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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FIG. 3

30
OITF ENTITY APPARATUS

31
IPTV SERVICE PROVIDER DISCOVERY ENTITY APPARATUS

32
IPTV SERVICE DISCOVERY ENTITY APPARATUS

HTTP Request (310)
HTTP Response (320)

HTTP Request (340)
HTTP Response (350)

RECEIPT OF SERVICE PROVIDER DISCOVERY INFORMATION

RECEIPT OF SERVICE DISCOVERY INFORMATION
FIG. 4

HTTP Request (410) → SIP:Subscribe (412) → SIP:200 OK (418) → SIP:Notify (422) → SIP:200 OK (424) → HTTP Response (428)

HTTP Request (450) → HTTP Response (452)
FIG. 6

DITF ENTITY APPARATUS

HTTP Request (610)

HTTP Response (620)

DVB STP MULTICAST (650)

RECEIPT OF SERVICE DISCOVERY INFORMATION USING HTTP

RECEIPT OF SERVICE DISCOVERY INFORMATION USING MULTICAST

IG ENTITY APPARATUS

TRANSPORT PROCESSING FUNCTION ENTITY APPARATUS

IPTV SERVICE DISCOVERY ENTITY APPARATUS

FIG. 7

CommunicationOffering RECORD

dvb:OfferingBase (extension)

attributes

DomainName

Version

InitialAppLoc
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"
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"/>
</xs:sequence>
</xs:extension>
</xs:complexContent>
</xs:complexType>
FIG. 9

CommunicationOffering

dvb:OfferingBase (extension)
  attributes
  DomainName
  Version

oif:ChatAppLoc
oif:IMAppLoc
oif:CallerIDAppLoc
oif:PresenceAppLoc
<table>
<thead>
<tr>
<th>AppMainType Value (1110)</th>
<th>AppSubType Value (1120)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x01 IMS Communication Application</td>
<td>0x01 Chat App</td>
</tr>
<tr>
<td></td>
<td>0x02 Instant message App</td>
</tr>
<tr>
<td></td>
<td>0x03 Caller ID App</td>
</tr>
<tr>
<td></td>
<td>0x04 Presence APP</td>
</tr>
<tr>
<td></td>
<td>0x05~0xFF Reserved</td>
</tr>
<tr>
<td>0x02 Guide Application</td>
<td>0x01 EPG Guide App</td>
</tr>
<tr>
<td></td>
<td>0x02 VoD Guide App</td>
</tr>
<tr>
<td></td>
<td>0x03 Advertisement Guide App</td>
</tr>
<tr>
<td></td>
<td>0x04~0xFF Reserved</td>
</tr>
</tbody>
</table>
FIG. 12

<?xml version="1.0" encoding="UTF-8" ?>
  <of:AppList>
    <of:AppItem AppMainType="COMM_APP" AppSubType="Chatting"/>
      1210
  </of:AppItem>
    1220
    <of:AppItem AppMainType="COMM_APP" AppSubType="InstantMsg"/>
      1230
  </of:AppItem>
    1240
    <of:AppItem AppMainType="COMM_APP" AppSubType="CallerD"/>
      1210
  </of:AppItem>
    1220
    <of:AppItem AppMainType="COMM_APP" AppSubType="Presence"/>
      1230
  </of:AppItem>
</of:AppList>
</of: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) communications 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) scheme, 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 the 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.

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 exemplary embodiments 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;

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 (SIP) protocol in a managed network model, according to another exemplary embodiment;

FIG. 6 is a flowchart of a process 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. 8A illustrates a “ServiceDiscovery” extensible markup language (XML) schema including a communication offering record, according to an exemplary embodiment;

FIG. 8B shows an XML schema of a communication offering record according to an exemplary embodiment;
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 entry point \(12\), 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 \(13\), 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 \(13\). When the user selects one IPTV service provider from among a plurality of IPTV service providers in operation \(13\), 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 \(13\). In operation \(14\), 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 \(13\), 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 \(14\).

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 access a URI of 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 hyper text 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 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 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 request to 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 the IPTV communication service-providing service, 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 OTIF 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 OTIF entity apparatus 52 and the IG entity apparatus 53, and is transmitted to the OTIF entity apparatus 52. In FIG. 5, the IG entity apparatus 53 transmits a HTTP RESPONSE message generated according to HTTP to the OTIF entity apparatus 52.

A user of the OTIF 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 OTIF 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 OTIF 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 OTIF entity apparatus 60. According to the present exemplary embodiment, the IPTV service discovery entity apparatus 63 transmits a HTTP RESPONSE message generated according to HTTP to the OTIF entity apparatus 60. In another exemplary embodiment, another protocol and another message of another format are used.

A user of the OTIF 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 OTIF 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 (DVBSDP).

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 a managing a multicast group, and previously receives an Internet group management protocol (IGMP): JOIN message for requesting joining the multicast group from the OTIF 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 OTIF entity apparatus 60 belonging to a corresponding multicast group.

A user of the OTIF 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 OTIF 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 OTIF 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 OTIF 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. 8A illustrates a "ServiceDiscovery" XML schema including a communication offering record, according to an exemplary embodiment.

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

In the present exemplary embodiment, the "ServiceDiscovery" element includes the communication offering record; however, another element may include the communication offering record.

FIG. 8B 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 OTIF entity apparatuses 30, 42, 52, and 60 may access the IPTV communication service-providing application through the URI information regarding the IPTV com-
communication 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 'CallerIDAAppLoc' 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 messaging service. The 'CallerIDAAppLoc' 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.

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 '0x01' as the 'AppMainType' value, and has a 'Chatting' value corresponding to '0x01' as the 'AppSubType' value. The user of the OTIF 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 '0x01' as the 'AppMainType' value, and has an 'InstantMsg' value corresponding to '0x02' as the 'AppSubType' value. The user of the OTIF 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 '0x01' as the 'AppMainType' value, and has a 'CallerID' value corresponding to '0x03' as the 'AppSubType' value. The user of the OTIF 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 '0x01' as the 'AppMainType' value, and has a 'Presence' value corresponding to '0x04' as the 'AppSubType' value. The user of the OTIF 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 OTIF apparatus 1300 according to an exemplary embodiment.

The OTIF 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 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 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:

(a) acquiring IP address information for initiating an IPTV service provider discovery at an entry point for searching for an IPTV service provider;
(b) receiving information regarding the IPTV service provider, from an IPTV service provider discovery entity apparatus by using the IP address information;
(c) 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:

(a) 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.