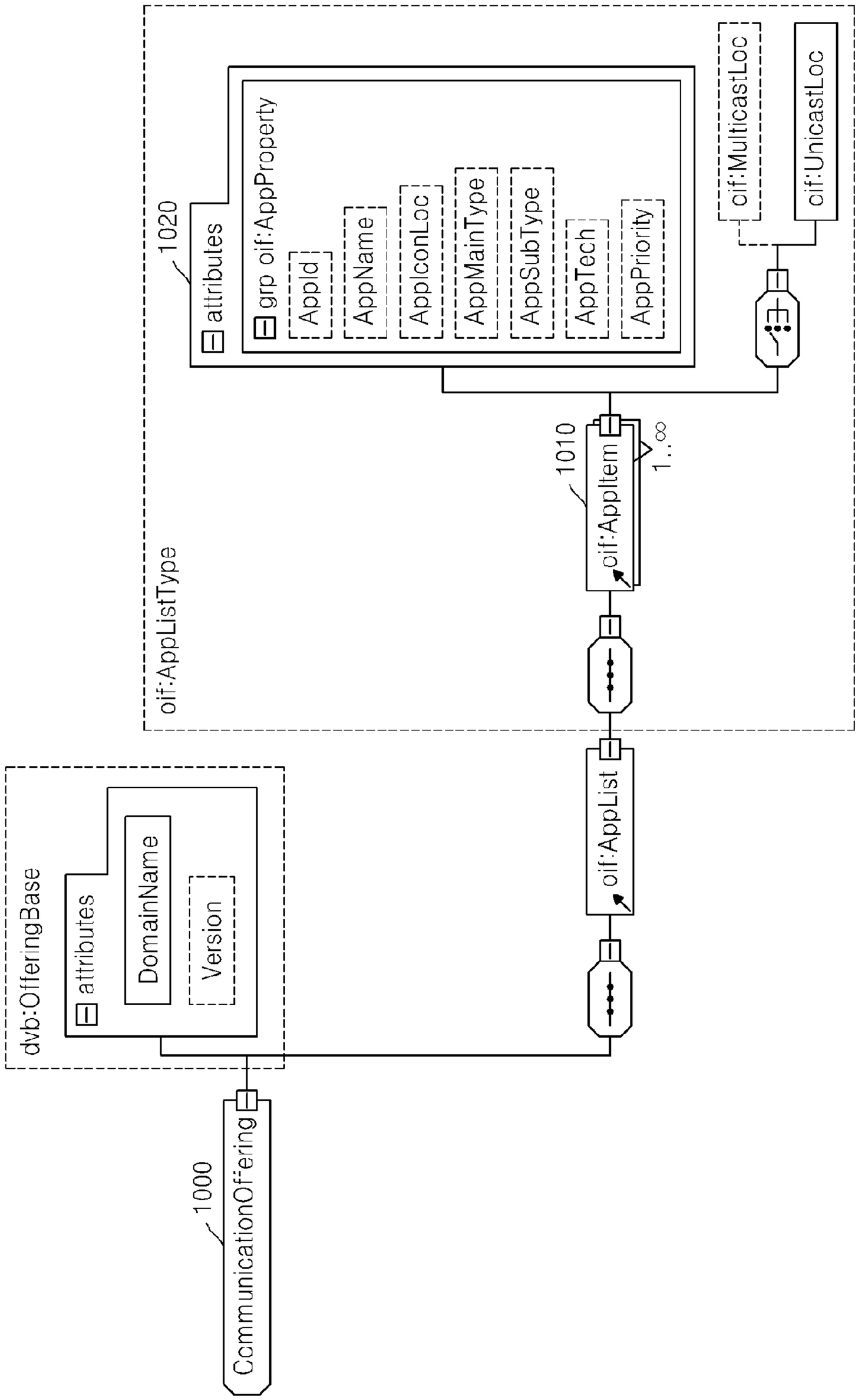

dvb:OfferingBase
attributes
DomainName
Version
1000
CommunicationOffering
oif:AppList
1010
oif:AppItem
1..∞
oif:AppListType
1020
attributes
grp oif:AppProperty
AppId
AppName
AppIconLoc
AppMainType
AppSubType
AppTech
AppPriority
oif:MulticastLoc
oif:UnicastLoc

FIG. 10

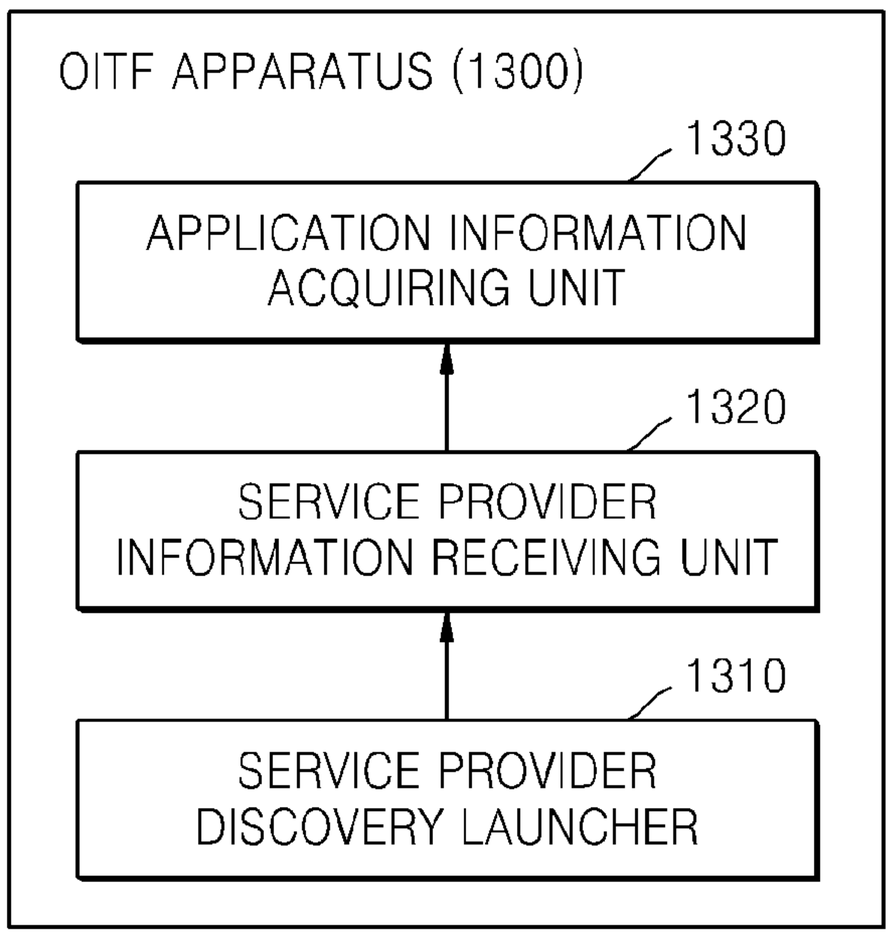
FIG. 11

AppMainType Value (1110)		AppSubType Value (1120)	
0×01	IMS Communication Application	0×01	Chat App
		0×02	Instant message App
		0×03	Caller ID App
		0×04	Presence APP
		0×05~0×FF	Reserved
0×02	Guide Application	0×01	EPG Guide App
		0×02	VoD Guide App
		0×03	Advertisement Guide App
		0×04~0×FF	Reserved

FIG. 12

```
<?xml version="1.0" encoding="UTF-8" ?>
<ServiceDiscovery xmlns="urn:dvb:ipi:sdns:2006" xmlns:oif="urn:oif:ipi:sdns:2008" xmlns:t
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"  xsi:schemaLocation="urn:
  ProtoMetaTF\MetadataWork\SchemaCollections\Oif_sdns.xsd">
-<oif:CommunicaionDiscovery DomainName="kt.co.kr" Version="1">
  -<oif:AppList>
    -<oif:AppItem AppMainType="COMM_APP" AppSubType="Chatting">
       <oif:UnicastLoc>http://kt.co.kr/IMSApp/ChatApp.html</oif:UnicastLoc>
    </oif:AppItem>                                                              } 1210
  -<oif:AppItem AppMainType="COMM_APP" AppSubType="InstantMsg">
       <oif:UnicastLoc>http://kt.co.kr/IMSApp/IMApp.html</oif:UnicastLoc>
    </oif:AppItem>                                                              } 1220
  -<oif:AppItem AppMainType="COMM_APP" AppSubType="CallerID">
       <oif:UnicastLoc>http://kt.co.kr/IMSApp/CallerIDApp.html</oif:UnicastLoc>
    </oif:AppItem>                                                              } 1230
  -<oif:AppItem AppMainType="COMM_APP" AppSubType="Presence">
       <oif:UnicastLoc>http://kt.co.kr/IMSApp/PresenceApp.html</oif:UnicastLoc>
    </oif:AppItem>                                                              } 1240
   </oif:AppList>
  </oif:CommunicationDiscovery>
</ServiceDiscovery>
```

FIG. 13


OITF APPARATUS (1300)
1330
APPLICATION INFORMATION ACQUIRING UNIT
1320
SERVICE PROVIDER INFORMATION RECEIVING UNIT
1310
SERVICE PROVIDER DISCOVERY LAUNCHER

DATA RECEIVING METHOD AND DEVICE FOR APPLICATIONS PROVIDING AN IPTV COMMUNICATIONS SERVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a Continuation Application of International Application PCT/KR2009/001556 filed on Mar. 27, 2009, which claims benefit of U.S. Provisional Patent Application No. 61/040,309, filed on Mar. 28, 2008, 61/083,309, filed on Jul. 24, 2008, and 61/086,563, filed on Aug. 6, 2008, the disclosures of which are incorporated herein in their entireties by reference.

BACKGROUND

1. Field

The exemplary embodiments relate to a method and apparatus for receiving information regarding applications for providing Internet protocol television (IPTV) communication service.

2. Description of the Related Art

Internet protocol television (IPTV) service is a service for providing information, moving picture contents, and broadcasting on a TV through an IP network, that is, an ultra-high speed Internet network. As services combining communication and broadcasting have been widely distributed, there is increased interest in IPTV service. Therefore, wide distribution of the IPTV service may largely affect the content industry and electrical appliances, as well as the communication and broadcasting industries.

According to a conventional art, in order for a subscriber of the IPTV service to use the IPTV service through the IP network, the subscriber requires a set-top box that is specific for an IPTV vendor. Only the user having the specific IPTV set-top box that is manufactured according to specifications set by the IPTV service provider may use the IPTV service of the corresponding IPTV service provider. For example, when there are three IPTV service providers, that is, Company A, Company B, and Company C, subscribers who bought the set-top box of company A may only use the IPTV service provided by company A, and they should buy an additional set-top box of company B or company C in order to subscribe for the IPTV service provided by company B or company C. The above problem of compatibility between the IPTV service and the set-top box limits a range of selection, and thus, quality of the IPTV service may be degraded and expansion of the IPTV service may be restricted.

In order to address the above compatibility problem, an open IPTV forum has been recently established to discuss standardization of the set-top box. In this forum, a common standard that is independent from the IPTV service providers and providing the service subscribers with the IPTV service based on the common standard are being discussed.

The open IPTV forum aims to make an interface and a hardware platform that are not dependent upon the IPTV service providers so that the subscriber may easily use the IPTV services provided by IPTV service providers. According to the open IPTV forum architecture, the subscriber may use the IPTV services provided by different IPTV service providers even when the subscriber does not have different set-top boxes, and thus, the range of services that may be selected by the subscriber can be expanded.

In order for the subscriber to use the IPTV services provided by the different IPTV service providers, a functional architecture according to the open IPTV forum includes

devices for relaying services of the plurality of IPTV service providers to a residential network. Examples of the relaying devices include entities such as an application gateway (AG) functional entity apparatus, an IMS gateway (IG) functional entity apparatus, and CSP gateway (CG) functional entity apparatus according to the functional architecture of the open IPTV forum. The above relaying devices receive the IPTV services provided from a provider network and relay the IPTV services to terminal devices in the residential network.

SUMMARY

According to exemplary embodiments, metadata including uniform resource identifier (URI) information regarding an application for providing an IPTV communication service is defined by using an extensible markup language (XML) schema, and thus, a user of an Internet protocol television (IPTV) terminal function (ITF) entity apparatus accesses the application for providing the IPTV communication service by using the metadata so as to use a predetermined communication service provided by a service provider.

According to an exemplary embodiment, there is provided a method of receiving information regarding an application for providing an Internet protocol television (IPTV) communication service, the method including: acquiring IP address information for initiating an IPTV service provider discovery at an entry point for searching for a service provider; receiving information regarding an IPTV service provider from an IPTV service provider discovery entity apparatus by using the IP address information; and acquiring information regarding the application for providing the IPTV communication service based on the information regarding the IPTV service provider.

The application for providing the IPTV communication service may include at least one of a chatting application, an instant message application, a caller identification (ID) application, and a presence application.

When the information regarding the IPTV service provider includes information for acquiring the application for providing the IPTV communication service, the method may further include acquiring information regarding at least one application for providing the IPTV communication service from the IPTV service discovery entity apparatus by using the information for acquiring the application for providing the IPTV communication service.

The information regarding the application for providing the IPTV communication service may include uniform resource identifier (URI) information regarding the application for providing the IPTV communication service, which may access at least one IPTV communication service provided by the IPTV service provider.

The information regarding the application for providing the IPTV communication service may include at least one of an application ID that may access at least one IPTV communication service provided by the IPTV service provider, name of the application, URI information for receiving the application icon, a kind of the application, information regarding technology used in the application, priority of the application, URI information for accessing the application through multicast, and URI information for accessing the application through unicast.

The information regarding the application for providing the IPTV communication service may include URI information regarding at least one of the chatting application, the instant message application, the caller ID application, and the presence application provided by the IPTV service provider.

The information regarding the application for providing the IPTV communication service may be provided as a part of a communication offering record.

The information regarding the IPTV service provider and the information regarding the application for providing the IPTV communication service may be written in extensible markup language (XML).

According to another exemplary embodiment, there is provided a computer readable recording medium having embodied thereon a computer program for executing the above method.

According to another exemplary embodiment, there is provided an open Internet protocol television (IPTV) terminal function (OITF) apparatus including: a service provider discovery launcher for acquiring IP address information for initiating an IPTV service provider discovery at an entry point for searching for the service provider; a service provider information receiving unit for receiving information regarding the IPTV service provider from an IPTV service provider discovery entity apparatus by using the IP address information; and an application information acquiring unit for acquiring information regarding an application for providing an IPTV communication service based on the information regarding the IPTV service provider.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic diagram illustrating a method of transmitting/receiving information about applications for providing an Internet protocol television (IPTV) communication service, according to an exemplary embodiment;

FIG. **2** is a schematic diagram showing a flow of information about the applications for providing an IPTV communication service, according to an exemplary embodiment;

FIG. **3** is a flowchart illustrating processes of transmitting/receiving information about the applications for providing the IPTV communication service in an unmanaged network model, according to an exemplary embodiment;

FIG. **4** is a flowchart illustrating processes of receiving information about the applications for providing the IPTV communication service from an apparatus performing as an IPTV service provider searching entity in a managed network model, according to another exemplary embodiment;

FIG. **5** is a flowchart illustrating processes of receiving information about applications for providing the IPTV communication service from an apparatus performing as an IPTV service discovery entity by using a session initiation protocol ( ) protocol in a managed network model, according to another exemplary embodiment;

FIG. **6** is a flowchart of an operation of receiving information regarding an IPTV communication service-providing application from an IPTV service discovery entity apparatus in a managed network model by using a hypertext transfer protocol (HTTP) protocol or a digital video broadcasting (DVB) service discovery & selection (SD&S) transport protocol (DVB STP) protocol, according to another exemplary embodiment;

FIG. **7** illustrates a structure of a communication offering record including metadata regarding an IPTV communication service-providing application, according to an exemplary embodiment;

FIG. **8**A illustrates a 'ServiceDiscovery' extensible markup language (XML) schema including a communication offering record, according to an exemplary embodiment;

FIG. **8**B shows an XML schema of a communication offering record according to an exemplary embodiment;

FIG. **9** shows a structure of a communication offering record including metadata regarding an application providing an IPTV communication service, according to another exemplary embodiment;

FIG. **10** shows a structure of a communication offering record including metadata regarding an IPTV communication service-providing application, according to another exemplary embodiment;

FIG. **11** is a table showing AppMainType values and AppSubType values of a communication offering record, according to another exemplary embodiment;

FIG. **12** shows XML-based metadata according to a structure of communication offering record, according to another exemplary embodiment; and

FIG. **13** is a block diagram of an open IPTV terminal function (OITF) apparatus according to an exemplary embodiment.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

The sexemplary embodiment s will now be described more fully with reference to the accompanying drawings. In the drawings, like reference numerals denote like elements and the thicknesses of layers and regions are exaggerated for clarity. Expressions such as "at least one of," when preceding a list of elements, modify the entire list of elements and do not modify the individual elements of the list.

FIG. **1** is a schematic diagram illustrating a method of transmitting/receiving information about applications for providing an Internet protocol television (IPTV) communication service, according to an exemplary embodiment.

In FIG. **1**, at least one IPTV service provider provides a predetermined IPTV service to a user terminal, that is, an apparatus **10** for performing a function of an IPTV terminal function (ITF) entity ('ITF entity apparatus **10**'). The exemplary embodiments are also applicable to provide other services, instead of the IPTV service.

In operation **110**, the ITF entity apparatus **10** and a network attachment entity apparatus **11** establish network connection to form an IPTV network. The ITF entity apparatus **10** acquires an IP address from the network attachment entity apparatus **11** to form the IPTV network. The network attachment entity apparatus **11** may be an apparatus for managing network connections, such as, a wide area network (WAN) gateway, and may perform user authentication of a network level, and access configuration. The ITF entity apparatus **10** may function as a user domain entity that receives an IPTV service from an IPTV service provider to use the IPTV service, and may perform a plurality of entity functions.

In operation **120**, the ITF entity apparatus **10** determines an entry point for searching for the IPTV service, i.e., determines the location where the operation of searching for the IPTV starts. The ITF entity apparatus **10** may search for the IPTV service provider before searching for the IPTV service. Thus, in operation **120**, the ITF entity apparatus **10** determines the IP address of an apparatus **12** for performing a function of an IPTV service provider discovery entity ('IPTV service provider discovery entity apparatus **12**') as the entry point. Information of the IP address of the IPTV service provider discovery entity apparatus **12** may be received from the network attachment entity apparatus **11** during the formation of the IPTV network, or alternatively, may be contained in the ITF entity apparatus **10** rather than being received from an external source.

In operation **130**, the ITF entity apparatus **10** accesses the IPTV service provider discovery entity apparatus **12**, and

searches for information of at least one IPTV service provider. A single ITF entity apparatus **10**, that is, a single user terminal, may search for information of a plurality of different IPTV service providers.

The information of the IPTV service provider may include uniform resource identifier (URI) information regarding applications providing an IPTV communication service, and information regarding a user interface (UI) that is used when a user of the ITF entity apparatus **10** selects an IPTV service provider. For example, the information related to a UI, such as logos, trademarks or icons of IPTV service providers is provided to the ITF entity apparatus **10**, and then is displayed to the user by the ITF entity apparatus **10**. Thus, the user of the ITF entity apparatus **10** may select one IPTV service provider from among the IPTV service providers.

Since the information regarding the IPTV service providers is provided to the ITF entity apparatus **10** through the IPTV service provider discovery entity apparatus **12**, the user may select a predetermined IPTV service provider through the ITF entity apparatus **10**, and may use an IPTV service of the selected IPTV service provider.

The user of the ITF entity apparatus **10** may access applications for providing the IPTV communication service provided by the IPTV service provider that is selected based on the URI information regarding the IPTV communication service-providing applications. The IPTV communication service-providing applications may include a chatting application, an instant message application, a caller identification (ID) application, and a presence application. The chatting application provides a chatting service, and the instant message application provides a message service. The caller ID application provides a service using the caller ID. The presence application provides a service using or indicating an on-line status and location of the user in a system such as a voice over IP (VOIP).

In operation **140**, the ITF entity apparatus **10** accesses a predetermined IPTV communication service based on the URI information regarding the IPTV communication service-providing applications, which is received in operation **130**. When the user selects one IPTV service provider from among a plurality of IPTV service providers in operation **130**, the ITF entity apparatus **10** may access a URI for the IPTV communication service-providing applications of the selected IPTV service provider, and may be provided with the predetermined IPTV communication service.

According to another exemplary embodiment, the ITF entity apparatus **10** may receive URI information of an apparatus **13** for performing a function of an IPTV service discovery entity ('IPTV service discovery entity apparatus **13**'), in operation **130**. In operation **140**, the ITF entity apparatus **10** may access the IPTV service discovery entity apparatus **13** according to a URI address of the IPTV service discovery entity apparatus **13**, which is received in operation **130**, and may search for information regarding at least one IPTV service. The information regarding the IPTV service may include URI information regarding applications providing IPTV communication service. The ITF entity apparatus **10** may access the applications providing the IPTV communication service based on the URI information regarding the received applications providing the IPTV communication service, which is received in operation **140**.

FIG. **2** is a schematic diagram illustrating flow of information of an application providing an IPTV communication service, according to an exemplary embodiment.

A data flow for providing information for finally accessing applications providing an IPTV service from a service provider discovery entry point **210** may include two flows: a web track **22** and a metadata track **21**. The service provider discovery entry point **210** acquires IP address information for initiating the discovery of the IPTV service provider from an external source. In an unmanaged network model, the IP address information may be configured in advance or configured manually, and in a managed network model, the IP address information may be received from an IMS gateway (IG) entity apparatus in a process of searching for the IG. The method of acquiring the IP address information is described in the functional architecture standard of the open IPTV forum, and thus, detailed descriptions are not provided here.

When the operation of the ITF entity apparatus **10** is based on the flow of the web track **22**, the ITF entity apparatus **10** operates according to a Declarative Application Environment (DAE) application that is provided as a web service from an operation where a service provider is searched for (operation **260**). The ITF entity apparatus **10** may be included in an open ITF (OITF) entity apparatus. The ITF entity apparatus **10** may sequentially access IPTV service provider, at least one IPTV service and an application providing the IPTV service with the DAE application. The DAE application provides a declarative language based environment (browser) based on CEA-2014 for presentation of user interface and includes scripting support for interaction with network server-side applications and access to the APIs of the other OITF functions. The DAE application is compliant with the OITF specification and thus a detailed description thereof will be omitted here.

When the operation of the ITF entity apparatus **10** is based on the flow of the metadata track **21**, the ITF entity apparatus **10** accesses the IPTV service provider discovery entity apparatus **12** using IP address information which is acquired from the service provider discovery entry point **210**, and searches for extensible markup language (XML)-based information regarding an IPTV service provider (operation **220**). The XML-based information regarding the IPTV service provider may include URI information regarding the IPTV communication service-providing application **250**. The user of the ITF entity apparatus **10** may access applications providing the IPTV communication service through the URI information regarding the IPTV communication service-providing application **250** (operation **23**).

According to another exemplary embodiment, when the ITF entity apparatus **10** is based on the flow of the metadata track **21**, the ITF entity apparatus **10** may access the IPTV service provider discovery entity apparatus **12** using IP address information which is acquired from the service provider discovery entry point **210**, and may receive XML-based URI information regarding the IPTV service discovery entity apparatus **13** (operation **220**). The ITF entity apparatus **10** may access the IPTV service discovery entity apparatus **13** according to a URI address of the IPTV service discovery entity apparatus **13**, which is contained in the received URI information, and may search for XML-based information regarding at least one IPTV service (operation **230**). The URI information regarding the IPTV service may include URI information regarding an application providing the IPTV communication service **250**. The user of the ITF entity apparatus **10** may access an application providing the IPTV communication service **250** through the URI information regarding the IPTV communication service-providing application **250** (operation **24**).

According to an exemplary embodiment, metadata including URI information regarding the IPTV communication service-providing application is defined by using a XML schema, and thus a user of an ITF entity apparatus accesses

the IPTV communication service-providing application by using the metadata so as to use a predetermined service provided by a service provider.

FIG. **3** is a flowchart of an operation of transmitting and receiving information regarding an IPTV communication service-providing application in an unmanaged network model, according to an exemplary embodiment.

Referring to FIG. **3**, an open IPTV terminal function (OITF) entity apparatus **30**, an IPTV service provider discovery entity apparatus **31**, and an IPTV service discovery entity apparatus **32** are illustrated. The OITF entity apparatus **30** is an apparatus for performing entity functions of a user domain according to open IPTV forum architecture. The IPTV service provider discovery entity apparatus **31**, and the IPTV service discovery entity apparatus **32** are apparatuses for performing entity functions of a network domain that is managed by an IPTV service provider, or a network provider.

The OITF entity apparatus **30** accesses an IPTV service through gateways of the user domain, that is, an application gateway (AG) functional entity apparatus and an IP multimedia subsystem (IMS) gateway (IG) functional entity apparatus. An apparatus, which finally uses the IPTV service such as a TV, may be the OITF entity apparatus **30**.

Referring to FIG. **3**, in operation **310**, the OITF entity apparatus **30** transmits a message requesting for information of at least one IPTV service provider to the IPTV service provider discovery entity apparatus **31**. The information of the IPTV service provider includes metadata including URI information of an IPTV communication service providing application. According to the present exemplary embodiment, the OITF entity apparatus **30** transmits a hypertext transfer protocol (HTTP) REQUEST message that is generated according to HTTP to the IPTV service provider discovery entity apparatus **31**. In another exemplary embodiment, another protocol and another message for another format are used.

In operation **320**, the IPTV service provider discovery entity apparatus **31** transmits a response message including information of at least one IPTV service provider to the OITF entity apparatus **30**, according to the received request message in operation **310**. According to the present exemplary embodiment, the IPTV service provider discovery entity apparatus **31** transmits the HTTP RESPONSE message that is generated according to HTTP to the OITF entity apparatus **30**. In another exemplary embodiment, another protocol and another message of another format are used.

A user of the OITF entity apparatus **30** may access an IPTV communication service-providing application provided through URI information regarding an IPTV communication service-providing application, which is contained in information regarding the IPTV service provider.

According to another exemplary embodiment, the OITF entity apparatus **30** accesses the IPTV service provider discovery entity apparatus **32**, and receives XML-based URI information regarding the IPTV service discovery entity apparatus **32**. Then, in operation **340**, the OITF entity apparatus **30** accesses the IPTV service discovery entity apparatus **32**, and transmits a request message for information about at least one IPTV service to the IPTV service discovery entity apparatus **32**. The information regarding the IPTV service includes metadata including URI information regarding an application providing an IPTV communication service. According to the present exemplary embodiment, the OITF entity apparatus **30** transmits an HTTP REQUEST message that is generated according to HTTP to the IPTV service discovery entity apparatus **32**. In another exemplary embodiment, another protocol and another message of another format are used.

In operation **350**, the IPTV service discovery entity apparatus **32** transmits a response message including the information regarding at least one IPTV service to the OITF entity apparatus **30**, according to the received request message in operation **340**. According to the present exemplary embodiment, the IPTV service discovery entity apparatus **32** transmits a HTTP RESPONSE message that is generated according to HTTP to the OITF entity apparatus **30**. In another exemplary embodiment, another protocol and another message of another format are used.

A user of the OITF entity apparatus **30** may access an application providing an IPTV communication service through URI information regarding an application providing the IPTV communication service, which is contained in the information of the IPTV service.

FIG. **4** is a flowchart of an operation of receiving information of an IPTV communication service-providing application from an IPTV service provider discovery entity apparatus in a managed network model, according to another exemplary embodiment.

In FIG. **4**, an OITF entity apparatus **42**, an IMS gateway functional (IG) entity apparatus **43**, an authentication and session management (ASM) entity apparatus **45**, and an IPTV service provider discovery entity apparatus **44** are illustrated. An ITF entity apparatus **41** may be an apparatus for performing entity functions of a user domain, and may perform a plurality of entity functions. In FIG. **4**, the ITF entity apparatus **41** includes the OITF entity apparatus **42** and the IG entity apparatus **43**. The OITF entity apparatus **42** and the IG entity apparatus **43** perform entity functions of a user domain according to the open IPTV forum architecture. The ASM entity apparatus **45** and the IPTV service provider discovery entity apparatus **44** perform entity functions of a network domain that is managed by a network provider. The IG entity apparatus **43** and the ASM entity apparatus **45** perform entity functions that are required in a managed model network from among IPTV service models according to the open IPTV forum architecture.

The OITF entity apparatus **42** accesses an IPTV service through gateways of the user domain, that is, an AG functional entity apparatus and the IG entity apparatus **43**. An apparatus, which finally uses the IPTV service such as a TV, may be the OITF entity apparatus **42**.

The IG entity apparatus **43** allows the OITF entity apparatus **42** to access the IPTV service based on an IP multimedia subsystem (IMS) core network. The IG entity apparatus **43** relays apparatuses for performing entity functions of a network domain, that is, the ASM entity apparatus **45** and the IPTV service provider discovery entity apparatus **44**, in order for the OITF entity apparatus **42** to access the IPTV service.

The ASM entity apparatus **45** performs access management and IPTV service session management so that only a specific user may access a managed network.

The IPTV service provider discovery entity apparatus **44** generates information regarding at least one service provider.

Referring to FIG. **4**, in operation **410**, the OITF entity apparatus **42** transmits a request message for information regarding at least one IPTV service provider to the IG entity apparatus **43**. The information regarding the IPTV service provider includes metadata including URI information regarding an IPTV communication service-providing application. The OITF entity apparatus **42** and the IG entity apparatus **43** are apparatuses for performing entity functions of a user domain, and transmit and receive messages that are

written in a predetermined message format defined therebetween. In FIG. **4**, the OITF entity apparatus **42** transmits a HTTP REQUEST message generated according to HTTP to the IG entity apparatus **43**.

In operation **412**, the IG entity apparatus **43** generates a SIP: SUBSCRIBE message, according to the received request message in operation **410**, and transmits the SIP: SUBSCRIBE message to the ASM entity apparatus **45**. The SIP: SUBSCRIBE message is a message to be transmitted to the IPTV service provider discovery entity apparatus **44**. However, since the ASM entity apparatus **45** performs the IPTV service session management in the managed network model, the SIP: SUBSCRIBE message is transmitted to the IPTV service provider discovery entity apparatus **44** through the ASM entity apparatus **45**.

In operation **414**, the ASM entity apparatus **45** transmits the SIP: SUBSCRIBE that is received from the IG entity apparatus **43** in operation **412** to the IPTV service provider discovery entity apparatus **44**.

In operation **416**, the IPTV service provider discovery entity apparatus **44** transmits a SIP: 200 OK message informing that the SIP: SUBSCRIBE message was normally received in operation **414** to the ASM entity apparatus **45**.

In operation **418**, the ASM entity apparatus **45** transmits the received SIP: 200 OK received in operation **416** to the IG entity apparatus **43**.

In operation **420**, the IPTV service provider discovery entity apparatus **44** transmits a SIP: NOTIFY message containing information regarding at least one service provider to the ASM entity apparatus **45**.

In operation **422**, the ASM entity apparatus **45** transmits the SIP: NOTIFY message that is received from the IPTV service provider discovery entity apparatus **44** in operation **420** to the IG entity apparatus **43**.

In operation **424**, the IG entity apparatus **43** transmits the SIP: 200 OK message informing that the SIP NOTIFY message was normally received in operation **422** to the ASM entity apparatus **45**.

In operation **426**, the ASM entity apparatus **45** transmits the received SIP: 200 OK message in operation **424** to the IPTV service provider discovery entity apparatus **44**.

In operation **428**, the IG entity apparatus **43** transmits a response message containing information regarding at least one IPTV service provider to the OITF entity apparatus **42**. The response message containing the information regarding at least one service provider is generated in a predetermined message format that is defined between the OITF entity apparatus **42** and the IG entity apparatus **43**, and is transmitted to the OITF entity apparatus **42**. In FIG. **4**, the IG entity apparatus **43** transmits a HTTP RESPONSE message generated according to HTTP to the OITF entity apparatus **42**.

A user of the OITF entity apparatus **42** may access IPTV communication service-providing applications through URI information regarding an IPTV communication service-providing application, which is contained in the information regarding the IPTV service provider.

According to the present exemplary embodiment, a message is transmitted between apparatuses for performing entity functions by using HTTP and SIP. In another exemplary embodiment, another protocol and another message of another format are used.

According to another exemplary embodiment, in operation **450**, the OITF entity apparatus **42** transmits a request message for information regarding at least one IPTV service provider to the IPTV service provider discovery entity apparatus **44**. The information regarding the IPTV service provider includes metadata including URI information regarding an IPTV communication service-providing application. According to the present exemplary embodiment, the OITF entity apparatus **42** transmits the HTTP REQUEST message generated according to HTTP to the IPTV service provider discovery entity apparatus **44**. In another exemplary embodiment, another protocol and another message of another format are used.

In operation **452**, the IPTV service provider discovery entity apparatus **44** transmits a response message containing information regarding at least one IPTV service provider to the OITF entity apparatus **42**, according to the received request message in operation **450**. According to the present exemplary embodiment, the IPTV service provider discovery entity apparatus **44** transmits a HTTP RESPONSE message generated according to HTTP to the OITF entity apparatus **42**. In another exemplary embodiment, another protocol and another message of another format are used.

The user of the OITF entity apparatus **42** may access applications providing IPTV communication service through URI information regarding an IPTV communication service-providing application, which is contained in the information regarding the IPTV service provider.

FIG. **5** is a flowchart of an operation of receiving information of an IPTV communication service-providing application from an IPTV service discovery entity apparatus by using an SIP protocol in a managed network model, according to another exemplary embodiment.

The operation of FIG. **5** is the same as the operation of FIG. **4** except that information regarding an IPTV service, which includes information regarding an IPTV communication service-providing application, is searched for by accessing an IPTV service discovery entity apparatus **54**.

Thus, an IG entity apparatus **53** generates a SIP: SUBSCRIBE message for requesting information regarding a service provider or information regarding a service. The IPTV service discovery entity apparatus **54** generates a SIP: NOTIFY message containing information regarding at least one service provided by a predetermined service provider.

In operation **510**, an OITF entity apparatus **52** transmits a request message for information regarding IPTV service to the IG entity apparatus **53**. The information regarding the IPTV service includes metadata containing URI information regarding applications providing IPTV communication service. The OITF entity apparatus **52** and the IG entity apparatus **53** are apparatuses for performing entity functions of a user domain, and transmit and receive messages that are written in a predetermined message format defined therebetween. In FIG. **5**, the OITF entity apparatus **52** transmits a HTTP REQUEST message generated according to HTTP to the IG entity apparatus **53**.

In operation **512**, the IG entity apparatus **53** generates a SIP: SUBSCRIBE message according to the received request message in operation **510**, and transmits the SIP: SUBSCRIBE message to an ASM entity apparatus **55**. The SIP: SUBSCRIBE message is a message to be transmitted to the IPTV service discovery entity apparatus **54**.

In operation **514**, the ASM entity apparatus **55** transmits the SIP: SUBSCRIBE message that is received from the IG entity apparatus **53** in operation **512** to the IPTV service discovery entity apparatus **54**.

In operation **516**, the IPTV service discovery entity apparatus **54** transmits a SIP: 200 OK message informing that the SIP: SUBSCRIBE message was normally received in operation **514** to the ASM entity apparatus **55**.

In operation **518**, the ASM entity apparatus **55** transmits the received SIP: 200 OK message in operation **516** to the IG entity apparatus **53**.

In operation **520**, the IPTV service discovery entity apparatus **54** transmits a SIP: NOTIFY message containing information regarding at least one service to the ASM entity apparatus **55**.

In operation **522**, the ASM entity apparatus **55** transmits the SIP: NOTIFY that is received from the IPTV service discovery entity apparatus **54** in operation **520** to the IG entity apparatus **53**.

In operation **524**, the IG entity apparatus **53** transmits a SIP: 200 OK message informing that the SIP: NOTIFY message was normally received in operation **522** to the ASM entity apparatus **55**.

In operation **526**, the ASM entity apparatus **55** transmits the received SIP: 200 OK message in operation **524** to the IPTV service discovery entity apparatus **54**.

In operation **528**, the IG entity apparatus **53** transmits a response message containing information regarding at least one service to the OITF entity apparatus **52**. The response message containing the information regarding at least one service is generated in a predetermined message format that is defined between the OITF entity apparatus **52** and the IG entity apparatus **53**, and is transmitted to the OITF entity apparatus **52**. In FIG. **5**, the IG entity apparatus **53** transmits a HTTP RESPONSE message generated according to HTTP to the OITF entity apparatus **52**.

A user of the OITF entity apparatus **52** may access an application providing an IPTV communication service through URI information regarding the application providing the IPTV communication service, which is contained in the information regarding the IPTV service.

FIG. **6** is a flowchart of an operation of receiving information regarding an IPTV communication service-providing application from an IPTV service discovery entity apparatus in a managed network model by using a HTTP protocol or a DVB STP protocol, according to another exemplary embodiment.

In operation **610**, an OITF entity apparatus **60** transmits a request message for information of an IPTV service to an IPTV service discovery entity apparatus **63**. The information of the IPTV service includes metadata including URI information regarding an application providing an IPTV communication service. The OITF entity apparatus **60** transmits a HTTP REQUEST message generated according to HTTP to the IPTV service discovery entity apparatus **63**. In another exemplary embodiment, another protocol and another message of another format are used.

In operation **620**, the IPTV service discovery entity apparatus **63** transmits a response message containing information regarding at least one IPTV service, according to the received request message in operation **610** to the OITF entity apparatus **60**. According to the present exemplary embodiment, the IPTV service discovery entity apparatus **63** transmits a HTTP PRESPONSE message generated according to HTTP to the OITF entity apparatus **60**. In another exemplary embodiment, another protocol and another message of another format are used.

A user of the OITF entity apparatus **60** may access an application providing an IPTV communication service through URI information regarding an application providing the IPTV communication service, which is contained in the information regarding the IPTV service.

According to another exemplary embodiment, the OITF entity apparatus **60** may receive the information regarding the IPTV service from the IPTV service discovery entity apparatus **63** in a multicast manner using a DVB SD&S transport protocol (DVB STP).

In operation **650**, the IPTV service discovery entity apparatus **63** transmits a DVB STP multicast message containing the information regarding the IPTV service to a transport processing function entity apparatus **62**. The information regarding the IPTV service includes metadata containing URI information regarding an application providing an IPTV communication service. The transport processing function entity apparatus **62** is an apparatus for performing entity functions of managing a multicast group, and previously receives an Internet group management protocol (IGMP): JOIN message for requesting joining the multicast group from the OITF entity apparatus **60** of a user domain, in operation **660**.

In operation **670**, the transport processing function entity apparatus **62** transmits the DVB STP multicast message containing the information regarding the IPTV service, which is received from the IPTV service discovery entity apparatus **63**, to the OITF entity apparatus **60** belonging to a corresponding multicast group.

A user of the OITF entity apparatus **60** may access an application providing an IPTV communication service through URI information regarding the application providing the IPTV communication service, which is included in the information regarding the IPTV service.

FIG. **7** illustrates a structure of a communication offering record **710** including metadata regarding an IPTV communication service-providing application, according to an exemplary embodiment.

The OITF entity apparatuses **30**, **42**, **52**, and **60** receive the communication offering record **710** from the IPTV service provider discovery entity apparatuses **31** and **44** or the IPTV service discovery entity apparatuses **32**, **54**, and **63** in response to the requests of the OITF entity apparatuses **30**, **42**, **52**, and **60** or a multicast transmission of the IPTV service discovery entity apparatus **63**.

The communication offering record **710** includes URI information regarding an application providing an IPTV communication service. In more detail, an 'initialAppLoc' **720** element indicates the URI information regarding the application providing the IPTV communication service. The user of the OITF entity apparatuses **30**, **42**, **52**, and **60** may access the IPTV communication service-providing application through the URI information regarding the application providing the IPTV communication service that is represented by the 'initialAppLoc' **720** element included in the communication offering record **710**.

FIG. **8**A illustrates a 'ServiceDiscovery' XML schema including a communication offering record, according to an exemplary embodiment.

As shown in FIG. **8**A, the 'ServiceDiscovery' element may include the communication offering record written in 'CommunicationOffering' type (**810**).

In the present exemplary embodiment, the 'Service Discovery' element includes the communication offering record; however, another element may include the communication offering record.

FIG. **8**B shows an XML schema of a communication offering record according to an exemplary embodiment.

The communication offering record is written in 'CommunicationOffering' type, and the 'CommunicationOffering' type includes an 'InitialAppLoc' element **820**. The 'InitialAppLoc' element **820** indicates URI information regarding an IPTV communication service-providing application. The user of the OITF entity apparatuses **30**, **42**, **52**, and **60** may access the IPTV communication service-providing application through the URI information regarding the IPTV com-

munication service-providing application, which is indicated by the 'InitialAppLoc' element **820** included in the communication offering record.

In another exemplary embodiment, the name of each of the elements may be changed or each of the elements may be changed to an attribute type.

FIG. **9** shows a structure of a communication offering record including metadata regarding an application providing an IPTV communication service according to another exemplary embodiment.

The communication offering record is written in the 'CommunicationOffering' type, and the 'CommunicationOffering' type includes a 'ChatAppLoc' element **920**, an 'IMAppLoc' element **930**, a 'CallerIDAppLoc' element **940**, and a 'PresenceAppLoc' element **950**. The 'ChatAppLoc' element **920** indicates URI information regarding a chatting application. The 'IMAppLoc' element **930** indicates URI information regarding an application providing a message service. The 'CallerIDAppLoc' element **940** indicates URI information regarding an application using a caller ID. The 'PresenceAppLoc' element **950** indicates URI information regarding a presence application using or indicating an on-line status of the user and a location of the user on a system such as VOIP.

The user of the OITF entity apparatuses **30**, **42**, **52**, and **60** may access each IPTV communication service-providing application through the URI information regarding the each IPTV communication service-providing application, which is indicated by the 'ChatAppLoc' element **920**, the 'IMAppLoc' element **930**, the 'CallerIDAppLoc' element **940**, and the 'PresenceAppLoc' element **950** included in the communication offering record.

In another exemplary embodiment, the name of each of the elements may be changed or each of the elements may be changed to an attribute type.

FIG. **10** shows a structure of a communication offering record including metadata regarding an IPTV communication service-providing application, according to another exemplary embodiment.

The communication offering record is written in the 'CommunicationOffering' type, and the 'CommunicationOffering' type includes an 'AppList' element and an 'AppItem' element **1010** hierarchically.

The 'AppItem' element **1010** may include 'AppId', 'AppName', 'AppIconLoc', 'AppMainType', 'AppSubType', 'AppTech', and 'AppPriority' as attributes.

The 'AppId' indicates an ID of the application, 'AppName' indicates the name of application, and 'AppIconLoc' indicates URI information for receiving an application icon. The 'AppMainType' and 'AppSubType' indicate the kind of the application, 'AppTech' indicates information about a technology used in the application, and 'AppPriority' indicates a priority of the application.

In addition, the 'AppItem' element **1010** may include 'MulticastLoc' and 'UnicastLoc' as elements. The 'MulticastLoc' indicates URI information for accessing the application through the multicast, and 'UnicastLoc' indicates URI information for accessing the application through the unicast.

The user of the OITF entity apparatuses **30**, **42**, **52**, and **60** may access each IPTV communication service-providing application through the URI information regarding the IPTV communication service-providing application, which is indicated by the 'UnicastLoc' element.

In another exemplary embodiment, the name and location of each of the elements and attributes in the XML schema of the communication offering record may be changed.

FIG. **11** is a table showing AppMainType values and AppSubType values of a communication offering record, according to another exemplary embodiment.

As illustrated with reference to FIG. **10**, the communication offering record includes 'AppMainType' and 'AppSubType' in the 'AppItem' element **1010**. For example, as shown in FIG. **11**, the 'AppMainType' value **1110** of the IPTV communication service-providing application may be written as '0x01'. In addition, 'AppSubType' values **1120** of the chatting application, the instant message application, the caller ID application, and the presence application may be respectively written as '0x01', '0x02', '0x03', and '0x04'.

FIG. **12** shows XML-based metadata according to a structure of communication offering record, according to another exemplary embodiment.

URI information of each of the chatting application, the instant message application, the caller ID application, and the presence application is written according to the structure of the communication offering record described with reference to FIGS. **10** and **11**.

'CommunicationDiscovery' element of the 'CommunicationOffering' type includes four 'AppItem' elements with respect to the applications. Each of the applications is recognized by combination of the 'AppMainType' value and the 'AppSubType' value, and the 'UnicastLoc' element includes URI information regarding applications providing the communication services.

As shown in FIG. **12**, the chatting application has a 'COMM_APP' value corresponding to '0xO1' as the 'AppMainType' value, and has a 'Chatting' value corresponding to '0x01' as the 'AppSubType' value. The user of the OITF entity apparatuses **30**, **42**, **52**, and **60** may access the chatting application provided by the corresponding service provider through URI 'http://kt.co.kr/IMSApp/ChatApp.html' indicated by the 'UnicastLoc' element.

The instant message application has a 'COMM_APP' value corresponding to '0xO1' as the 'AppMainType' value, and has an 'InstantMsg' value corresponding to '0x02' as the 'AppSubType' value. The user of the OITF entity apparatuses **30**, **42**, **52**, and **60** may access the instant message application provided by the corresponding service provider through URI 'http://kt.co.kr/IMSApp/IMApp.html' indicated by the 'UnicastLoc' element.

The caller ID application has a 'COMM_APP' value corresponding to 'OxO1' as the 'AppMainType' value, and has 'CallerID' value corresponding to 'Ox03' as the 'AppSubType' value. The user of the OITF entity apparatuses **30**, **42**, **52**, and **60** may access the caller ID application provided by the corresponding service provider through URL 'http://kt-.co.kr/IMSApp/CallerIDApp.html' indicated by the 'UnicastLoc' element.

The presence application has a 'COMM_APP' value corresponding to '0xO1' as the 'AppMainType' value, and has 'Presence' value corresponding to '0x04' as the 'AppSubType' value. The user of the OITF entity apparatuses **30**, **42**, **52**, and **60** may access the presence application provided by the corresponding service provider through URL 'http://kt-.co.kr/IMSApp/PresenceApp.html' indicated by the 'UnicastLoc' element.

FIG. **13** is a block diagram of an OITF apparatus **1300** according to an exemplary embodiment.

The OITF apparatus **1300** of the present exemplary embodiment includes a service provider discovery launcher **1310**, a service provider information receiving unit **1320**, and an application information acquiring unit **1330**.

The service provider discovery launcher **1310** acquires IP address information for initiating the IPTV service provider discovery at an entry point for searching for the IPTV service provider.

The service provider information receiving unit **1320** receives information regarding the IPTV service provider from an IPTV service provider discovery entity apparatus by using the IP address information acquired by the service provider discovery launcher **1310**. The information regarding the IPTV service provider may be written in XML; however, in another exemplary embodiment, other technical formats may be used.

The application information acquiring unit **1330** selectively acquires information regarding at least an application for providing IPTV communication service based on the information regarding the IPTV service provider. The application for providing the IPTV communication service may include at least one of the chatting application, the instant message application, the caller ID application, and the presence application. The information regarding the application for providing the IPTV communication service may be written in XML; however, in another exemplary embodiment, other technical formats may be used.

When the information regarding the IPTV service provider received by the service provider information receiving unit **1320** is URI information regarding the IPTV service discovery entity apparatus, which may search for at least one service provided by the IPTV service provider, the application information acquiring unit **1330** acquires information regarding at least one application for providing the IPTV communication service from the IPTV service discovery entity apparatus by using the URI information.

The information regarding the application for providing the IPTV communication service may include URI information regarding an application for providing the IPTV communication service, which may access at least one IPTV communication service provided by the IPTV service provider.

According to another exemplary embodiment, the information regarding the application for providing the IPTV communication service may include at least one of an application ID that may access at least one IPTV communication service provided by the IPTV service provider, the name of application, URI information for receiving the application icon, a kind of application, information regarding technology used in the application, priority of the application, URI information for accessing the application through the multicast, and URI information for accessing the application through the unicast. The user of the OITF entity apparatus may access each of the applications by using the URI information for accessing the application through the unicast.

According to another exemplary embodiment, the information regarding the application for providing the IPTV communication service may include URI information regarding at least one of the chatting application, the instant message application, the caller ID application, and the presence application provided by the IPTV service provider.

The information regarding the application for providing the IPTV communication service may be provided as a part of the communication offering record.

While the present invention has been particularly shown and described with reference to exemplary embodiments thereof, it will be understood by those of ordinary skill in the art that various changes in form and details may be made therein without departing from the spirit and scope of the present invention as defined by the following claims.

For example, the apparatus for transmitting/receiving information regarding an application for providing IPTV communication service may include a bus coupled to each of units in the device shown in FIGS. **13** and **14**, and at least one processor coupled to the bus. In addition, the apparatus may include a memory that is coupled to the bus in order to store commands, received messages, and generated messages, and coupled to the at least one processor for performing the above commands.

The exemplary embodiments of the present invention can be written as computer programs and can be implemented in general-use digital computers that execute the programs using a computer readable recording medium. Examples of the computer readable recording medium include magnetic storage media (e.g., ROM, floppy disks, hard disks, etc.), optical recording media (e.g., CD-ROMs, or DVDs), etc. The computer readable recording medium can also be distributed over network coupled computer systems so that the computer readable code is stored and executed in a distributed fashion.

What is claimed is:

1. A method of receiving information regarding an application for providing an Internet protocol television (IPTV) communication service, the method comprising:

acquiring IP address information for initiating an IPTV service provider discovery at an entry point for searching for an IPTV service provider;

receiving information regarding the IPTV service provider, from an IPTV service provider discovery entity apparatus by using the IP address information;

and acquiring information regarding the application for providing the IPTV communication service, based on the information regarding the IPTV service provider, wherein the application for providing the IPTV communication service includes at least one of a chatting application, an instant message application, a caller identification (ID) application, and a presence application provided by the IPTV service provider, wherein the information regarding the application for providing the IPTV communication service includes a resource identifier (URI) information regarding at least one of the chatting application, the instant message application, the caller ID application, and the presence application;

wherein the information regarding the application for providing the IPTV communication service is provided as a part of a communication offering record.

2. The method of claim **1**, wherein the method further comprises acquiring information regarding the application for providing the IPTV communication service from an IPTV service discovery entity apparatus by using the information for acquiring the application for providing the IPTV communication service.

3. The method of claim **1**, wherein the information regarding the application for providing the IPTV communication service includes at least one of an application ID that is operable to access the IPTV communication service provided by the IPTV service provider, name of the application, uniform resource identifier (URI) information for receiving an application icon, a type and sub-type of the application, a kind of the application, URI information for accessing the application through multicast, and URI information for accessing the application through unicast.

4. The method of claim **1**, wherein the information regarding the IPTV service provider and the information regarding the application for providing the IPTV communication service are in extensible markup language (XML) format.

5. An open Internet protocol television (IPTV) terminal function (OITF) apparatus comprising:

at least one memory comprising computer executable instructions;

at least one processor operable to read the at least one memory and execute computer executable instructions, the computer executable instructions comprising instructions which implement: a service provider discovery launcher which acquires IP address information for initiating an IPTV service provider discovery at an entry point for searching for an IPTV service provider;

a service provider information receiving unit which receives information regarding the IPTV service provider, from an IPTV service provider discovery entity apparatus by using the IP address information; and

an application information acquiring unit which acquires information regarding an application for providing an IPTV communication service, based on the information regarding the IPTV service provider,

wherein the application for providing the IPTV communication service includes at least one of a chatting application, an instant message application, a caller identification (ID) application, and a presence application,

wherein the information regarding the application for providing the IPTV communication service includes a uniform resource identifier (URI) information regarding at least one of the chatting application, the instant message application, the caller ID application, and the presence application provided by the IPTV service provider, and

wherein the information regarding the application for providing the IPTV communication service is provided as a part of a communication offering record.

6. The OITF apparatus of claim **5**, wherein the application information acquiring unit acquires information regarding the application for providing the IPTV communication service from the IPTV service discovery entity apparatus by using the information for acquiring the application for providing the IPTV communication service.

7. The OITF apparatus of claim **5**, wherein the information regarding the application for providing the IPTV communication service includes at least one of an application ID that is operable to access the IPTV communication service provided by the IPTV service provider, name of the application, uniform resource identifier (URI) information for receiving an application icon, a kind of the application, an application type and sub-type, information regarding technology used in the application, URI information for accessing the application through multicast, and URI information for accessing the application through unicast.

8. The OITF apparatus of claim **5**, wherein the information regarding the IPTV service provider and the information regarding the application for providing the IPTV communication service are in extensible markup language (XML) format.

9. A non-transitory computer readable recording medium having embodied thereon a computer program for executing the method according to claim **1**.

10. The method of claim **1**, wherein the presence application relates to an online status or a location of a user.

11. The OITF apparatus of claim **5**, wherein the presence application relates to an online status or a location of a user.

12. A method of receiving at a user terminal, information regarding an application for providing an Internet protocol television (IPTV) service, the method comprising:

receiving from a gateway, IP address information of an entry point for searching for an IPTV service provider, the entry point being outside of the gateway; receiving information regarding the IPTV service provider, from the gateway by using the received IP address information; and

receiving information regarding the application, based on the information regarding the IPTV service provider,

wherein the application for providing the IPTV communication service includes at least one of a chatting application, an instant message application, a caller identification (ID) application, and a presence application,

wherein the information regarding the includes a uniform resource identifier (URI) information regarding at least one of the chatting application, the instant message application, the caller ID application, and the presence application provided by the IPTV service provider, and

wherein the information regarding the application for providing the IPTV communication service is provided as a part of a communication offering record.

13. The method of claim **1**, wherein the information regarding the application for providing the IPTV communication service comprises the technology used in the application.

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