Title: METHOD AND APPARATUS FOR TRANSMITTING AND RECEIVING PERSONAL BROADCASTING DATA BASED ON PEER-TO-PEER COMMUNICATION

(57) Abstract: Provided is a method of transmitting and receiving personal broadcasting data in a peer-to-peer (P2P) based network. A terminal (client) that receives a personal broadcast requests a tracker server for a viewing reservation by using electronic program guide (EPG) information or a uniform resource locator (URL) of a personal broadcasting channel, a terminal (broadcaster) that transmits personal broadcasting data receives a list of clients that made a viewing reservation of the personal broadcast from the tracker server and notifies the clients about starting of the personal broadcast when it is time to start the personal broadcast. Accordingly, the client starts streaming when notified about the starting of the personal broadcast by connecting to the personal broadcasting channel after making the viewing reservation, without having to wait for the personal broadcast to start.

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Description

Title of Invention: METHOD AND APPARATUS FOR TRANSMITTING AND RECEIVING PERSONAL BROADCASTING DATA BASED ON PEER-TO-PEER COMMUNICATION

Technical Field

The present invention relates to a method of transmitting and receiving personal broadcasting data by using peer-to-peer (P2P) communication.

Background Art

Unlike a server-client model, where a plurality of clients receive a service from a server as resources are concentrated on a central server, network participants exchange data as equal peers in a peer-to-peer (P2P) based network.

The network participants can share each other's digital contents via P2P communication, and one of the network participants can directly transmit a broadcast to other network participants in real time by generating a personal broadcasting channel.

FIG. 1 is a diagram illustrating a conventional P2P based method of transmitting and receiving personal broadcasting data.

In operation 101, a first terminal (broadcaster) that transmits personal broadcasting data registers a personal broadcasting channel in a tracker server. Here, the tracker server manages a list of personal broadcasting channels in a P2P based network.

In operation 102, the broadcaster starts a broadcast.

In operation 103, a second terminal (client) that wishes to view a personal broadcast obtains the list of personal broadcasting channels from the tracker server.

In operation 104, the client selects a channel according to a user input.

In operation 105, the broadcaster transmits the personal broadcasting data to the client via streaming.

Disclosure of Invention

Technical Problem

In a conventional P2P based personal broadcast, a client is unable to determine information about or broadcast starting times of programs of various personal broadcasting channels. Also, since there is no method of making a reservation to view a personal broadcast, the client needs to wait until a desired program is broadcast after connecting to a personal broadcasting channel.

Solution to Problem

The present invention provides a method of transmitting and receiving personal
broadcasting data, wherein a broadcast of a personal broadcasting channel may be reserved in a peer-to-peer (P2P) based network.

Advantageous Effects of Invention

According to the current embodiment of the present invention, the client may make a viewing reservation by using the information about the personal broadcasting channel. Also, the broadcaster may obtain a list of clients that made a viewing reservation on the personal broadcasting channel. The list may be used for various purposes, for example, for totaling program ratings.

Brief Description of Drawings

FIG. 1 is a diagram illustrating a conventional P2P based method of transmitting and receiving personal broadcasting data;

FIG. 2 is a flowchart illustrating a method of transmitting personal broadcasting data, according to an embodiment of the present invention;

FIG. 3 is a flowchart illustrating a method of receiving personal broadcasting data, according to an embodiment of the present invention;

FIG. 4 is a diagram for describing a method of transmitting and receiving personal broadcasting data by using electronic program guide (EPG) information, according to an embodiment of the present invention;

FIG. 5 is a diagram for describing a method of transmitting and receiving personal broadcasting data by using a uniform resource locator (URL) of a personal broadcasting channel, according to an embodiment of the present invention;

FIG. 6 is a block diagram of a structure of a broadcaster and a client, according to an embodiment of the present invention;

FIG. 7 is a diagram of extensible markup language (XML) based EPG information according to an embodiment of the present invention; and

FIG. 8 is a diagram of EPG information displayed via a user interface of a client, according to an embodiment of the present invention.

Best Mode for Carrying out the Invention

According to an aspect of the present invention, there is provided a method of receiving a personal broadcast of a second terminal by using peer-to-peer (P2P) communication, wherein the method is performed by a first terminal, the method including: transmitting information about the reservation to a tracker server when an external input for making a reservation to view the personal broadcast is received; and starting streaming with the second terminal when the starting of the personal broadcast is notified from the second terminal that received the information from the tracker server.

The method may further include: receiving timeline based electronic program guide (EPG) information about a personal broadcasting channel of the second terminal from
the tracker server; and displaying the EPG information via a user interface for a user to refer to the EPG information while making the reservation.

[23] The method may further include receiving a uniform resource locator (URL) of a personal broadcasting channel of the second terminal, from the second terminal, wherein the information is generated based on the URL.

[24] The EPG information may be based on extensible markup language (XML).

[25] The method may further include synchronizing the received EPG information with the second terminal.

[26] According to another aspect of the present invention, there is provided a computer readable recording medium having recorded thereon a program for executing the method.

[27] According to another aspect of the present invention, there is provided a method of transmitting a personal broadcast by using P2P communication, wherein the method is performed by a terminal, the method including: receiving a list of at least one client who made a viewing reservation on a personal broadcasting channel of the terminal, from a tracker server; and notifying the at least one client about starting of the personal broadcast before streaming, when it is time for the viewing reservation.

[28] The method may further include registering timeline based EPG information about the personal broadcasting channel of the terminal in the tracker server, wherein the viewing reservation by the at least one client is performed by referring to the EPG information registered in the tracker server.

[29] The method may further include transmitting a URL of the personal broadcasting channel to at least one client, wherein the viewing reservation by the at least one client is performed by referring to the URL.

[30] According to another aspect of the present invention, there is provided a computer readable recording medium having recorded thereon a program for executing the method.

[31] According to another aspect of the present invention, there is provided an apparatus for enabling a first terminal to receive a personal broadcast by using P2P communication, the apparatus including: a reservation processor which, when an external input for making a reservation to view the personal broadcast is received, transmits information about the reservation to a tracker server; and a streaming unit which starts streaming with the second terminal when the starting of the personal broadcast is notified from the second terminal that received the information from the tracker server.

[32] The apparatus may further include an EPG processor which receives timeline based EPG information about a personal broadcasting channel of the second terminal from the tracker server and displays the EPG information via a user interface so that a user refers to the EPG information while making the reservation.
The apparatus may further include a URL receiver which receives a URL of a personal broadcasting channel of the second terminal from the second terminal, wherein the reservation processor generates the information based on the URL.

According to another aspect of the present invention, there is provided an apparatus for transmitting a personal broadcast by using P2P communication, the apparatus including: a receiver which receives a list of at least one client that made a viewing reservation of a personal broadcasting channel of a terminal from a tracker server; and a notifying unit which notifies at least one client about starting of the personal broadcast before starting streaming, when it is time for the viewing reservation.

The apparatus may further include an EPG registering unit which registers timeline based EPG information about the personal broadcasting channel of the terminal in the tracker server, wherein the viewing reservation by the at least one client is performed by referring to the EPG information registered in the tracker server.

Mode for the Invention

Hereinafter, the present invention will be described more fully with reference to the accompanying drawings, in which exemplary embodiments of the invention are shown.

FIG. 2 is a flowchart illustrating a method of transmitting personal broadcasting data, according to an embodiment of the present invention.

Herein, a terminal that transmits personal broadcasting data will be referred to as a broadcaster, and a terminal that receives personal broadcasting data will be referred to as a client.

In operation 201, a broadcaster registers timeline based electronic program guide (EPG) information in a tracker server as a part of channel information. The EPG information includes information about programs of personal broadcasting channels, such as a title of a program, a starting time of a program, and a length of a program.

The EPG information may be based on extensible markup language (XML). An example of XML based EPG information is illustrated in FIG. 7.

The EPG information registered in the tracker server is transmitted to a client, and the client may request a viewing reservation to the tracker server by referring to the EPG information.

In operation 202, the broadcaster receives, from the tracker server, a list of clients that made a viewing reservation on a personal broadcasting channel.

In operation 203, the broadcaster synchronizes the EPG information with the client. Due to characteristics of a personal broadcast, broadcast programming or broadcasting times may frequently change, and thus synchronization with the EPG information is important. The synchronization of the EPG information may be performed via the tracker server, or directly performed between the broadcaster and the client. Also, the
synchronization of the EPG server may be performed periodically, or when a change occurs.

Accordingly, in FIG. 2, operation 203 is performed between operations 202 and 204, but may be performed at another time.

In operation 204, when it is time to start the personal broadcast, the broadcaster notifies the clients that made the viewing reservation about the starting of the personal broadcast. Although the clients are aware of a starting time of the personal broadcast based on the EPG information, the broadcaster may notify the clients so as to start streaming in the case when the synchronization with the EPG information is not completed or when there is a real time clock (RTL) difference between the broadcaster and the client.

In operation 205, the broadcaster starts streaming of the personal broadcasting data.

FIG. 3 is a flowchart illustrating a method of receiving personal broadcasting data, according to an embodiment of the present invention.

In operation 301, a client receives information about a personal broadcasting channel from a broadcaster or a tracker server. Here, the information is required for the client to make a viewing reservation on a personal broadcasting channel. The information may be EPG information or a uniform resource locator (URL) of a corresponding broadcasting channel.

In operation 302, the client displays the received information to a user via a user interface.

In operation 303, the client receives a viewing reservation input from the user.

In operation 304, the client transmits reservation information, which is generated based on the viewing reservation input and required to request a viewing reservation, to the tracker server.

In operation 305, the client synchronizes the information about the personal broadcasting channel with the broadcaster. In other words, the client synchronizes EPG information or a URL of a broadcasting channel of the broadcaster with the broadcaster. Such synchronization may be performed periodically or whenever a change occurs, like in the method of FIG. 2. Also, the synchronization may be performed via the tracker server or directly between the broadcaster and the client.

In operation 306, the client receives a message informing about the starting of a broadcast, from the broadcaster of the personal broadcasting channel in regard to which the client made a viewing reservation.

In operation 307, the client receives personal broadcasting data from the broadcaster via streaming.

As such, according to the current embodiment of the present invention, the client may make a viewing reservation by using the information about the personal
broadcasting channel. Also, the broadcaster may obtain a list of clients that made a viewing reservation on the personal broadcasting channel. The list may be used for various purposes, for example, for totaling program ratings.

FIG. 4 is a diagram for describing a method of transmitting and receiving personal broadcasting data by using EPG information, according to an embodiment of the present invention.

In operation 401, a first terminal (broadcaster) registers a personal broadcasting channel in a tracker server. At this time, timeline based EPG information about the personal broadcasting channel of the first terminal is also registered in the tracker server.

In operation 402, a second terminal (client) receives the EPG information from the tracker server.

In operation 403, the second terminal requests the tracker server for a viewing reservation so as to view the personal broadcasting channel at a certain time.

In operation 404, the first terminal receives, from the tracker server, a list of clients that made a viewing reservation on the personal broadcasting channel. The list may include the second terminal.

In operation 405, the first and second terminals synchronize the EPG information. As described above, the synchronization may be performed periodically or whenever there is a change in the EPG information. Also, the synchronization may be performed via the tracker server directly between the first and second terminals.

In operation 406, when it is the time that the second terminal made the viewing reservation, the first terminal notifies the second terminal about the starting of a broadcast.

In operation 407, the first terminal transmits personal broadcasting data to the second terminal via streaming.

FIG. 5 is a diagram for describing a method of transmitting and receiving personal broadcasting data by using a URL of a personal broadcasting channel, according to an embodiment of the present invention.

In operation 501, a first terminal (broadcaster) registers a personal broadcasting channel in a tracker server. At this time, EPG information may also be registered.

In operation 502, the first terminal notifies a second terminal (client) about a URL of the personal broadcasting channel. Such a notification may be performed by using any one of various methods. For example, the notification may be performed by using a messenger program. Meanwhile, the URL may be a URL for connecting to the personal broadcasting channel or a URL for requesting a viewing reservation on a corresponding channel.

In operation 503, the second terminal requests a viewing reservation for viewing the
personal broadcasting channel of the first terminal at a predetermined time to the
tracker server by using the URL.

In operation 504, the first terminal receives a list of clients that made a viewing
reservation on the personal broadcasting channel from the tracker server. The list may
include the second terminal.

In operation 505, the first and second terminals synchronize the URL. As described
above, the synchronization may be performed periodically or whenever a change
occurs in the URL. Also, the synchronization may be performed via the tracker server
or directly between the first and second terminals.

Aside from the URL, the first terminal may register EPG information in the tracker
server, and the second terminal may read the EPG information from the tracker server
at any time. Accordingly, synchronization of the EPG information may be performed
independently from the synchronization of the URL.

In operation 506, when it is the time that the second terminal made the viewing
reservation, the first terminal notifies the second terminal about the starting of a
broadcast.

In operation 507, the first terminal transmits personal broadcasting data to the second
terminal via streaming.

FIG. 6 is a block diagram of a structure of a broadcaster 610 and a client 600,
according to an embodiment of the present invention.

As shown in FIG. 6, the client 600 includes a reservation processor 601, an EPG
processor 602, a synchronizer 603, a URL receiver 604, and a streaming unit 605.

When an external input making a viewing reservation to view a personal broadcast of
the broadcaster 610 at a certain time is received from a user, the reservation processor
601 generates information about the viewing reservation based on EPG information or
a URL of a personal broadcasting channel of the broadcaster 610, and transmits the
generated information to a tracker server 650 so as to request the viewing reservation
on the personal broadcasting channel.

The EPG processor 602 obtains timeline based EPG information about the personal
broadcasting channel from the tracker server 650, and displays the EPG information
via a user interface so that the user refers to be EPG information during the viewing
reservation.

The synchronizer 603 synchronizes the EPG information or the URL with the
broadcaster 610. Here, the synchronization may be performed periodically or whenever
there is a change in the EPG information or the URL. Also, the synchronization may
be performed indirectly via the tracker server 650 or directly between the broadcaster
610 and the client 600.

The URL receiver 604 receives the URL of the personal broadcasting channel from
the broadcaster 610.

When a message informing about the starting of a broadcast is received from the broadcaster 610, the streaming unit 605 receives personal broadcasting data of the broadcaster 610 via streaming.

Meanwhile, as shown in FIG. 6, the broadcaster 610 includes a notifying unit 611, a receiver 612, a URL transmitter 613, an EPG registering unit 614, and a synchronizer 615.

When it is a time of the viewing reservation, the notifying unit 611 notifies clients, which made a viewing reservation on the personal broadcasting channel of the broadcaster 610, about the starting of a broadcast.

The receiver 612 receives, from the tracker server 650, a list of the clients that made the viewing reservation.

The URL transmitter 613 transmits a URL of the personal broadcasting channel of the client 610 to the client 600.

The EPG registering unit 614 registers timeline based EPG information about the personal broadcasting channel of the broadcaster 610 in the tracker server 650.

The client 600 may make a viewing reservation by referring to the EPG information or the URL. Accordingly, any one of the URL transmitter 613 and the EPG registering unit 614 may not be included in the broadcaster 610.

The synchronizer 615 synchronizes the EPG information and/or the URL with the client 600.

FIG. 7 is a diagram of extensible markup language (XML) based EPG information according to an embodiment of the present invention.

As shown in FIG. 7, the EPG information including information about a P2P based personal broadcasting channel is realized by using XML. Accordingly, a client may determine a channel identifier (ID), a broadcasting program title, a program length, a broadcast starting time, etc. from the EPG information, and request a tracker server for a viewing reservation based on the EPG information.

FIG. 8 is a diagram of EPG information displayed via a user interface of a client, according to an embodiment of the present invention.

As shown in FIG. 8, a client device displays program information of each of personal broadcasting channels, such as KWON, LEE, ZHANG, RYU, and Mi-D, based on a timeline. Accordingly, a user may make a viewing reservation on a personal broadcasting channel by locating a cursor on a desired program and pressing a viewing reservation button. For example, when the user locates the cursor on Lost_S04_EP01 broadcast by Mi-D, and presses the viewing reservation button, the client device performs other operations without connecting to the personal broadcasting channel of Mi-D until Lost_S04_EP01 starts, and starts streaming when the starting of
Lost_S04_EP01 is notified from Mi-D.

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.
Claims

[Claim 1] A method of receiving a personal broadcast of a second terminal by using peer-to-peer (P2P) communication, wherein the method is performed by a first terminal, the method comprising: transmitting information about the reservation to a tracker server when an external input for making a reservation to view the personal broadcast is received; and starting streaming with the second terminal when the starting of the personal broadcast is notified from the second terminal that received the information from the tracker server.

[Claim 2] The method of claim 1, further comprising: receiving timeline based electronic program guide (EPG) information about a personal broadcasting channel of the second terminal from the tracker server; and displaying the EPG information via a user interface for a user to refer to the EPG information while making the reservation.

[Claim 3] The method of claim 1, further comprising receiving a uniform resource locator (URL) of a personal broadcasting channel of the second terminal, from the second terminal, wherein the information is generated based on the URL.

[Claim 4] The method of claim 2, wherein the EPG information is based on extensible markup language (XML).

[Claim 5] The method of claim 2, further comprising synchronizing the received EPG information with the second terminal.

[Claim 6] A computer readable recording medium having recorded thereon a program for executing the method of claim 1.

[Claim 7] A method of transmitting a personal broadcast by using P2P communication, wherein the method is performed by a terminal, the method comprising: receiving a list of at least one client who made a viewing reservation on a personal broadcasting channel of the terminal, from a tracker server; and notifying the at least one client about starting of the personal broadcast before streaming, when it is time for the viewing reservation.

[Claim 8] The method of claim 7, further comprising registering timeline based EPG information about the personal broadcasting channel of the terminal in the tracker server, wherein the viewing reservation by the at
least one client is performed by referring to the EPG information registered in the tracker server.

[Claim 9] The method of claim 7, further comprising transmitting a URL of the personal broadcasting channel to at least one client, wherein the viewing reservation by the at least one client is performed by referring to the URL.

[Claim 10] The method of claim 8, further comprising synchronizing the EPG information with at least one client.

[Claim 11] The method of claim 8, wherein the EPG information is based on XML.

[Claim 12] A computer readable recording medium having recorded thereon a program for executing the method of claim 7.

[Claim 13] An apparatus for enabling a first terminal to receive a personal broadcast by using P2P communication, the apparatus comprising: a reservation processor which, when an external input for making a reservation to view the personal broadcast is received, transmits information about the reservation to a tracker server; and a streaming unit which starts streaming with the second terminal when the starting of the personal broadcast is notified from the second terminal that received the information from the tracker server.

[Claim 14] The apparatus of claim 13, further comprising an EPG processor which receives timeline based EPG information about a personal broadcasting channel of the second terminal from the tracker server and displays the EPG information via a user interface so that a user refers to the EPG information while making the reservation.

[Claim 15] The apparatus of claim 13, further comprising a URL receiver which receives a URL of a personal broadcasting channel of the second terminal from the second terminal, wherein the reservation processor generates the information based on the URL.

[Claim 16] The apparatus of claim 14, wherein the EPG information is based on XML.

[Claim 17] The apparatus of claim 14, further comprising a synchronizer which synchronizes the EPG information with the second terminal.

[Claim 18] An apparatus for transmitting a personal broadcast by using P2P communication, the apparatus comprising: a receiver which receives a list of at least one client that made a viewing reservation of a personal broadcasting channel of a terminal from a tracker server; and
a notifying unit which notifies at least one client about starting of the personal broadcast before starting streaming, when it is time for the viewing reservation.

[Claim 19] The apparatus of claim 18, further comprising an EPG registering unit which registers timeline based EPG information about the personal broadcasting channel of the terminal in the tracker server, wherein the viewing reservation by the at least one client is performed by referring to the EPG information registered in the tracker server.

[Claim 20] The apparatus of claim 18, further comprising a URL transmitter which transmits a URL of the personal broadcasting channel of the terminal to the at least one client, wherein the viewing reservation by the at least one client is performed by referring to the URL.

[Claim 21] The apparatus of claim 19, further comprising a synchronizer which synchronizes the EPG information with the at least one client.

[Claim 22] The apparatus of claim 19, wherein the EPG information is based on XML.
[Fig. 1]

FIRST TERMINAL (BROADCASTER) → REGISTER PERSONAL BROADCASTING CHANNEL (101) → START BROADCAST (102) → OBTAIN LIST OF PERSONAL BROADCASTING CHANNELS (103) → SELECT CHANNEL (104) → SECOND TERMINAL (CLIENT) → STREAM PERSONAL BROADCASTING DATA (105)
START

- Register timeline based EPG information in tracker server (201)

- Receive list of clients that made viewing reservation from tracker server (202)

- Synchronize EPG information with client (203)

- Notify clients that made viewing reservation, when it is time to start personal broadcast (204)

- Start streaming personal broadcasting data (205)

END
[Fig. 3]

START

1. RECEIVE INFORMATION ABOUT PERSONAL BROADCASTING CHANNEL FROM BROADCASTER OR TRACKER SERVER

2. DISPLAY RECEIVED INFORMATION TO USER

3. RECEIVE VIEWING RESERVATION INPUT

4. TRANSMIT RESERVATION INFORMATION TO TRACKER SERVER

5. SYNCHRONIZE INFORMATION ABOUT PERSONAL BROADCASTING CHANNEL WITH BROADCASTER

6. RECEIVE MESSAGE INFORMING ABOUT STARTING OF BROADCAST FROM BROADCASTER

7. RECEIVE PERSONAL BROADCASTING DATA VIA STREAMING

END
[Fig. 4]

FIRST TERMINAL (BROADCASTER) — TRACKER SERVER — SECOND TERMINAL (CLIENT)

REGISTER CHANNEL (REGISTER EPG INFORMATION) (401)

- OBTAIN EPG INFORMATION (402)
- REQUEST VIEWING RESERVATION (403)

- OBTAIN LIST OF CLIENTS THAT MADE VIEWING RESERVATION (404)

- SYNCHRONIZE EPG INFORMATION (405)

- NOTIFY START OF BROADCAST (406)

- TRANSMIT BROADCASTING DATA VIA STREAMING (407)
[Fig. 5]

FIRST TERMINAL (BROADCASTER) -> TRACKER SERVER -> SECOND TERMINAL (CLIENT)

REGISTER CHANNEL (501)

NOTIFY URL OF PERSONAL BROADCASTING CHANNEL (502)

REQUEST VIEWING RESERVATION (503)

RECEIVE LIST OF CLIENTS THAT MADE VIEWING RESERVATION (504)

SYNCHRONIZE URL OF PERSONAL BROADCASTING CHANNEL (505)

NOTIFY START OF BROADCAST (506)

TRANSMIT BROADCASTING DATA VIA STREAMING (507)
<ChannelList>
  <channel id="131080">
    <title>Africa Tour</title>
    <genre>documentary</genre>
    <description>daily life record in Africa</description>
    <publisher>norton</publisher>
    <category>PremiumContents</category>
    <starttime>20080905160000</starttime>
    <programList count="2">
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