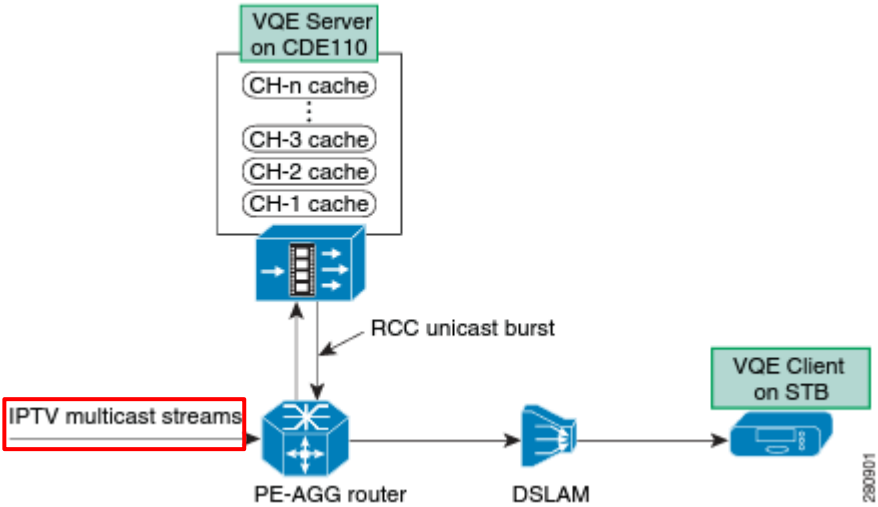
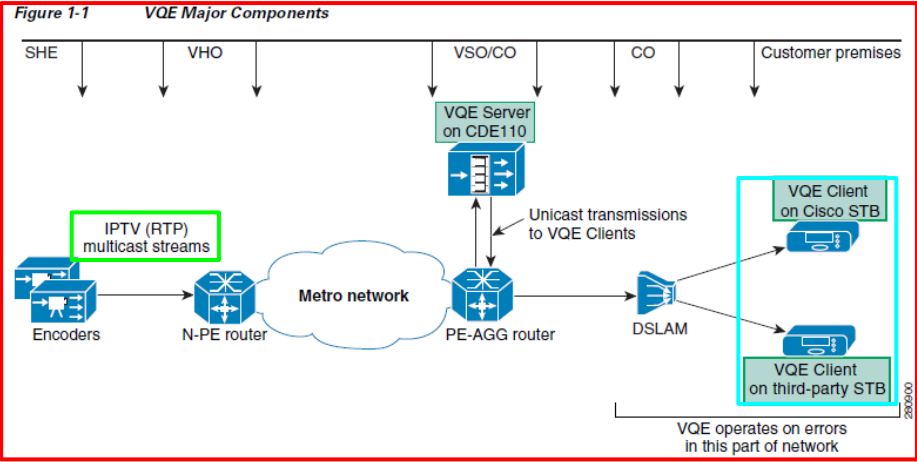
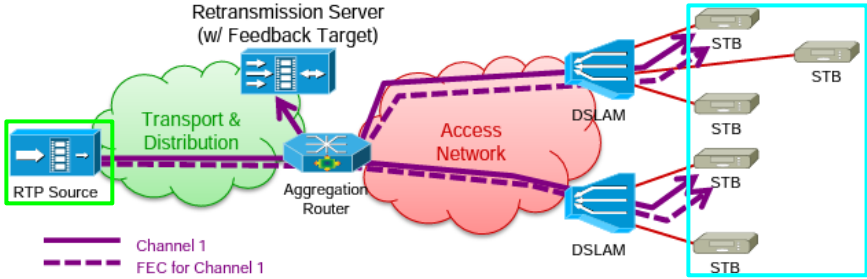
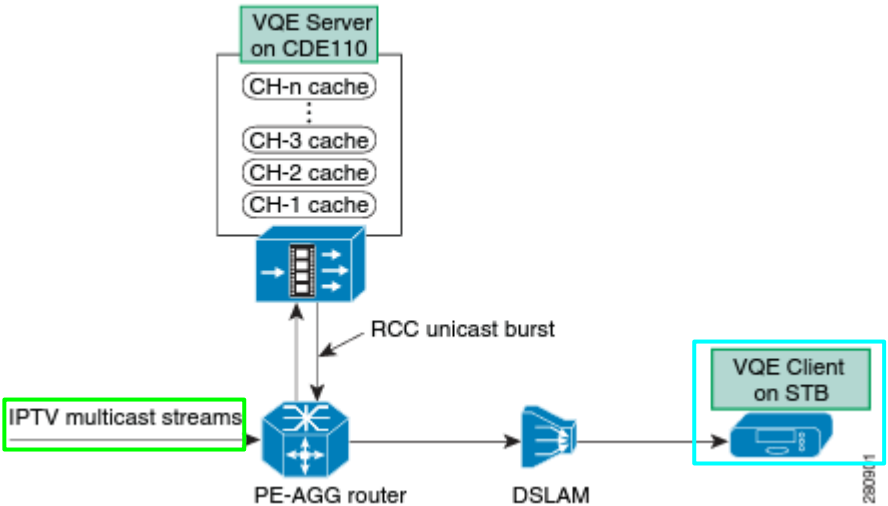


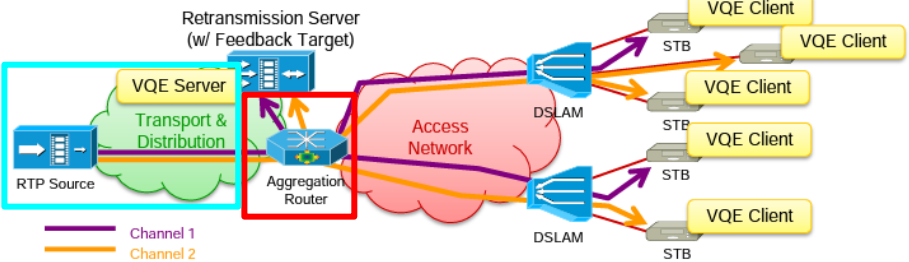
Infringement Claim Chart for U.S. Patent No. 7,885,286

U.S. Patent No. 7,885,286	Earliest Priority Date	Infringement Contentions
1. An application framework connectable to an IP network, the application framework comprises	Dec. 23, 2005	The preamble is not a limitation. <i>Storage Tech. Corp. v. Cisco Sys., Inc.</i>, 329 F.3d 823, 831 (Fed. Cir. 2003) (preamble does not limit claim). The Cisco CDA video quality experience (VQE) application system provides for an application framework connectable to an IP network. Cisco CDA Visual Quality Experience (VQE) Application offers service providers a set of technologies and products associated with the delivery of Internet Protocol television (IPTV) video services. VQE is designed to improve the quality of IPTV services and viewing experiences of the subscriber. VQE is part of a Cisco end-to-end solution that builds video awareness into the network infrastructure. For Cisco VQE Release 3.5, VQE technology is intended for wireline operators who offer managed broadcast (multicast) IPTV services using xDSL. Figure 1-1 VQE Major Components <pre> graph TD SHE --> VQE_SHE[VQE Server on CDE110] VHO --> VQE_SHE VSO_CO[VSO/CO] --> VQE_SHE CO --> VQE_SHE Customer_premises[Customer premises] --> VQE_SHE VQE_SHE -- "Unicast transmissions to VQE Clients" --> VQE_Client1[VQE Client on Cisco STB] VQE_SHE -- "Unicast transmissions to VQE Clients" --> VQE_Client2[VQE Client on third-party STB] Encoders[Encoders] -- "IPTV (RTP) multicast streams" --> N_PE_router[N-PE router] N_PE_router --> Metro_network[Metro network] Metro_network --> PE_AGG_router[PE-AGG router] PE_AGG_router --> DSLAM[DSLAM] DSLAM --> VQE_Client1 DSLAM --> VQE_Client2 </pre> The diagram illustrates the VQE major components and their interactions. At the top, a horizontal line represents the network backbone, with arrows pointing down to various components: SHE, VHO, VSO/CO, CO, and Customer premises. These components are connected to a central VQE Server on CDE110. The VQE Server is connected to a PE-AGG router, which in turn is connected to a DSLAM. The DSLAM is connected to two VQE Clients: one on a Cisco STB and one on a third-party STB. The VQE Server also sends unicast transmissions to these VQE Clients. On the left, Encoders send IPTV (RTP) multicast streams to an N-PE router, which connects to a Metro network. The Metro network connects to the PE-AGG router. A red box highlights the Encoders and N-PE router. A green box highlights the VQE Server, PE-AGG router, and DSLAM. A note at the bottom right states: 'VQE operates on errors in this part of network'. Source: https://www.cisco.com/c/en/us/td/docs/video/cds/cda/vqe/3_5/user/guide/vqe_guide3_5.pdf

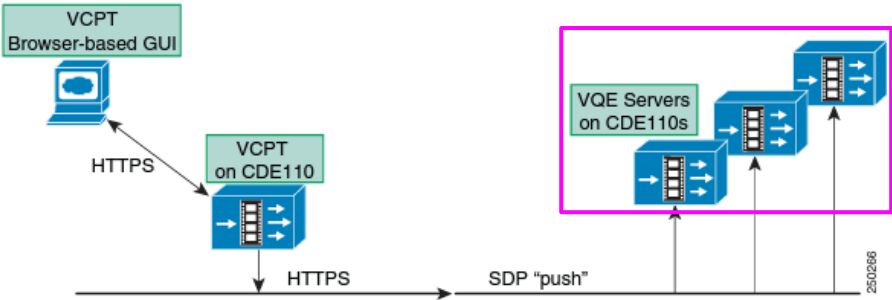
U.S. Patent No. 7,885,286	Earliest Priority Date	Infringement Contentions
		Figure 1-4 VQE Server Caches Multicast IPTV Packets for RCC  Source: https://www.cisco.com/c/en/us/td/docs/video/cds/cda/vqe/3_5/user/guide/vqe_guide3_5.pdf
[1A] means for receiving a request for media distribution requiring a multicast distribution from a client in said IP network,	Dec. 23, 2005	The Cisco CDA VQE application system provides for receiving a request for a media distribution requiring a multicast distribution form a client in the IP network. Rapid Channel Change (RCC)—When the subscriber requests a channel change, the VQE-C on the STB sends the VQE-S a request for the IPTV packets of the new channel. The VQE-S sends the VQE-C an optimized unicast burst of IPTV packets and other channel information for the new channel from the cached video data of the VQE-S. This greatly reduces the time needed to display the new channel. For RCC, when a subscriber selects a new channel, the VQE-C sends to the VQE-S a special RTCP packet requesting a unicast burst of the IPTV packets for the new channel. As soon as the unicast IPTV packets arrive, the VQE-C software is responsible for sending the packets to the decoder. When the multicast IPTV packets for the new channel begin to arrive, the VQE-C manages the seamless transition between unicast packets from the VQE-S and multicast packets from the headend encoder.

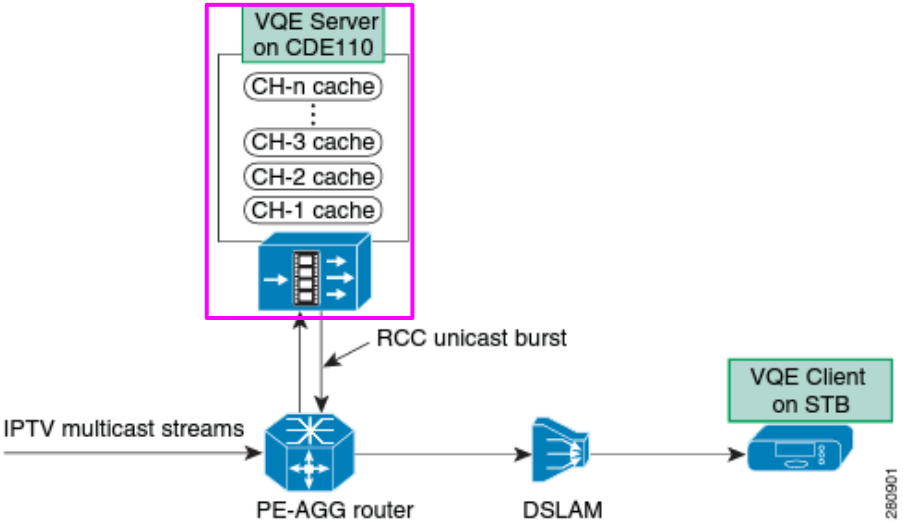
U.S. Patent No. 7,885,286	Earliest Priority Date	Infringement Contentions
		Source: https://www.cisco.com/c/en/us/td/docs/video/cds/cda/vqe/3_5/user/guide/vqe_guide3_5.pdf Figure 1-1 VQE Major Components  Source: https://www.cisco.com/c/en/us/td/docs/video/cds/cda/vqe/3_5/user/guide/vqe_guide3_5.pdf  - Each TV channel may be associated with one or more FEC streams - FEC streams may have different repair capabilities - IP STBs may join the respective multicast sessions to receive FEC stream(s)

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		Source: https://www.cisco.com/c/dam/global/en_ca/assets/plus/assets/pdf/IPTV-Internet-Video-ABEGEN.pdf Figure 1-4 VQE Server Caches Multicast IPTV Packets for RCC  After a short period of time, multicast packets for the new channel start to arrive at the STB. The VQE-C monitors RTP sequence numbers from both unicast and multicast streams. It is likely that the VQE-C sees a few packets with duplicate RTP sequence numbers before the unicast stream ends. During this period, the VQE-C only forwards one copy of the RTP packet to the MPEG demultiplexing stage. Source: https://www.cisco.com/c/en/us/td/docs/video/cds/cda/vqe/3_5/user/guide/vqe_guide3_5.pdf
[1B] means for requesting network resources from a network resource manager for a Media	Dec. 23, 2005	The Cisco CDA VQE application system provides for requesting network resources from a network resource manager for a Media Quick Start, to start the requested media distribution.

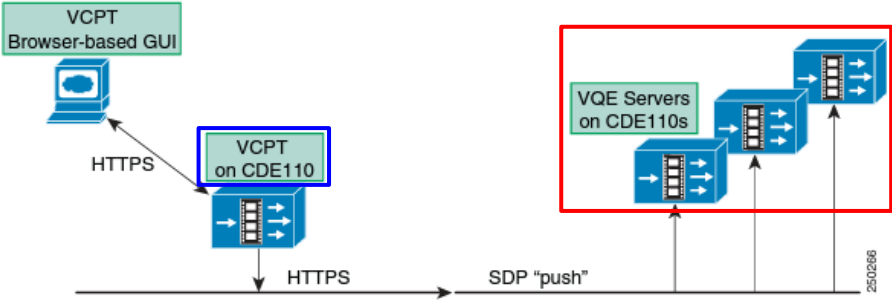
U.S. Patent No. 7,885,286	Earliest Priority Date	Infringement Contentions
Quick Start, to start the multicast distribution,		 The diagram illustrates a network architecture for VQE distribution. It starts with an RTP Source connected to a VQE Server, which is part of a Transport & Distribution block. This block is connected to a Retransmission Server (w/ Feedback Target) and an Aggregation Router. The Aggregation Router is connected to an Access Network, which then connects to DSLAMs. The DSLAMs are connected to STBs (Set-Top Boxes), which are in turn connected to VQE Clients. Two channels, Channel 1 (purple) and Channel 2 (orange), are shown being distributed through the network. ▪ Each TV channel is served in a unique (SSM) multicast session - IP STBs join the respective multicast session for the desired TV channel - Retransmission servers join all multicast sessions ▪ Unicast feedback from IP STBs are collected by the feedback target - NACK messages reporting missing packets, rapid channel change requests - RTCP receiver and extended reports reporting reception quality Source: https://www.cisco.com/c/dam/global/en_ca/assets/plus/assets/pdf/IPTV-Internet-Video-ABEGEN.pdf The VCPT sends or <i>pushes</i> the channel information to all VQE-Ss that are defined in the current VCPT configuration file. The channel information is sent to the VQE-Ss over secure HTTPS. The VCPT contains a secure HTTPS client, and each VQE-S has an embedded web server running. Each VQE-S stores its own local copy of the channel information. Figure 1-6 shows the interactions between the VCPT and the VQE-Ss. For information on the VQE-Ss, see the “VQE-S” section on page 9. • VCPT is an optional channel-provisioning utility to aid with the channel lineup configuration required by both the VQE-S and the VQE-C. The channel information is in Session Description Protocol (SDP) format. The VCPT sends the channel information to the VQE-Ss and VCDSSs. The VCDSS servers provide the channel lineup or network configuration to the VQE-Cs on the STBs. VQE relies on RTP and RTCP. RTP is used to carry video packets over multicast streams from the video headend to the VQE-Cs on the STBs. It is also used to transport specific video packets between the VQE-S and a VQE-C. RTCP is a signaling protocol used between VQE devices. RTP is the transport baseline for application-layer FEC, Unicast Retransmission, and RCC.

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		Rapid Channel Change (RCC)—When the subscriber requests a channel change, the VQE-C on the STB sends the VQE-S a request for the IPTV packets of the new channel. The VQE-S sends the VQE-C an optimized unicast burst of IPTV packets and other channel information for the new channel from the cached video data of the VQE-S. This greatly reduces the time needed to display the new channel. For RCC, when a subscriber selects a new channel, the VQE-C sends to the VQE-S a special RTCP packet requesting a unicast burst of the IPTV packets for the new channel. As soon as the unicast IPTV packets arrive, the VQE-C software is responsible for sending the packets to the decoder. When the multicast IPTV packets for the new channel begin to arrive, the VQE-C manages the seamless transition between unicast packets from the VQE-S and multicast packets from the headend encoder. Source: https://www.cisco.com/c/en/us/td/docs/video/cds/cda/vqe/3_5/user/guide/vqe_guide3_5.pdf
[1C] means for receiving feedback information relating to network resource availability from the network resource manager, and	Dec. 23, 2005	The Cisco CDA VQE application system provides for receiving feedback information relating to network resource availability from the network resource manager. The VCPT is responsible for the creation, maintenance, and distribution of the channel information containing channel-lineup data. The VCPT includes a browser-based GUI that allows the service provider to provision the following: • Channel definitions—Information on the channels that is serviced by VQE • Server definitions—Information on each VQE-S, VCDS, and Remote Server that receives the channel information • Channel lineups—Associations between channels, the VQE-Ss, and the VCDSs When the user completes channel, server, and channel-lineup configuration and starts the VCPT send operation, the VCPT sends the channel information in Session Description Protocol (SDP) format to the set of VQE-Ss, to the VCDS, or to a Remote Server. The VCPT sends or <i>pushes</i> the channel information to all VQE-Ss that are defined in the current VCPT configuration file. The channel information is sent to the VQE-Ss over secure HTTPS. The VCPT contains a secure HTTPS client, and each VQE-S has an embedded web server running. Each VQE-S stores its own local copy of the channel information. Figure 1-6 shows the interactions between the VCPT and the VQE-Ss. For information on the VQE-Ss, see the “VQE-S” section on page 9.

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		Like a regular IP host, the VQE-S joins multicast groups using Internet Group Management Protocol (IGMP). The VQE-S maintains a dedicated buffer for each channel. The VQE-S receives the multicast stream for each channel from upstream, caching a few seconds of the most recently received program content from each. The VQE-S can use the same cache of video to service both Unicast Retransmission requests and RCC requests. Figure 1-6 VCPT: Sending Channel Information to VQE Servers  The VQE-S software is hosted on a Cisco CDE110 appliance running a standard Linux operating system. The Cisco CDE110 comes with the required software preinstalled: VQE-S, VQE-S AMT, Linux, Apache web server, and other software. The VQE-S is responsible for the following functions: • Creating a channel configuration database using the channel configuration information sent by the VCPT • Maintaining per-channel and per-component state information • Handling Unicast Retransmission by caching RTP data streams for channels and sending repair packets to the requesting VQE-Cs on the STBs • Handling RCC by caching RTP data streams as well as PAT, PMT, ECM, PCR, and sequence information and sending RCC unicast bursts to requesting VQE-Cs when a channel change occurs • Load balancing VQE-S services across the Cisco CDE110 Ethernet or bond interfaces • Providing detailed statistics on IPTV delivery down to the STB VQE-C level • Monitoring the health of VQE-S application processes

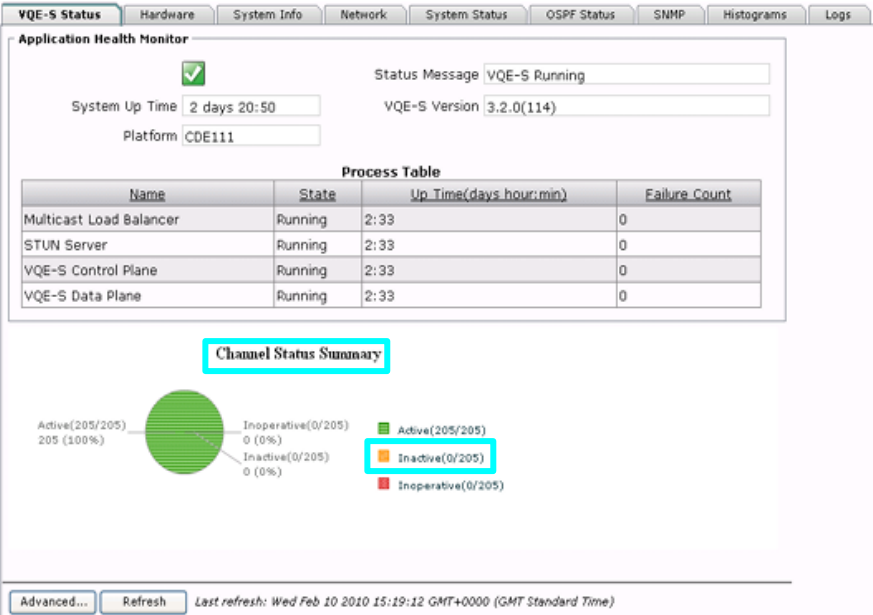
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		 The diagram illustrates a network architecture for Video-on-Demand (VOD) service. At the top, a 'VQE Server on CDE110' is shown, which includes a stack of caches: 'CH-n cache', 'CH-3 cache', 'CH-2 cache', and 'CH-1 cache'. Below these caches is a blue box representing the server's interface. This server is connected to a 'PE-AGG router' (represented by a blue cube with a star) via a bidirectional arrow labeled 'RCC unicast burst'. The router receives 'IPTV multicast streams' (indicated by an arrow from the left) and forwards them to a 'DSLAM' (represented by a blue trapezoid). The DSLAM then connects to a 'VQE Client on STB' (represented by a blue box with a screen). The entire system is labeled with the number '280901' at the bottom right. Source: https://www.cisco.com/c/en/us/td/docs/video/cds/cda/vqe/3_5/user/guide/vqe_guide3_5.pdf VQE also provides three web browser-based tools: VQE Channel Provisioning Tool (VCPT), VQE-S Application Monitoring Tool (AMT), and VQE Client Configuration Delivery Server (VCDS) AMT. • VCPT is an optional channel-provisioning utility to aid with the channel lineup configuration required by both the VQE-S and the VQE-C. The channel information is in Session Description Protocol (SDP) format. The VCPT sends the channel information to the VQE-Ss and VCDSs. The VCDS servers provide the channel lineup or network configuration to the VQE-Cs on the STBs. • VQE-S AMT is a browser-based GUI that displays configuration, status, and statistics on the VQE-S processes, the channel lineup, Unicast Retransmission, RCC, Ethernet interfaces, and VQE-S RTCP Exporter. The VQE-S AMT also allows you to configure debugging and logging facilities. • VCDS AMT is a browser-based GUI that displays configuration, status, and statistics on the VCDS and VQE Tools server. The VCDS AMT also allows you to configure debugging and logging facilities. Source: https://www.cisco.com/c/en/us/td/docs/video/cds/cda/vqe/3_5/user/guide/vqe_guide3_5.pdf

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[1D] means for allowing the Media Quick start or to use another behavior to start the media distribution based on the received feedback information,	Dec. 23, 2005	The Cisco CDA VQE application system provides for allowing the Media Quick Start or using another behavior to start the requested media distribution based on the received feedback information wherein the another behavior is to use the feedback information provided by the network resource manager to signal to the client that a Media Quick Start unicast stream for the requested media distribution is not available due to resource shortage in the IP network but the client is still allowed to subscribe to the multicast distribution. VQE also provides three web browser-based tools: VQE Channel Provisioning Tool (VCPT), VQE-S Application Monitoring Tool (AMT), and VQE Client Configuration Delivery Server (VCDS) AMT. • VCPT is an optional channel-provisioning utility to aid with the channel lineup configuration required by both the VQE-S and the VQE-C. The channel information is in Session Description Protocol (SDP) format. The VCPT sends the channel information to the VQE-Ss and VCDSs. The VCDS servers provide the channel lineup or network configuration to the VQE-Cs on the STBs. The VCPT is responsible for the creation, maintenance, and distribution of the channel information containing channel-lineup data. The VCPT includes a browser-based GUI that allows the service provider to provision the following: • Channel definitions—Information on the channels that is serviced by VQE • Server definitions—Information on each VQE-S, VCDS, and Remote Server that receives the channel information • Channel lineups—Associations between channels, the VQE-Ss, and the VCDSs When the user completes channel, server, and channel-lineup configuration and starts the VCPT send operation, the VCPT sends the channel information in Session Description Protocol (SDP) format to the set of VQE-Ss, to the VCDS, or to a Remote Server. The VCPT sends or <i>pushes</i> the channel information to all VQE-Ss that are defined in the current VCPT configuration file. The channel information is sent to the VQE-Ss over secure HTTPS. The VCPT contains a secure HTTPS client, and each VQE-S has an embedded web server running. Each VQE-S stores its own local copy of the channel information. Figure 1-6 shows the interactions between the VCPT and the VQE-Ss. For information on the VQE-Ss, see the “VQE-S” section on page 9.

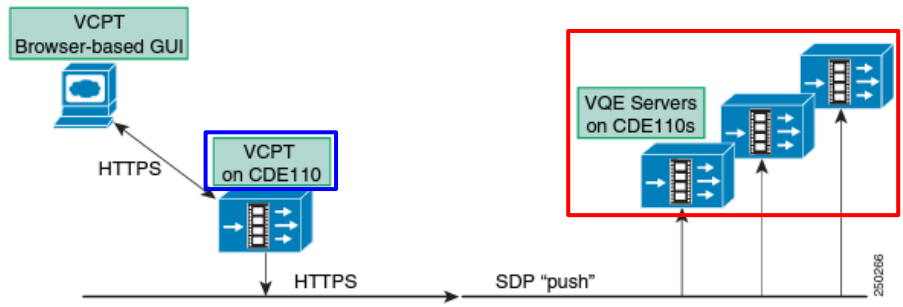
U.S. Patent No. 7,885,286	Earliest Priority Date	Infringement Contentions
		Figure 1-6 VCPT: Sending Channel Information to VQE Servers  The VQE-S software is hosted on a Cisco CDE110 appliance running a standard Linux operating system. The Cisco CDE110 comes with the required software preinstalled: VQE-S, VQE-S AMT, Linux, Apache web server, and other software. The VQE-S is responsible for the following functions: • Creating a channel configuration database using the channel configuration information sent by the VCPT • Maintaining per-channel and per-component state information • Handling Unicast Retransmission by caching RTP data streams for channels and sending repair packets to the requesting VQE-Cs on the STBs • Handling RCC by caching RTP data streams as well as PAT, PMT, ECM, PCR, and sequence information and sending RCC unicast bursts to requesting VQE-Cs when a channel change occurs • Load balancing VQE-S services across the Cisco CDE110 Ethernet or bond interfaces • Providing detailed statistics on IPTV delivery down to the STB VQE-C level • Monitoring the health of VQE-S application processes

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		Retransmission Server (w/ Feedback Target) Transport & Distribution RTP Source Aggregation Router Access Network DSLAM STB Channel 1 FEC for Channel 1 - Each TV channel may be associated with one or more FEC streams - FEC streams may have different repair capabilities - IP STBs may join the respective multicast sessions to receive FEC stream(s) Source: https://www.cisco.com/c/dam/global/en_ca/assets/plus/assets/pdf/IPTV-Internet-Video-ABEGEN.pdf Figure 1-4 VQE Server Caches Multicast IPTV Packets for RCC VQE Server on CDE110 CH-n cache CH-3 cache CH-2 cache CH-1 cache RCC unicast burst IPTV multicast streams PE-AGG router DSLAM VQE Client on STB

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		After a short period of time, multicast packets for the new channel start to arrive at the STB. The VQE-C monitors RTP sequence numbers from both unicast and multicast streams. It is likely that the VQE-C sees a few packets with duplicate RTP sequence numbers before the unicast stream ends. During this period, the VQE-C only forwards one copy of the RTP packet to the MPEG demultiplexing stage. Source: https://www.cisco.com/c/en/us/td/docs/video/cds/cda/vqe/3_5/user/guide/vqe_guide3_5.pdf When the subscriber requests a channel change, the VQE-C on the STB requests the IPTV packets for the new channel from its target the VQE-S, using a specific RTCP message. After it has sent the RTCP message, the VQE Client issues an IGMP join for the new channel at an optimum point in time. Because the incoming burst from the VQE-S contains an I-frame, the STB decoder can immediately start processing the MPEG information. This greatly reduces the time a subscriber waits before the image is rendered on the TV screen. Other VQE optimizations for RCC, such as Fast Decoder Buffer Fill, shorten channel change time by reducing MPEG decoder buffer delay. After a short period of time, multicast packets for the new channel start to arrive at the STB. The VQE-C monitors RTP sequence numbers from both unicast and multicast streams. It is likely that the VQE-C sees a few packets with duplicate RTP sequence numbers before the unicast stream ends. During this period, the VQE-C only forwards one copy of the RTP packet to the MPEG demultiplexing stage. The VQE-C is responsible for managing the seamless transition between unicast and multicast IPTV packets. The RCC unicast burst continues for up to the full duration of the IGMP join or until it is explicitly stopped by a message sent from the VQE-C to the VQE-S. Source: https://www.cisco.com/c/en/us/td/docs/video/cds/cda/vqe/3_5/user/guide/vqe_guide3_5.pdf VQE also provides three web browser-based tools: VQE Channel Provisioning Tool (VCPT), VQE-S Application Monitoring Tool (AMT), and VQE Client Configuration Delivery Server (VCDS) AMT. • VQE-S AMT is a browser-based GUI that displays configuration, status, and statistics on the VQE-S processes, the channel lineup, Unicast Retransmission, RCC, Ethernet interfaces, and VQE-S RTCP Exporter. The VQE-S AMT also allows you to configure debugging and logging facilities.

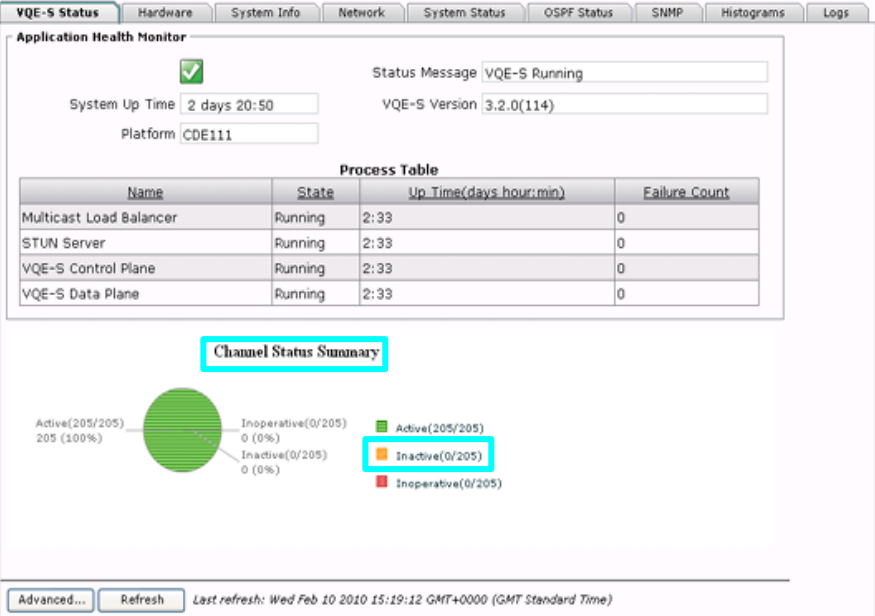
U.S. Patent No. 7,885,286	Earliest Priority Date	Infringement Contentions																				
		The VQE-S AMT is a browser-based GUI that allows the service-provider operator to do the following: • Monitor the health of the VQE-S processes • View channel configuration details, status, and statistics • Monitor statistics for Unicast Retransmission and RCC • Monitor statistics for STUN Server usage • View configuration details, status, and statistics for: – Multicast Load Balancer – VQE-S RTCP Exporter • Change VQE-S logging levels and debugging options Figure 1-10 Monitoring VQE-S Processes  The screenshot displays the VQE-S Status GUI. At the top, there are tabs for VQE-S Status, Hardware, System Info, Network, System Status, OSPF Status, SNMP, Histograms, and Logs. The VQE-S Status tab is active, showing an 'Application Health Monitor' section with a green checkmark icon, indicating the system is running. Below this, there are fields for 'System Up Time' (2 days 20:50), 'Platform' (CDE111), 'Status Message' (VQE-S Running), and 'VQE-S Version' (3.2.0(114)). A 'Process Table' is also present, listing the following processes: <table><thead><tr><th>Name</th><th>State</th><th>Up Time(days:hour:min)</th><th>Failure Count</th></tr></thead><tbody><tr><td>Multicast Load Balancer</td><td>Running</td><td>2:33</td><td>0</td></tr><tr><td>STUN Server</td><td>Running</td><td>2:33</td><td>0</td></tr><tr><td>VQE-S Control Plane</td><td>Running</td><td>2:33</td><td>0</td></tr><tr><td>VQE-S Data Plane</td><td>Running</td><td>2:33</td><td>0</td></tr></tbody></table> Below the process table is a 'Channel Status Summary' section. It features a pie chart showing the status of channels: Active (205/205, 100%), Inoperative (0/205, 0%), and Inactive (0/205, 0%). A legend on the right indicates that green represents Active (205/205), orange represents Inactive (0/205), and red represents Inoperative (0/205). The 'Inactive' status is highlighted with a red box. At the bottom of the GUI, there are buttons for 'Advanced...', 'Refresh', and a timestamp: 'Last refresh: Wed Feb 10 2010 15:19:12 GMT+0000 (GMT Standard Time)'.	Name	State	Up Time(days:hour:min)	Failure Count	Multicast Load Balancer	Running	2:33	0	STUN Server	Running	2:33	0	VQE-S Control Plane	Running	2:33	0	VQE-S Data Plane	Running	2:33	0
Name	State	Up Time(days:hour:min)	Failure Count																			
Multicast Load Balancer	Running	2:33	0																			
STUN Server	Running	2:33	0																			
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VQE-S Data Plane	Running	2:33	0																			

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		• Status—Indicates channel status as follows: – Green with a checkmark—Channel is active. The VQE-S is receiving the multicast stream. – Yellow with exclamation mark (!)—Channel is inactive. The channel is successfully initialized, but the VQE-S is not receiving the multicast stream. – Red with an X—Channel is inoperative (for example, the channel is not configured correctly). • Member Receiver Population—Provides the number of VQE-Cs that are currently receiving this multicast stream. Source: https://www.cisco.com/c/en/us/td/docs/video/cds/cda/vqe/3_5/user/guide/vqe_guide3_5.pdf
[1E] wherein said another behavior is to use the feedback information provided by the resource manager to signal to the client that a Media Quick Start unicast stream for the requested media distribution is not available due to resource shortage in the IP network but the client is still allowed to subscribe to the multicast distribution.	Dec. 23, 2005	The Cisco CDA VQE application system provides for allowing the Media Quick Start or using another behavior to start the requested media distribution based on the received feedback information wherein the another behavior is to use the feedback information provided by the network resource manager to signal to the client that a Media Quick Start unicast stream for the requested media distribution is not available due to resource shortage in the IP network but the client is still allowed to subscribe to the multicast distribution. VQE also provides three web browser-based tools: VQE Channel Provisioning Tool (VCPT), VQE-S Application Monitoring Tool (AMT), and VQE Client Configuration Delivery Server (VCDS) AMT. • VCPT is an optional channel-provisioning utility to aid with the channel lineup configuration required by both the VQE-S and the VQE-C. The channel information is in Session Description Protocol (SDP) format. The VCPT sends the channel information to the VQE-Ss and VCDSs. The VCDS servers provide the channel lineup or network configuration to the VQE-Cs on the STBs. The VCPT is responsible for the creation, maintenance, and distribution of the channel information containing channel-lineup data. The VCPT includes a browser-based GUI that allows the service provider to provision the following: • Channel definitions—Information on the channels that is serviced by VQE • Server definitions—Information on each VQE-S, VCDS, and Remote Server that receives the channel information • Channel lineups—Associations between channels, the VQE-Ss, and the VCDSs

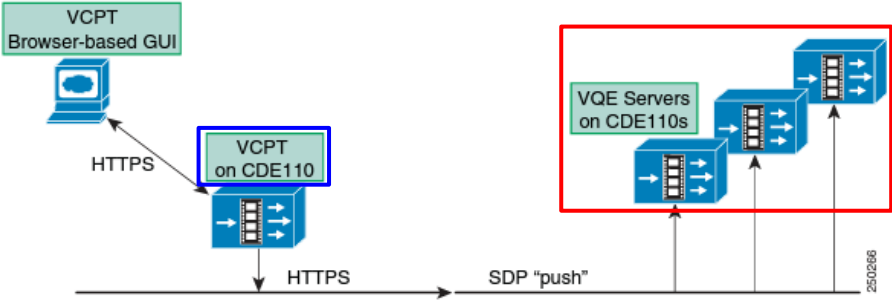
U.S. Patent No. 7,885,286	Earliest Priority Date	Infringement Contentions
		When the user completes channel, server, and channel-lineup configuration and starts the VCPT send operation, the VCPT sends the channel information in Session Description Protocol (SDP) format to the set of VQE-Ss, to the VCDS, or to a Remote Server. The VCPT sends or <i>pushes</i> the channel information to all VQE-Ss that are defined in the current VCPT configuration file. The channel information is sent to the VQE-Ss over secure HTTPS. The VCPT contains a secure HTTPS client, and each VQE-S has an embedded web server running. Each VQE-S stores its own local copy of the channel information. Figure 1-6 shows the interactions between the VCPT and the VQE-Ss. For information on the VQE-Ss, see the “VQE-S” section on page 9. Figure 1-6 VCPT: Sending Channel Information to VQE Servers  The diagram illustrates the process of sending channel information from the VCPT to VQE servers. On the left, a 'VCPT Browser-based GUI' (represented by a laptop icon) is connected to a 'VCPT on CDE110' (represented by a server icon) via an 'HTTPS' connection. The 'VCPT on CDE110' then sends an 'SDP "push"' via 'HTTPS' to a group of 'VQE Servers on CDE110s' (represented by multiple server icons). The VQE servers are enclosed in a red box. A vertical label '250266' is positioned to the right of the VQE servers. The VQE-S software is hosted on a Cisco CDE110 appliance running a standard Linux operating system. The Cisco CDE110 comes with the required software preinstalled: VQE-S, VQE-S AMT, Linux, Apache web server, and other software. The VQE-S is responsible for the following functions: • Creating a channel configuration database using the channel configuration information sent by the VCPT • Maintaining per-channel and per-component state information • Handling Unicast Retransmission by caching RTP data streams for channels and sending repair packets to the requesting VQE-Cs on the STBs • Handling RCC by caching RTP data streams as well as PAT, PMT, ECM, PCR, and sequence information and sending RCC unicast bursts to requesting VQE-Cs when a channel change occurs • Load balancing VQE-S services across the Cisco CDE110 Ethernet or bond interfaces • Providing detailed statistics on IPTV delivery down to the STB VQE-C level • Monitoring the health of VQE-S application processes

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		After a short period of time, multicast packets for the new channel start to arrive at the STB. The VQE-C monitors RTP sequence numbers from both unicast and multicast streams. It is likely that the VQE-C sees a few packets with duplicate RTP sequence numbers before the unicast stream ends. During this period, the VQE-C only forwards one copy of the RTP packet to the MPEG demultiplexing stage. Source: https://www.cisco.com/c/en/us/td/docs/video/cds/cda/vqe/3_5/user/guide/vqe_guide3_5.pdf When the subscriber requests a channel change, the VQE-C on the STB requests the IPTV packets for the new channel from its target the VQE-S, using a specific RTCP message. After it has sent the RTCP message, the VQE Client issues an IGMP join for the new channel at an optimum point in time. Because the incoming burst from the VQE-S contains an I-frame, the STB decoder can immediately start processing the MPEG information. This greatly reduces the time a subscriber waits before the image is rendered on the TV screen. Other VQE optimizations for RCC, such as Fast Decoder Buffer Fill, shorten channel change time by reducing MPEG decoder buffer delay. After a short period of time, multicast packets for the new channel start to arrive at the STB. The VQE-C monitors RTP sequence numbers from both unicast and multicast streams. It is likely that the VQE-C sees a few packets with duplicate RTP sequence numbers before the unicast stream ends. During this period, the VQE-C only forwards one copy of the RTP packet to the MPEG demultiplexing stage. The VQE-C is responsible for managing the seamless transition between unicast and multicast IPTV packets. The RCC unicast burst continues for up to the full duration of the IGMP join or until it is explicitly stopped by a message sent from the VQE-C to the VQE-S. Source: https://www.cisco.com/c/en/us/td/docs/video/cds/cda/vqe/3_5/user/guide/vqe_guide3_5.pdf VQE also provides three web browser-based tools: VQE Channel Provisioning Tool (VCPT), VQE-S Application Monitoring Tool (AMT), and VQE Client Configuration Delivery Server (VCDS) AMT. • VQE-S AMT is a browser-based GUI that displays configuration, status, and statistics on the VQE-S processes, the channel lineup, Unicast Retransmission, RCC, Ethernet interfaces, and VQE-S RTCP Exporter. The VQE-S AMT also allows you to configure debugging and logging facilities.

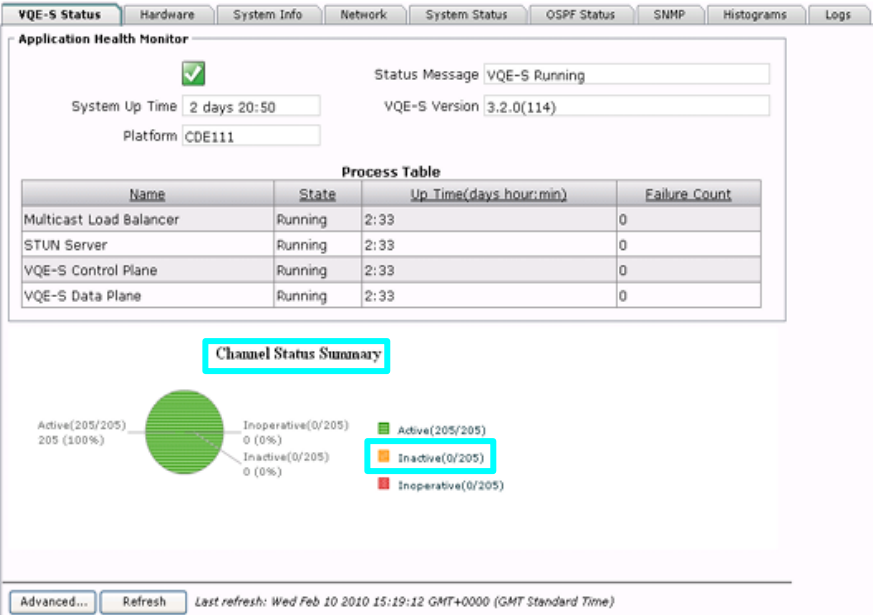
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		The VQE-S AMT is a browser-based GUI that allows the service-provider operator to do the following: • Monitor the health of the VQE-S processes • View channel configuration details, status, and statistics • Monitor statistics for Unicast Retransmission and RCC • Monitor statistics for STUN Server usage • View configuration details, status, and statistics for: – Multicast Load Balancer – VQE-S RTCP Exporter • Change VQE-S logging levels and debugging options Figure 1-10 Monitoring VQE-S Processes  The screenshot displays the VQE-S Status GUI with the following components: Application Health Monitor: Shows a green checkmark icon, a status message "VQE-S Running", system up time of "2 days 20:50", VQE-S version "3.2.0(114)", and platform "CDE111". Process Table: A table listing the status of various processes. Channel Status Summary: A pie chart showing the distribution of channel states: Active (205/205, 100%), Inoperative (0/205, 0%), and Inactive (0/205, 0%). At the bottom of the GUI, there are buttons for "Advanced...", "Refresh", and a timestamp: "Last refresh: Wed Feb 10 2010 15:19:12 GMT+0000 (GMT Standard Time)".

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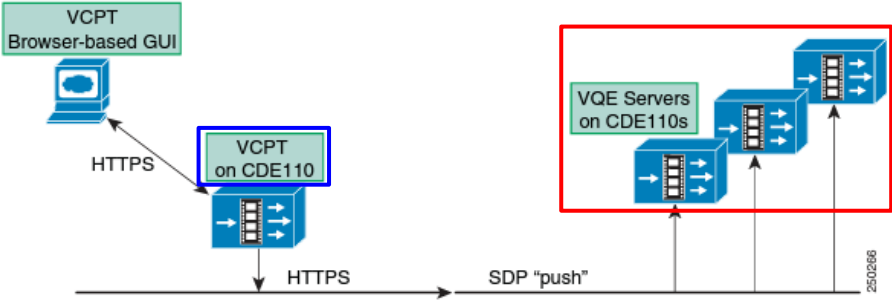
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U.S. Patent No. 7,885,286	Earliest Priority Date	Infringement Contentions
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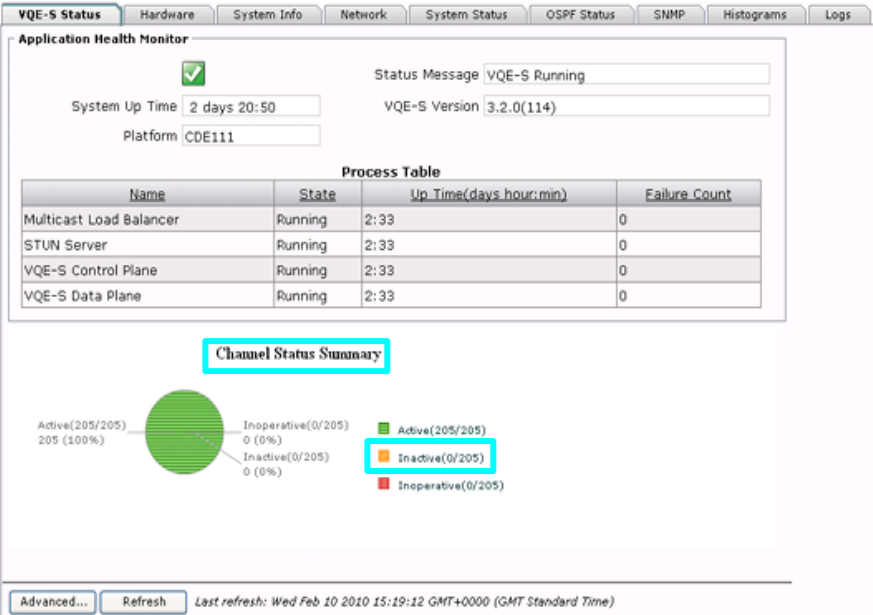
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4. A system comprises	Dec. 23, 2005	
[4A] a network resource manager comprising a resource utilization map adapted to manage network resources in an IP network,	Dec. 23, 2005	See claim 1.
[4B] an application framework comprising means for receiving a request for a media distribution requiring a multicast distribution from a	Dec. 23, 2005	See claim 1[A].

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client in said IP network,		
[4C] and means for requesting network resources from a network resource manager for a Media Quick Start, to start the requested media distribution,	Dec. 23, 2005	See claim 1[B].
[4D] the network resource manager comprises means for providing the application framework with feedback information relating to network resource availability from the network resource manager,	Dec. 23, 2005	See claim 1[C].
[4E] and the application framework comprises means for receiving said feedback information and	Dec. 23, 2005	See claim 1[C].

U.S. Patent No. 7,885,286	Earliest Priority Date	Infringement Contentions
[4F] means for allowing the Media Quick start or to use another behavior to start the requested media distribution based on the received feedback information,	Dec. 23, 2005	See claim 1[D].
[4G] wherein said another behavior is to use the feedback information provided by the network resource manager to signal to a client that a Media Quick Start unicast stream for the requested media is not available due to resource shortage in the IP network but the client is still allowed to subscribe to a multicast version of the media.	Dec. 23, 2005	See claim 1[E].
5. The system according to claim 4, wherein said another	Dec. 23, 2005	See claim 2.

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behavior further includes to temporarily deny the Media Quick Start.		
6. The system according to claim 4, wherein said another behavior further includes to deny the Media Quick Start.	Dec. 23, 2005	See claim 3.
7. A method for an application framework connectable to an IP network, wherein the method comprises the steps of:	Dec. 23, 2005	See claim 1.
[7A] receiving a request for a media distribution requiring a multicast distribution from a client in said IP network,	Dec. 23, 2005	See claim 1[A].
[7B] requesting network resources from a network	Dec. 23, 2005	See claim 1[B].

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resource manager for a Media Quick Start, to start the requested media distribution,		
[7C] receiving feedback information relating to network resource availability from the network resource manager, and	Dec. 23, 2005	See claim 1[C].
[7D] allowing the Media Quick start or using another behavior to start the requested media distribution based on the received feedback information,	Dec. 23, 2005	See claim 1[D].
[7E] wherein said another behavior is to use the feedback information provided by the network resource manager to signal to the client that a Media Quick	Dec. 23, 2005	See claim 1[E].

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Start unicast stream for the requested media distribution is not available due to resource shortage in the IP network but the client is still allowed to subscribe to the multicast distribution.		
8. The method according to claim 7, wherein said another behavior further includes to temporarily deny the requested Media Quick Start.	Dec. 23, 2005	
9. The method according to claim 7, wherein said another behavior further includes to deny the requested Media Quick Start.	Dec. 23, 2005	See claim 2.
10. A computer program product embodied on a non-	Dec. 23, 2005	See claim 7.

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transitory computer-readable medium comprising software code portions for performing the steps of claim 7.		
11. A computer program product stored on a computer usable medium, comprising readable program for causing a computer, within an application framework in an IP network, to control an execution of the steps of claim 7.	Dec. 23, 2005	See claim 7.
12. An Application-Specific Integrated Circuit for starting a multicast media distribution in an IP network, wherein the Integrated Circuit comprises	Dec. 23, 2005	See claim 1.
[12A] means for receiving a request	Dec. 23, 2005	See claim 1[A].

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for a media distribution requiring a multicast distribution from a client in said IP network,		
[12B] means for requesting network resources from a network resource manager for a Media Quick Start, to start the requested media distribution,	Dec. 23, 2005	See claim 1[B].
[12C] means for receiving feedback information relating to network resource availability from the network resource manager, and	Dec. 23, 2005	See claim 1[C].
[12D] means for allowing the Media Quick start or to use another behavior to start the requested media distribution based on the received	Dec. 23, 2005	See claim 1[D].

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feedback information,		
[12E] wherein said another behavior is to use the feedback information provided by the resource manager to signal to the client that a Media Quick Start unicast stream for the requested media distribution is not available due to resource shortage in the IP network but the client is still allowed to subscribe to the multicast distribution.	Dec. 23, 2005	See claim 1[E].