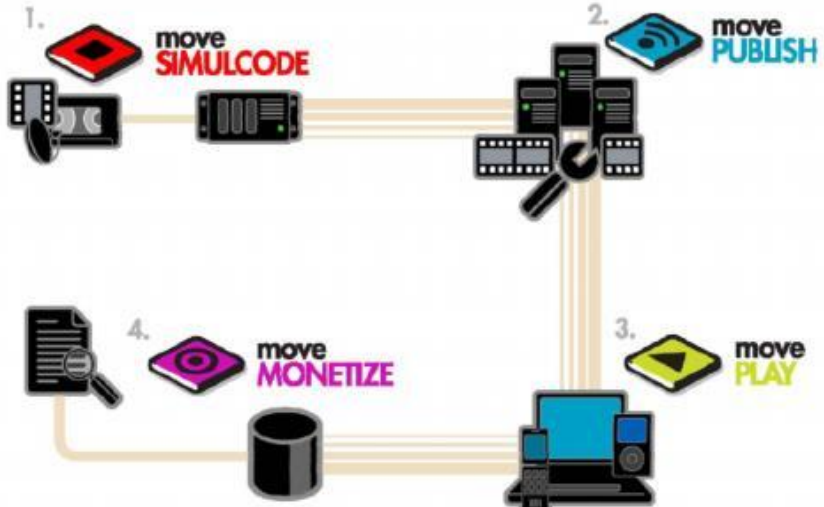


U.S. Patent No. 10,951,680 Claim 14

The following claim chart shows exemplary aspects of certain streaming services and products provided by MOVE Networks, Inc. (“MOVE”) that practice the limitations of claim 14 of the ’680 Patent. The chart is exemplary and should not be read to limit MOVE’s practicing of the below-listed claim or any claim with respect to the services or products described below, including MOVE’s Move Media Player (“Media Player”). Nor should this chart be read to limit the claims practiced by MOVE. Additionally, this chart should not be read to limit the acts that infringe the below claim.

Claim Element	Example Infringement Evidence
[14.pre] An end user station to stream a video over a network from a server for playback of the video, the content player device comprising:	MOVE’s Media Player operated within a system that operates on an end user’s content player device (“End User Device”) to stream live and on-demand videos over a network from a server for playback of the video. Any images in this chart are from MOVE’s “Technical Overview of Move Networks Implementation,” labeled as EX2012. For example, “Move Networks provides and operates the premier video distribution platform.” EX2012, at 4. “The architecture of the move platform enables a revolutionary viewing experience giving viewers control over how they watch and interact with the video content. Move Networks manages the systems in the platform to provide an end-to-end broadband solution on behalf of video publishers and broadcasters.” <i>Id.</i> A high-level diagram of the Move platform is shown below:

Claim Element	Example Infringement Evidence
	 <i>Id.</i> at 6. Thus, MOVE provided a content player device to stream a video over a network from a server for playback of the video.
[14.1] a processor;	As stated above, MOVE's platform operated on an End User Device. Example content player devices include Windows personal computers, Macintosh computers. <i>See, e.g.</i> , EX2012 at 17-18. The End Users' Devices included a processor configured to enable video streaming.
[14.2] a digital processing apparatus memory device comprising	As explained above, the MOVE's platform ran on End Users' Devices. These devices were equipped to access the internet via one or more network connections and included at least one processor configured to enable video streaming. <i>See, e.g.</i> , EX2012 at 17-18, 23. The End User Devices also included memory devices having non-transitory machine-readable instructions that caused the content player device to establish one or more network

U.S. Patent No. 10,951,680 Claim 14

Claim Element	Example Infringement Evidence
non-transitory machine-readable instructions that, when executed cause the processor to: establish one or more network connections between the end user station and the server, wherein the server is configured to access at least one of a plurality of groups of streamlets;	connections, such as an internet connection, between the End User Device and the one or more servers associated with the videos desired for streaming. <i>See</i> EX2011 at 2-7. Further, MOVE’s Media Player automatically placed a streamlet request using a HTTP GET request for each streamlet over one or more network connections to the stream to retrieve a streamlet/file for the selected stream, and the HTTP GET requests identify the selected streamlet, and the requested streamlets are received from the server. <i>See e.g.</i>, EX2012; 2011. To playback the video normally, the Move Media Player requests sequential files/streamlets from one of the copies from the video server based on the time indexes. <i>See e.g.</i>, EX2012; 2011. For example, the Move system provides for “[s]imple HTTP protocol transfer of media files from standard Web servers rather than deployment of expensive media servers.” EX2012 at 22. This is further illustrated in the figure below. <i>Id.</i> Thus, MOVE provided a digital processing apparatus memory device comprising non-transitory machine-readable instructions that, when executed, cause the End User Device’s processor to: establish an internet

U.S. Patent No. 10,951,680 Claim 14

Claim Element	Example Infringement Evidence
	connection between the End User Device and the server, wherein the server is configured to access at least one of a plurality of groups of streamlets.
[14.3 wherein the video is encoded at a plurality of different bitrates to create a plurality of streams including at least a low quality stream, a medium quality stream, and a high quality stream, each of the low quality stream, the medium quality stream, and the high quality stream comprising a group of streamlets encoded at the same respective one of the different bitrates, each group comprising at least first and	In MOVE's system, the live or on-demand video was encoded using Move Simulcode, which included "[t]he process of atomizing and encoding video for transmission. The first step in this process of preparing video for transmission decompose[d] the captured video content into small streamlets for encoding and transmission The process of Simulcoding refers to the process of producing media that matches multiple viewing profiles (based on device and performance profiles) in a single process." EX2012 at 10. Further, each of the different bitrate/quality streams are stored on and accessed by the server as groups or sets of streamlets/files that correspond to portions of the video, and each group is encoded at the same respective one of the different bitrates. <i>See, e.g.</i>, EX2012; 2011. For example, "Live content streamlets are encoded ... to provide a self-optimizing, variable bitrate viewing experience." EX2012 at 10. The figure below provides an overview of this aspect of the Move System. <i>Id.</i> at 11. More specifically as to the different viewing profiles and bitrates, "Move Networks encode[d] to either high definition (16x9) or standard definition (3x4) aspect ratios, using one of the following 'best practice' profile sets, based on an aspect ratio (16x9) frames-per-second. Profiles up to 2.4 Mbps are used for video streams intended for distribution over high-bandwidth networks. The low-end profiles include a 'thumbnail' profile (Stream Type = T), which is used in multi-player mosaic Web pages, and an 'emergency profile (Stream Type = E) which

U.S. Patent No. 10,951,680 Claim 14

Claim Element	Example Infringement Evidence
second streamlets, each of the streamlets corresponding to a portion of the video;	provides a minimal experience for poor connectivity or low-bandwidth connections. The remaining profiles are ‘normal’ and are situated at bit rates that offer a smooth end user experience as the Move Media Player up-shifts and down-shifts in response to the network and CPU availability.” <i>Id.</i> at 19. Similarly, the streamlets across the groups include a time index, are time aligned, and corresponding streamlets across the groups have equal durations. <i>See e.g.</i>, EX2012; EX2011. For example, “Move Networks provides an integrated Content Management System (CMS) for entering the metadata associated with video programming, such as titles, descriptions, topics, program thumbnails, and time offsets (beginning and end points of a video segment). Time offsets can also be automatically detected in some cases based on time indexes and sudden changes in video keyframes.” EX2012 at 25. Further, the figure below provides an exemplary illustration of the duration and alignment of streamlets/files of varying bitrates in the Move system. The diagram, titled "Instant Start, No Buffering: Move Adaptive Streaming", illustrates the adaptive streaming process. It features a horizontal timeline with a "Click Play" button at the start. Three levels of streamlets are shown: "Normal" (top), "Low" (middle), and "High" (bottom). The "Normal" streamlets are represented by large yellow blocks. The "Low" streamlets are smaller yellow blocks. The "High" streamlets are the smallest yellow blocks. A red arrow points to the "Normal" streamlets, indicating the initial playback. A green arrow points to the "Low" streamlets, indicating a switch to a lower bitrate. A green arrow points to the "High" streamlets, indicating a switch to a higher bitrate. The diagram shows that the video can start playing immediately without buffering, and the bitrate can be adjusted dynamically based on network conditions. <i>Id.</i> at 24.

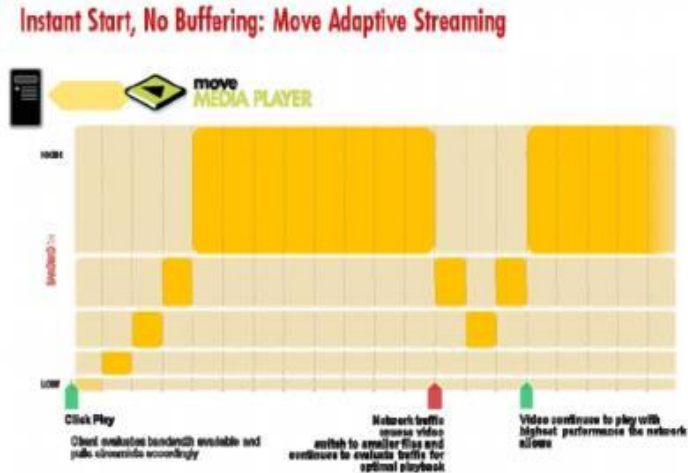
U.S. Patent No. 10,951,680 Claim 14

Claim Element	Example Infringement Evidence
	Thus, MOVE practiced encoding a video at a plurality of different bitrates to create a plurality of streams including at least a low quality stream, a medium quality stream, and a high quality stream, wherein each of the low quality stream, the medium quality stream, and the high quality stream comprises a streamlet that encodes the same portion of the video at a different one of the plurality of different bitrates.
[14.4] wherein at least one of the low quality stream, the medium quality stream, and the high quality stream is encoded at a bit rate of no less than 600 kbps; and	As explained above, “Move Networks encode[d] to either high definition (16x9) or standard definition (3x4) aspect ratios, using one of the following ‘best practice’ profile sets, based on an aspect ratio (16x9) frames-per-second. Profiles up to 2.4 Mbps are used for video streams intended for distribution over high-bandwidth networks. The low-end profiles include a ‘thumbnail’ profile (Stream Type = T), which is used in multi-player mosaic Web pages, and an ‘emergency profile (Stream Type = E) which provides a minimal experience for poor connectivity or low-bandwidth connections. The remaining profiles are ‘normal’ and are situated at bit rates that offer a smooth end user experience as the Move Media Player up-shifts and down-shifts in response to the network and CPU availability.” EX2012 at 19. Thus, MOVE practiced at least one of the low quality stream, medium quality stream, and high quality stream is encoded at a bit rate of no less than 600 kbps.
[14.5] and wherein the first streamlets of each of the low quality stream, the medium quality stream and the high quality stream each has an equal playback duration and each of the first streamlets encodes the same portion of the video at a	As explained above, Move’s system comprised different viewing profiles and bitrates. “Move Networks encode[d] to either high definition (16x9) or standard definition (3x4) aspect ratios, using one of the following ‘best practice’ profile sets, based on an aspect ratio (16x9) frames-per-second. Profiles up to 2.4 Mbps are used for video streams intended for distribution over high-bandwidth networks. The low-end profiles include a ‘thumbnail’ profile (Stream Type = T), which is used in multi-player mosaic Web pages, and an ‘emergency profile (Stream Type = E) which provides a minimal experience for poor connectivity or low-bandwidth connections. The remaining profiles are ‘normal’ and are situated at bit rates that offer a smooth end user experience as the Move Media Player up-shifts and down-shifts in response to the network and CPU availability.” <i>Id.</i> at 19. Similarly, the streamlets across the groups include a time index, are time aligned, and corresponding streamlets across the groups have equal durations. <i>See e.g.</i>, EX2012; EX2011. For example, “Move Networks provides an integrated Content Management System (CMS) for entering the metadata associated with video programming, such as titles, descriptions, topics, program thumbnails, and time offsets (beginning and end points of a video

U.S. Patent No. 10,951,680 Claim 14

Claim Element	Example Infringement Evidence
different one of the different bitrates;	segment). Time offsets can also be automatically detected in some cases based on time indexes and sudden changes in video keyframes.” EX2012 at 25. To playback the video normally, however, the Move Media Player requested sequential files/streamlets from one of the copies from the video server based on the time indexes. <i>See e.g.</i>, EX2011; 2012 at 23 (“Move Media Player, the Move Networks client software, delivers the video experience to the end consumer. The client decodes and renders the video streamlets to provide a continuous, optimal stream of video.”). Thus, MOVE provided encoding the same portion of the video in the low quality stream has an equal playback duration as the streamlet encoding the same portion of the video in the high quality stream.
[14.6] select a specific one of the low quality stream, the medium quality stream, and the high quality stream based upon a determination by the end user station to select a higher or lower bitrate version of the streams;	As explained above, in MOVE’s system, the Media Player automatically places a streamlet request using a HTTP GET request for each streamlet over one or more network connections to the stream to retrieve a streamlet/file for the selected stream, and the HTTP GET requests identify the selected streamlet, and the requested streamlets are received from the server. <i>See e.g.</i>, EX2012 at 23; 2011 at 7-8. The stream selection and automatic streamlet/file requests by the Move Media Player are based upon successive local determinations to shift the playback quality to a higher or lower quality one of the copies and includes repeatedly generating a factor relating to the performance of the network that is indicative of the media player’s current ability to sustain streaming the video using the streamlets/files from different ones of the copies. <i>See e.g.</i>, EX2012 at 23; 2011 at 8 (“The basic question is not, ‘what is my available bandwidth?’ but, ‘<i>am I receiving the current stream fast enough to present it in real time?</i>’”). The Move Media Player makes such successive determinations to shift to achieve continuous playback of the video using the highest quality determined sustainable such that the player upshifts to a higher quality when the factor is greater than a first threshold and downshifts when the factor is less than a second threshold. <i>See e.g.</i>, EX2012 at 23; EX2011 at 8. In this context, the Move client evaluates bandwidth available and pulls streamlets accordingly, where such “pull” would be made with an HTTP GET request. <i>See EX 2012 at 23.</i> For example, the Move system “provide[s] a self-optimizing, variable bitrate viewing experience.” <i>Id.</i> at 10. These processes produced several benefits including “continuous playback—no noticeable buffering” and “[q]uality of service optimization based on hardware profiles and speed and quality of the connection to the

U.S. Patent No. 10,951,680 Claim 14

Claim Element	Example Infringement Evidence
	Internet.” <i>Id.</i> at 11. The Move system was configured to “offer a smooth end user experience as the Move Media Player up-shifts and down-shifts in response to network and client CPU availability.” <i>Id.</i> at 19. More specifically, the “Move Media Player, the Move Networks client software, delivers the video experience to the end consumer. The client decodes and renders the video streamlets to provide a continuous, optimal stream of video. A major function of the client is managing the viewing experience. The Quantum Delivery Manager ensures the player is constantly receiving the streamlets required to deliver a continuous stream of video. The Quantum Media Manager deduces the current environment to tell the Delivery Manager which streamlets to pull into the player. For instance, if the Quantum Media Manager senses that the current environment has poor connectivity, the Quantum Delivery manager will be directed to only request streamlets from low-bandwidth profiles. If the connection speed or quality of the connection suddenly increases, the Quantum Delivery Manager starts downloading higher quality streamlets. The Quantum Media Manager continues to test the environment to provide the best viewing experience currently possible. This ability to ‘upshift’ and ‘downshift’ to multiple viewing profile bit rates ... is called Adaptive Streaming.” <i>Id.</i> at 23. The diagram below illustrates how Move Adaptive Streaming starts instantly, doesn’t stall, and adapts the streaming. Instant Start, No Buffering: Move Adaptive Streaming  Click Play Client evaluates bandwidth available and pulls streamlets accordingly Network traffic causes video switch to smaller files and continues to evaluate traffic for optimal playback Video continues to play with highest performance the network allows

U.S. Patent No. 10,951,680 Claim 14

Claim Element	Example Infringement Evidence
	<i>Id.</i> at 24. Importantly, “the intelligence that controls the quality of service resid[es] in the client.” <i>Id.</i> at 22. The client of the Move system “is always on the watch to use an appropriate stream encoding rate selection so that the available bandwidth is not exceeded by downloading of the component streamlets.” EX2011 at 8. Because “<i>the client</i> [of the Move system] <i>can select and retrieve directly from an array of streamlets of different encode rates</i>, there is no need to inform any media server and ask it to change the data it is sending.” <i>Id.</i> Thus, “[i]f the client observes that over some modest interval of time (say 20 seconds or so) the player is, on average, consuming streamlets more quickly than they arrive, then a stream of lower quality must be selected.” <i>Id.</i> In view of this, the Move Media Player makes successive determinations as to whether or not to shift to achieve continuous playback of the video using the highest quality determined sustainable. <i>See, e.g.</i>, EX 2012 at 23. As part of the streaming, the Move Media Player also requested and received a virtual timeline from the server based on the selected one of the streams. <i>See e.g.</i>, EX2012 at 26 (referencing “QVT”). The figure below further illustrates the components of the Move Media Player that render the video.  <pre> graph TD subgraph MoveMediaPlayer [Move Media Player] QDM[Quantum Delivery Manager] QMM[Quantum Media Manager] QV[Quantum Viewer] QV --> Decode QV --> Render QV --> Unlabeled[] end QV --- BA[Browser APIs] style BA fill:#ff0000,color:#fff style Unlabeled fill:#ff0000,color:#fff </pre>

U.S. Patent No. 10,951,680 Claim 14

Claim Element	Example Infringement Evidence
	EX2012 at 25. Thus, MOVE’s system practiced selecting a specific one of the streams based upon a determination by the client module to select a higher or lower bitrate version of the streams.
[14.7] place at least one virtual timeline request for at least one virtual times based on the selected one of the he low quality stream, the medium quality stream, and the high quality stream; and	As explained above, the MOVE client evaluated bandwidth available and pulls streamlets accordingly, where such “pull” would be made with an HTTP GET request. <i>See</i> EX 2012 at 23. For example, MOVE’s Media Player automatically would place a streamlet request using a HTTP GET request for each streamlet over one or more network connections to the stream to retrieve a streamlet/file for the selected stream, and the HTTP GET requests identify the selected streamlet, and the requested streamlets are received from the server. <i>See e.g.</i>, EX2012 at 22-24; EX2011 at 4 (“Streamlets are retrieved through standard HTTP GET requests; streamlet path and file names are selected to uniquely identify each streamlet’s time sequence in the content as well as stream rate.”). Moreover, MOVE’s system provided for “[s]imple HTTP protocol transfer of media files from standard Web servers rather than deployment of expensive media servers.” EX2012 at 22. This is further illustrated in the figure below. <pre> graph LR QM[Quantum Media] --- OWS[Origin Web Server] OWS --- IS[Internet] IS --- SWS[Standard Web Servers] SWS -- HTTP --> QMP[QuantumMedia Player] </pre> • Transparent to user • Standard Web Servers or Caches • Multi connection delivery (HTTP/TCP) • Fast Start, Fast Seek, Smooth Adaptive • Client Control: rapid adaptive • Client control: rapid adaptive management • Genuine video <i>Id.</i> As part of the streaming, the Move Media Player also requested and received a virtual timeline from the server based on the selected one of the streams. <i>See e.g.</i>, EX2012 at 26 (referencing “QVT”).

U.S. Patent No. 10,951,680 Claim 14

Claim Element	Example Infringement Evidence
[14.8] receive the at least one virtual timeline.	As shown above, the MOVE system would receive the requested virtual timelines from server(s) via the one or more network connections. For example, MOVE's system provided for "[s]imple HTTP protocol transfer of media files from standard Web servers rather than deployment of expensive media servers." EX2012 at 22. This is further illustrated in the figure below. <pre> graph LR QM[Quantum Media] --- OWS[Origin Web Server] OWS --- I((Internet)) I --- SWS[Standard Web Servers] SWS -- HTTP --> QMP[QuantumMedia Player] </pre> • Transparent to user • Standard Web Servers or Caches • Multi connection delivery (HTTP/TCP) • Fast Start, Fast Seek, Smooth Adaptive • Client Control: rapid adaptive • Client control: rapid adaptive management • Genuine video <i>Id.</i> Thus, MOVE's system practiced receiving the requested streamlets from the server via the one or more network connections.