



Patent Application

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[Korean Title of the Invention (Design)] 멀티캐스트 스트리밍 서비스
방법 및 시스템

[English Title of the Invention (Design)] SERVICE METHOD AND
SYSTEM FOR MULTICAST STREAMING

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[Purpose]

I hereby apply as above in accordance with Article 42 of the
Patent Act.

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[Fees]

[(Basic) Application Fee] 20 pages 29,000 won

[Additional Fee] 1 page 1,000 won

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1. Summary/Specification (Drawings)_1 copy



[ABSTRACT OF THE DISCLOSURE]

[ABSTRACT]

The present invention relates to a multicast streaming service method and system, and in particular, an object of the present invention is to enable efficient control for multicast streaming on UPnP by defining actions such as MulticastStart(), Join(), and Leave() to enable multicast service in a UPnP AV standard. The present invention for this purpose is characterized by being configured to perform step (S101) in which a control point (110) calls a 'MulticastStart()' action to a media server (120) to request transmission of the specified content to a multicast address; step (S102) in which the media server (120) transmits the RTSP URL (RTSP server address) to be connected to receive the corresponding content to the control point (110) in response to the 'MulticastStart()' action; step (S103) in which the media server (120) transmits the corresponding content using RTP to the multicast address; step (S104) in which the control point (110) uses the 'Join()' action to inform the RTSP URL to a plurality of media renderers (131-136) that want to participate in the multicast group; and step (S105) in which the media renderers (131-136) that want to participate in the multicast group connect to the RTSP server of the media server (120) using the RTSP URL, obtain the properties of the media data to be transmitted and the multicast address, and then receive the multicast data using that information.

Representative Drawing

FIG. 1



[DESCRIPTION OF THE INVENTION]

[TITLE OF THE INVENTION]

SERVICE METHOD AND SYSTEM FOR MULTICAST STREAMING

[BRIEF DESCRIPTION OF THE DRAWINGS]

[0001] FIG. 1 is a signal flow diagram showing a multicast service process in an embodiment of the present invention.

[0002] FIG. 2 and 3 are operational sequence diagrams showing a multicast transmission and reception process in an embodiment of the present invention.

[0003] FIG. 4 to 6 are exemplary diagrams showing additional actions for a multicast service in an embodiment of the present invention.

[0004] <Description of Symbols>

[0005] 110: Control Point (CP) 120: Media Server (MS)

[0006] 131 to 136: MediaRenderer (MR)

[BACKGROUND OF THE INVENTION]

[Purpose of the Invention]

[Technical field to which the invention belongs and prior art in that field]

[0007] The present invention relates to home networking services, and more particularly, to a multicast streaming service method and system in UPnP™ technology.

[0008] When two or more devices in a home communicate with each other, it is called a home network.

[0009] With the proliferation of home networking, the traditional PC-centric network environment in households is gradually shifting to an environment where various sub-network technologies are used, leading to the need for a technology that can network these home appliances independently and in a unified manner using the IP protocol, which prompted the proposal of UPnP™ (hereinafter abbreviated as UPnP) technology by Microsoft (MS).

[0010] UPnP is a technology that expands Internet standard technologies such as TCP/IP, HTTP, and XML to the entire network, enabling network devices such as various home appliances, network



printers, and Internet gateways to network, especially home networking.

[0011] A UPnP network is basically composed of a number of UPnP devices, services, and control points (CP).

[0012] The above service refers to the smallest control unit on the network, and the service itself is modeled through state variables.

[0013] The above CP (Control Point) refers to a controller that has the function of detecting and controlling other devices.

[0014] Therefore, users can discover (discovery, description), control, and receive events (eventing) of various devices through the interface provided by the control point (CP).

[0015] The current UPnP AV architecture comprises a media server (MS) that provides media data to a home network, a media renderer (MR) that plays the media data through the home network, and an AV control point (CP) that controls the media server (MS) and media renderer (MR).

[0016] In the UPnP AV architecture with this configuration, the media server (MS) informs information about the content whenever a UPnP action occurs, and for the playback of the content, the media server (MS) and the media renderer (MR) transmit the content in a streaming manner.

[0017] At this time, any of the various streaming methods presented can be used, but currently UPnP AV uses the Out-of-Band transfer protocol for streaming.

[0018] For example, RTSP-RTP can be used for content transmission.

[0019] In the case of a program using RTSP-RTP, content is sent using RTP on top of UDP. At this time, in order to view the content sent by the media server (MS), each client must participate in and leave the RTSP session, and the RTSP server operates to manage this.

[0020] Therefore, the RTSP-RTP player can participate in the RTSP session by using the address provided by the RTSP server, and once it participates in the RTSP session, it can play the content being sent by the server by using RTP.

[Technical Problem to be achieved by the Invention]

[0021] However, the conventional UPnP AV standard operates on the concept that one content sent from a media server is played by



one media renderer.

[0022] However, when a media server receives a TV signal and sends it to a media renderer, there may be cases where multiple displays want to watch the same channel at the same time.

[0023] Additionally, suppose there is a surveillance camera in the house, and the images captured by that camera are stored on the server in real time. In this case, it can also be issued when the members of the house want to simultaneously see what is happening in front of the house.

[0024] Additionally, if a person watching TV in the living room moves to another space, the TV content can be sent via multicast, allowing the media renderer in the new space to join the multicast group and continue watching the previously viewed program without interruption.

[0025] To efficiently implement the above scenarios, UPnP AV devices must be able to send content via multicast and join and leave multicast groups.

[0026] However, the conventional UPnP AV standard only considers the situation where media data is transmitted by establishing a single connection between a media server and a media renderer, and therefore cannot provide efficient control when transmitting and receiving content via multicast.

[0027] That is, since the conventional UPnP AV standard does not take into account the multicast model, it is difficult to implement a multicast streaming service.

[0028] Accordingly, the present invention aims to provide a multicast streaming service method and system that enables efficient control for multicast streaming on UPnP by defining actions such as MulticastStart(), Join(), and Leave() to improve the UPnP AV standard to enable multicast service.

[Configuration of the Invention]

[0029] The present invention, in order to achieve the above object, is characterized in that the method for controlling a UPnP AV network for performing streaming transmission for media playback comprises a media server (MS), a plurality of media renderers (MR), and a control point (CP) for controlling the servers and renderers, the method comprising: checking, by the control point, content and calling the Start Multicast Streaming action to the media server;
informing, by the media server, the control point of the multicast group address to receive the corresponding content;



informing, by the control point, the plurality of media renderers of the multicast group address; and
confirming, by the plurality of media renderers, the multicast address by joining the multicast group address and receiving the content.

[0030] The method is characterized in that the control point above includes initiating by the media server multicast streaming of the content before and after informing a plurality of media renderers of the multicast group address.

[0031] Furthermore, to achieve the above objective, the present invention provides a UPnP AV network control method for performing streaming transmission for media playback, comprising a media server (MS), wherein, upon recognizing a multicast start action, the method is configured to inform the multicast group address and multicast stream the corresponding content to the multicast address using an RTSP server.

[0032] And, in order to achieve the above objective, the present invention provides a UPnP AV network control method for performing media playback by having a plurality of media renderers (MR), characterized in that it comprises checking whether content is multicast; receiving a multicast group address if it is confirmed that multicast exists; joining the multicast group address, then confirming the multicast group address and receiving the corresponding multicast content.

[0033] Meanwhile, to achieve the above objective, the present invention is characterized by comprising: a media server (MS) that provides a multicast group address and multicasts the corresponding content to the multicast address using an RTSP server; a plurality of media renderers (MR) that join the RTSP server, confirm the multicast address, and play back the content transmitted to the multicast address; and a control point (CP) that checks the content to be multicasted, calls a multicast start action to the media server, and informs the multicast group address provided by the media server to the plurality of media renderers.

[0034] The media server is characterized by being configured to either start the multicast of the corresponding content after transmitting the multicast group address to the control point or to transmit the multicast group address to the control point and start the multicast of the corresponding content after a predetermined period of time has elapsed.

[0035] In the above, the multicast group address is characterized



as being the address of the RTSP server.

[0036] In the above, the multicast address is characterized as being a fixed multicast address for content multicasting or a dynamic multicast address by a media server.

[0037] Hereinafter, the present invention will be described in detail with reference to the drawings as follows.

[0038] In an embodiment of the present invention, UPnP actions necessary for transmitting and receiving multicast data on UPnP are defined, and a process for performing multicast transmission and reception using the actions is described.

[0039] In the multicast model of the IP for the embodiment of the present invention, a media server (MS) transmits data to a specific multicast address, and a client that wants to receive the data, that is, the media renderer (MR), subscribes to the multicast address.

[0040] In order to apply the multicast model to UPnP, UPnP actions such as MulticastStart(), Join(), and Leave() are introduced as shown in FIGS. 4 to 6.

[0041] FIG. 1 is a signal flow diagram of a system for an embodiment of the present invention. As shown in FIG. 1, it is configured to perform a control point (110) calls a 'MulticastStart()' action to a media server (120) to request transmission of the specified content to a multicast address; step (S102) in which the media server (120) transmits the RTSP URL (RTSP server address) to be connected to receive the corresponding content to the control point (110) in response to the 'MulticastStart()' action; step (S103) in which the media server (120) transmits the corresponding content using RTP to the multicast address; a step (S104) in which the control point (110) uses the 'Join()' action to inform the RTSP URL to a plurality of media renderers (131-136) that want to participate in the multicast group; and step (S105) in which the media renderers (131-136) that want to participate in the multicast group connect to the RTSP server of the media server (120) using the RTSP URL, obtain the properties of the media data to be transmitted and the multicast address, and then receive the multicast data using that information.

[0042] The above RTSP URL is characterized by being expressed in the format rtsp://ipaddress/path.

[0043] In addition, the control point (110) described above is configured to include calling the 'Leave()' action of a media



renderer (131 to 136) to stop receiving data from a media renderer that has participated in a multicast group.

[0044] In an embodiment of the present invention configured in this manner, the process for playing content in a media renderer using multicast is as shown in the operation flowchart of Fig. 2, and is described as follows.

[0045] First, the control point (110) selects any content through the 'Browse()' action and checks whether the media renderer (131-136) can play the content through the 'GetProtocolInfo()' action.

[0046] Accordingly, the control point (110) calls the 'MulticastStart()' action when the media server (120) provides multicast functionality and is capable of pushing the content. At this time, as shown in the example diagram of Figure 4, the 'MulticastStart()' action includes the ObjectID in the input parameter, and the output parameter contains the RTSP URL provided by the media server (120) that can be used to join the multicast group.

[0047] Subsequently, the media server (120) transmits the RTSP URL, which is used to connect for receiving the corresponding content, to the control point (110) as a response to the 'MulticastStart()' action. The RTSP URL is in the form of rtsp://ipaddress/path.

[0048] Subsequently, the media server (120) begins transmitting the content to the multicast address using RTP.

[0049] At this time, the control point (110) informs the plurality of media renderers (131~136), which intend to play back the content, of the RTSP URL provided by the media server (120) through the 'SetAVTransportURI' action.

[0050] Accordingly, among the media renderers (131~136), any media renderer that intends to join the multicast group will, upon receiving the 'Join()' action from the control point (110), directly request the creation of a session with the RTSP server residing in the media server (120).

[0051] Therefore, the media renderers that have joined the multicast group play the content being sent by the media server (120), allowing the user to view the corresponding content.

[0052] Subsequently, to leave the multicast group, the corresponding media renderer utilizes the 'Leave()' action received from the control point (110).

[0053] If you want to see the existing content again after the



content ends, you may have to leave the multicast group and then participate again.

[0054] This is a general case, and a play function may be used again when the content is finished. In other words, when the same content is reproduced again according to the manufacturer, the session of the media renderer previously joined to the multicast group may be maintained as it is.

[0055] On the other hand, in the embodiment of the present invention, it may be implemented to execute a process such as the operation flowchart of FIG. 3 so as to delay content multicast and adjust the multicast content in the media renderer to the multicast time of the media server.

[0056] In the case of transmitting and receiving multicast data in the process of FIG. 2 presented in the embodiment of the present invention, since there is a gap between when the media server 120 starts transmitting data and when the media renderer participating in the multicast group among the media renderers 131 to 136 starts receiving data, the media renderer may not be able to reproduce the first part of the currently transmitted content.

[0057] Therefore, to solve the above problem, the media server 120 is configured to start streaming when the media renderer connects through the RTSP server for the first time without starting content transmission immediately when the 'MulticastStart()' action is called.

[0058] That is, to briefly describe the operation process of FIG. 3 in FIG. 1, the control point 110 is configured to preferentially execute a process of informing the media renderers 131 to 136 of the RTSP URL to be multicast before the media server 120 starts multicasting the content.

[0059] Thus, a media renderer that participates in a multicast group among the media renderers 131-136 can play back the first portion of the content transmitted from the media server 120 without missing it.

[Effect of the Invention]

[0060] As described in detail above, the present invention uses multicast to allow a plurality of media renderers (MR) to simultaneously view the same content provided by a media server (MS), enabling multiple media renderers to receive media data through a single streaming connection, thereby reducing network load.



[CLAIMS]

[Claim 1]

A multicast streaming service method, characterized in that, in a UPnP AV network control method for performing streaming transmission for media playback, comprising a media server (MS), a plurality of media renderers (MR), and a control point (CP) for controlling the servers and renderers, comprising:

checking, by the control point, content and instructing the media server to initiate multicast streaming;

informing, by the media server, the control point of the multicast group address to receive the corresponding content;

informing, by the control point, the plurality of media renderers of the multicast group address; and

confirming, by the plurality of media renderers, the multicast address by joining the multicast group address and receiving the content.

[Claim 2]

The multicast streaming service method of claim 1, characterized in that the method comprises starting, by the media server, multicast streaming of content before the control point notifies a multicast group address to a plurality of media renderers.

[Claim 3]

The multicast streaming service method of claim 1, characterized in that the control point comprises checking, by the plurality of media renderers, a multicast group address from the control point, waiting for a predetermined time after the media server informs the multicast group address to the control point to receive the content, and starting multicast streaming of the content.

[Claim 4]

The multicast streaming service method of claims 1 to 3, characterized in that the multicast group address is an RTSP URL,





and the RTSP URL is in the form of rtsp://ipaddress/path.

[Claim 5]

The multicast streaming service method of claim 1, characterized in that it comprises terminating multicast content reception upon recognizing a 'Leave()' action call.

[Claim 6]

The multicast streaming service method, characterized in that, in a UPnP AV network that performs streaming transmission for media playback by having a media server (MS), comprising:

informing the multicast group address and multicast streaming the corresponding content to the multicast address using an RTSP server upon recognizing a multicast start action.

[Claim 7]

The multicast streaming service method, characterized in that, in a UPnP AV network that performs media playback by having a plurality of media renderers (MR), comprising:

checking whether or not the content is multicast;

receiving a multicast group address upon confirming that there is a multicast; and

joining the multicast group address to confirm the multicast address and receive the corresponding multicast content.

[Claim 8]

A multicast streaming service system, characterized in that, in a UPnP AV network system that performs streaming transmission for media playback, comprising:

a media server (MS) that, upon recognizing a multicast start action, provides a multicast group address and multicasts the corresponding content to the multicast address using an RTSP server;

a plurality of media renderers (MR) that join the RTSP server,



confirm the multicast address, and play back the content transmitted to the multicast address; and

a control point (CP) that checks the content to be multicast, calls a multicast start action to the media server, and informs the multicast group address provided by the media server to the plurality of media renderers.

[Claim 9]

The multicast streaming service system of claim 8, characterized in that the media server is configured to start multicast of the corresponding content immediately after transmitting a multicast group address to the control point.

[Claim 10]

The multicast streaming service system of claim 8, characterized in that the media server transmits a multicast group address to a control point and is configured to start multicasting of the corresponding content after a certain period of time has elapsed.

[Claim 11]

The multicast streaming service method of claims 8 to 10, characterized in that the multicast group address is an RTSP URL, and the RTSP URL is configured in the form of rtsp://ipaddress/path.

[Claim 12]

The multicast streaming service system, characterized in that, in a UPnP AV network system that performs streaming transmission for media playback, a multicast start action is recognized, a media server is provided that announces a multicast group address and multicast-streams the corresponding content to the multicast address using an RTSP server.

[Claim 13]

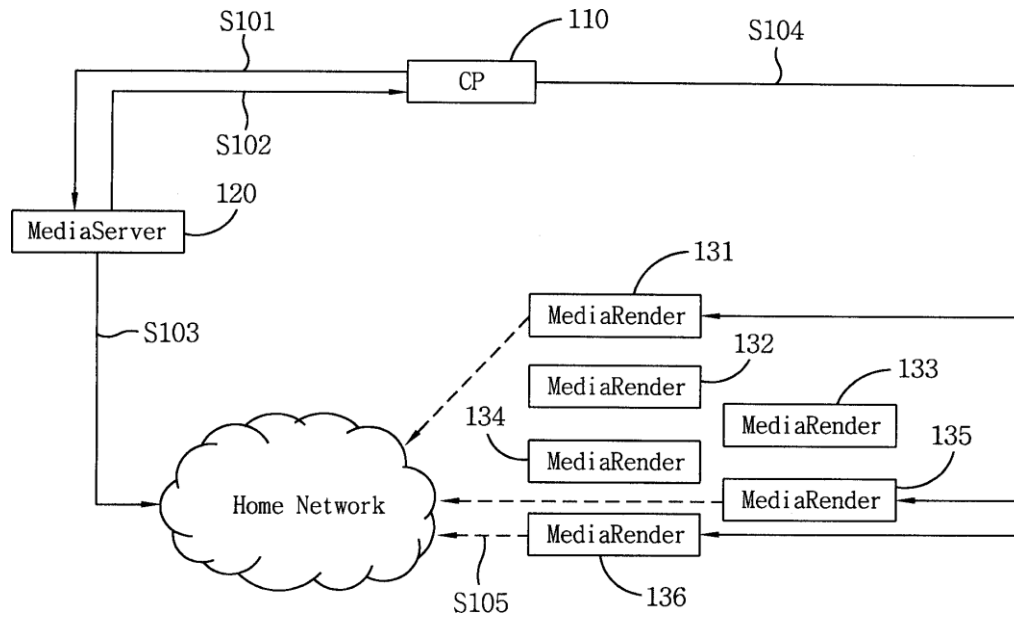


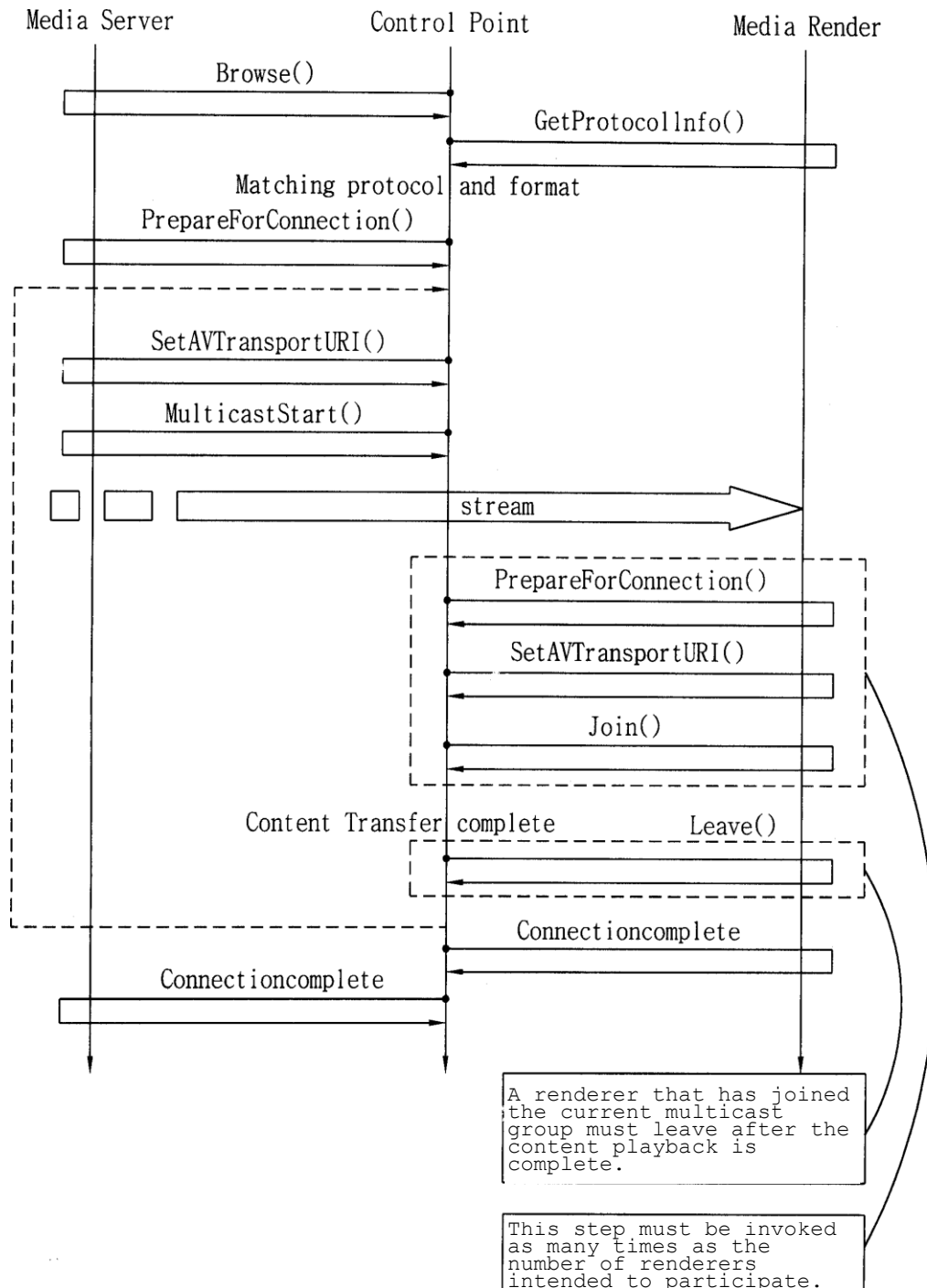
The multicast streaming service system,

characterized in that, in a UPnP AV network system that performs media playback, when multicast of content is confirmed, a multicast group address is received, a plurality of media renderers are provided to join the address, and a multicast address of the content is confirmed to receive the content.

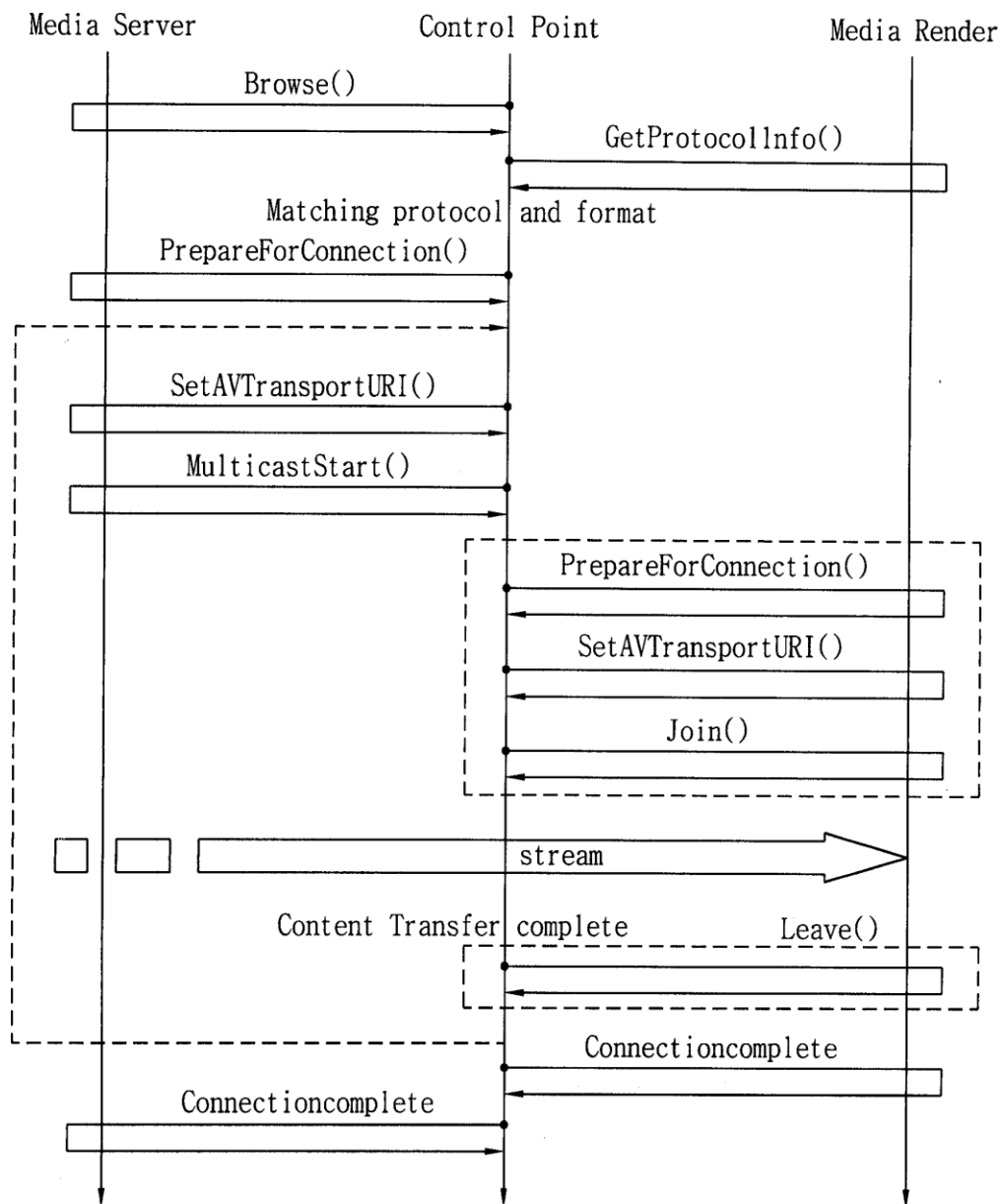
[Claim 14]

The multicast streaming service system of claim 13, wherein the plurality of media renderers are configured to terminate the reception of multicast content upon recognizing a 'Leave()' action call.

【Drawings】**【FIG 1】**

[FIG 2]


【FIG 3】



[FIG 4]

a)

Argument	Direction	relatedStateVariable
InstanceID	IN	A ARG TYPE InstanceID
ServerRTSPURL	OUT	RTSPURL

b)

Variable Name	Req.or Opt. ¹	Data Type	Allowed Value	Default Value	Eng. Units
RTSPURL	0	string			

[FIG 5]

Argument	Direction	relatedStateVariable
MulticastGroupJoinAddress	IN	RTSPURL

[FIG 6]

Argument	Direction	relatedStateVariable
MulticastGroupLeaveAddress	IN	RTSPURL

TRANSLATION CERTIFICATION

Date: 2025/07/18

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Samuel Wu, Managing Director of this company, attests to the following under penalty of perjury:

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Signature of **Samuel Wu**, Managing Director



TRANSLATOR CERTIFICATION

Date: July 19, 2025

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