

U.S. PATENT NO. 10,425,697 CLAIM LISTING

No.	Element
1.0	1. A system for providing a first plurality of copies of a first broadcaster's live stream of digital content including first live sporting event video-based commentary from a first broadcaster client device to a first plurality of viewer client devices, and for providing a second plurality of copies of a second broadcaster's live stream of digital content including second live sporting event video-based commentary from a second broadcaster client device to a second plurality of viewer client devices, the system comprising:
1.1	A) a plurality of media sources to:
1.2	receive the first broadcaster's live stream of digital content and the second broadcaster's live stream of digital content;
1.3	provide a first copy of the first plurality of copies to a first viewer client device of the first plurality of viewer client devices via a first video Internet communication channel between the plurality of media sources and the first viewer client device of the first plurality of viewer client devices; and
1.4	provide a first copy of the second plurality of copies to a first viewer client device of the second plurality of viewer client devices via a second video Internet communication channel between the plurality of media sources and the first viewer client device of the second plurality of viewer client devices;
1.5	B) a control server to periodically retrieve, via the Internet and from an event information provider, first event information germane to a first live sporting event, wherein the first event information includes first score information for the first live sporting event; and
1.6	C) at least one socket server communicatively coupled to the control server to:
1.7	receive from the control server at least the first score information; and
1.8	transmit the first score information to at least the first viewer client device of the first plurality of viewer client devices via a first event information Internet communication channel between at least one first event socket of the at least one socket server and the first viewer client device of the first plurality of viewer devices, wherein the at least one

	first event socket corresponds to the first event information germane to the first live sporting event.
10.0	10. The system of claim 1, wherein: the plurality of media sources comprises at least one of:
10.1	at least one real-time messaging protocol (RTMP) media server to receive the first broadcaster's live stream of digital content; and
10.2	at least one web real time communication (WebRTC) media server to receive the first broadcaster's live stream of digital content; and
10.3	an HTTP live streaming (HLS) caching server architecture communicatively coupled to at least one of the at least one RTMP media server and the at least one WebRTC media server; and
10.4	the system establishes the first video Internet communication channel to provide the first copy of the first plurality of copies of the first broadcaster's live stream of digital content to the first viewer client device of the first plurality of viewer devices between the first viewer client device and the HLS caching server architecture.
11.0	11. The system of claim 10, wherein the HLS caching server architecture comprises:
11.1	an HLS mother server communicatively coupled to the at least one of the at least one RTMP media server and the at least one WebRTC media server to receive, from the at least one of the at least one RTMP media server and the at least one WebRTC media server, a first HLS file suite representing the first broadcaster's live stream of digital content; and
11.2	a plurality of HLS child servers communicatively coupled to the HLS mother server and an HLS content delivery network (HLS CDN),
11.3	wherein the system establishes the first video Internet communication channel to provide the first copy of the first plurality of copies of the first broadcaster's live stream of digital content to the first viewer client device of the first plurality of viewer devices between the first viewer client device and the HLS CDN; and

11.4	the first copy of the first plurality of copies of the first broadcaster's live stream of digital content is based on the first HLS file suite.
12.0	12. The system of claim 11, further comprising:
12.1	at least one webserver to provide an applications programming interface (API) between the system and each of the first broadcaster client device, the second broadcaster client device, the first plurality of viewer client devices and the second plurality of viewer client devices; and
12.2	a memory system communicatively coupled to the at least one webserver, the memory system including a database storing: first stream information for the first broadcaster's live stream of digital content including the first live sporting event video-based commentary from the first broadcaster client device, wherein the first stream information includes a stream identifier (StreamID) for the first broadcaster's live stream of digital content,
12.3	wherein the at least one webserver: determines an address for the HLS CDN to establish the first video Internet communication channel to provide the first copy of the first plurality of copies to the first viewer client device, based at least in part on the StreamID for the broadcaster's live stream of digital content; and
12.4	transmits the address for the HLS CDN to the first viewer client device of the first plurality of viewer client devices to establish the first video Internet communication channel.

13.0	13. The system of claim 12, wherein:
13.1	the first stream information for the first broadcaster's live stream of digital content further includes an event identifier (EventID) for the first live sporting event; and
13.2	the at least one webserver further: determines a first socket address for the at least one first event socket of the at least one socket server based at least in part on the EventID; and
13.3	transmits the first socket address to the first viewer client device of the first plurality of viewer client devices to establish the first event information Internet communication channel.
14.0	14. The system of claim 13, wherein:
14.1	in C), the at least one socket server further transmits and receives first chat information regarding the first live sporting event video-based commentary included in the first broadcaster's live stream of digital content via at least one first chat/system event Internet communication channel between at least one first chat/system event socket of the at least one socket server and the first viewer client device of the first plurality of viewer client devices, wherein the at least one first chat/system event socket corresponds to the first chat information regarding the first live sporting event video-based commentary; and
14.2	the at least one webserver further: determines a second socket address for the at least one first chat/system event socket of the at least one socket server based at least in part on the StreamID; and
14.3	transmits the second socket address to the first viewer client device of the first plurality of viewer client devices to establish the first chat/system event Internet communication channel.

15.0	15. The system of claim 11, wherein the HLS mother server requests, from the at least one of the at least one RTMP media server and the at least one WebRTC media server, only the first HLS file suite representing the first broadcaster's live stream of digital content and no other HLS file suite representing the first broadcaster's live stream of digital content.
16.0	16. The system of claim 15, wherein the HLS mother server maintains a persistent connection to the at least one of the at least one RTMP media server and the at least one WebRTC media server, during at least a portion of a duration of the first broadcaster's live stream of digital content, to receive respective elements of the first HLS file suite.
17.0	17. The system of claim 1, wherein:
17.1	the plurality of media sources comprises at least one of: - at least one real-time messaging protocol (RTMP) media server to receive the first broadcaster's live stream of digital content; and - at least one web real time communication (WebRTC) media server to receive the first broadcaster's live stream of digital content; and - an HTTP live streaming (HLS) caching server architecture communicatively coupled to at least one of the at least one RTMP media server and the at least one WebRTC media server; the system establishes the first video Internet communication channel to provide the first copy of the first plurality of copies of the first broadcaster's live stream of digital content to the first viewer client device of the first plurality of viewer devices between the first viewer client device and the HLS caching server architecture;
17.2	the HLS caching server architecture comprises: an HLS mother server communicatively coupled to the at least one of the at least one RTMP media server and the at least one WebRTC media server to receive, from the at least one of the at least one RTMP

	media server and the at least one WebRTC media server, a first HLS file suite representing the first broadcaster's live stream of digital content; and
	a plurality of HLS child servers communicatively coupled to the HLS mother server and an HLS content delivery network (HLS CDN); the system establishes the first video Internet communication channel to provide the first copy of the first plurality of copies of the first broadcaster's live stream of digital content to the first viewer client device of the first plurality of viewer devices between the first viewer client device and the HLS CDN; the first copy of the first plurality of copies of the first broadcaster's live stream of digital content is based on the first HLS file suite;
17.3	the HLS mother server requests, from the at least one of the at least one RTMP media server and the at least one WebRTC media server, only the first HLS file suite representing the first broadcaster's live stream of digital content and no other HLS file suite representing the first broadcaster's live stream of digital content;
17.4	the HLS mother server maintains a persistent connection to the at least one of the at least one RTMP media server and the at least one WebRTC media server, during at least a portion of a duration of the first broadcaster's live stream of digital content, to receive respective elements of the first HLS file suite;
17.5	the first HLS file suite provided by the at least one of the at least one RTMP media server and the at least one WebRTC media server to the HLS mother server comprises: a first HLS playlist specifying a first plurality of different resolution versions of the first broadcaster's live stream of digital content, the first HLS playlist further including a corresponding first plurality of chunklist pointers to first respective chunklists for the first plurality of different resolution versions; the first respective chunklists for the first plurality of different resolution versions, wherein each chunklist of the first respective chunklists includes a first plurality of file segment pointers to first respective file segments for each different resolution version of the first plurality of different resolution versions; and

	the first respective file segments for each different resolution version of the first plurality of different resolution versions;
17.6	the HLS mother server caches the first HLS playlist, the first respective chunklists, and the first respective file segments and passes on to at least one HLS child server of the plurality of HLS child servers at least one first copy of the first HLS playlist, the first respective chunklists, and the first respective file segments;
17.7	the at least one HLS child server of the plurality of HLS child servers server caches the at least one first copy of the first HLS playlist, the first respective chunklists, and the first respective file segments and passes on to the HLS CDN at least one second copy of the first HLS playlist, the first respective chunklists, and the first respective file segments; and
17.8	the first copy of the first plurality of copies of the first broadcaster's live stream of digital content to the first viewer client device of the first plurality of viewer devices is based on the at least one second copy of the first HLS playlist, the first respective chunklists, and the first respective file segments.
18.0	18. The system of claim 17, wherein:
18.1	the at least one of the at least one RTMP media server and the at least one WebRTC media server is configurable according to a plurality of HLS settings for generating the first HLS file suite, wherein the plurality of HLS settings include: a video segment duration for each file segment of the respective file segments; and
18.2	an HLS buffer length including a first number of the first plurality of file segment pointers in each chunklist;
18.3	the video segment duration for each file segment of the respective file segments is configured to be approximately two seconds; and
18.4	the first number of the first plurality of file segment pointers in each chunklist for the HLS buffer length is one of four, five and six.

23.0	A method for providing a first copy of a first broadcaster's live stream of digital content including first live sporting event video-based commentary from a first broadcaster client device to a first viewer client device, the method comprising:
23.1	A) providing the first copy to the first viewer client device via a first video communication channel between a plurality of media sources and the first viewer client device;
23.2	B) periodically retrieving, via the Internet and from an event information provider, first event information germane to a first live sporting event, wherein the first event information includes first score information for the first live sporting event; and
23.3	C) transmitting the first score information to at least the first viewer client device via a first event information communication channel between at least one first event socket of at least one socket server and the first viewer client device of the first plurality of viewer devices, wherein the at least one first event socket corresponds to the first event information germane to the first live sporting event.
24.0	The method of claim 23, further comprising:
24.1	D) transmitting and receiving first chat information regarding the first live sporting event video-based commentary included in the first broadcaster's live stream of digital content via at least one first chat/system event Internet communication channel between at least one first chat/system event socket of the at least one socket server and the first viewer client device of the first plurality of viewer client devices, wherein the at least one first chat/system event socket corresponds to the first chat information regarding the first live sporting event video-based commentary.

26.0	26. The method of claim 24, wherein:
26.1	the plurality of media sources comprises: at least one of at least one real-time messaging protocol (RTMP) media server to receive the first broadcaster's live stream of digital content; and
26.2	at least one web real time communication (WebRTC) media server to receive the first broadcaster's live stream of digital content; and
26.3	an HTTP live streaming (HLS) caching server architecture communicatively coupled to at least one of the at least one RTMP media server and the at least one WebRTC media server,
26.4	wherein the HLS caching server architecture comprises: an HLS mother server communicatively coupled to the at least one of the at least one RTMP media server and the at least one WebRTC media server to receive, from the at least one of the at least one RTMP media server and the at least one WebRTC media server, a first HLS file suite representing the first broadcaster's live stream of digital content; and
26.5	a plurality of HLS child servers communicatively coupled to the HLS mother server and an HLS content delivery network (HLS CDN); and
26.6	A) comprises providing the first copy to the first viewer client device via the first video communication channel between the HLS CDN and the first viewer client device, wherein the first copy is based on the first HLS file suite received by the HLS mother server.