

Civil Action No. 2:18-cv-90-JRG-RSP (E.D. Texas)
Personalized Media Communications, LLC v. Google LLC

Exhibit A

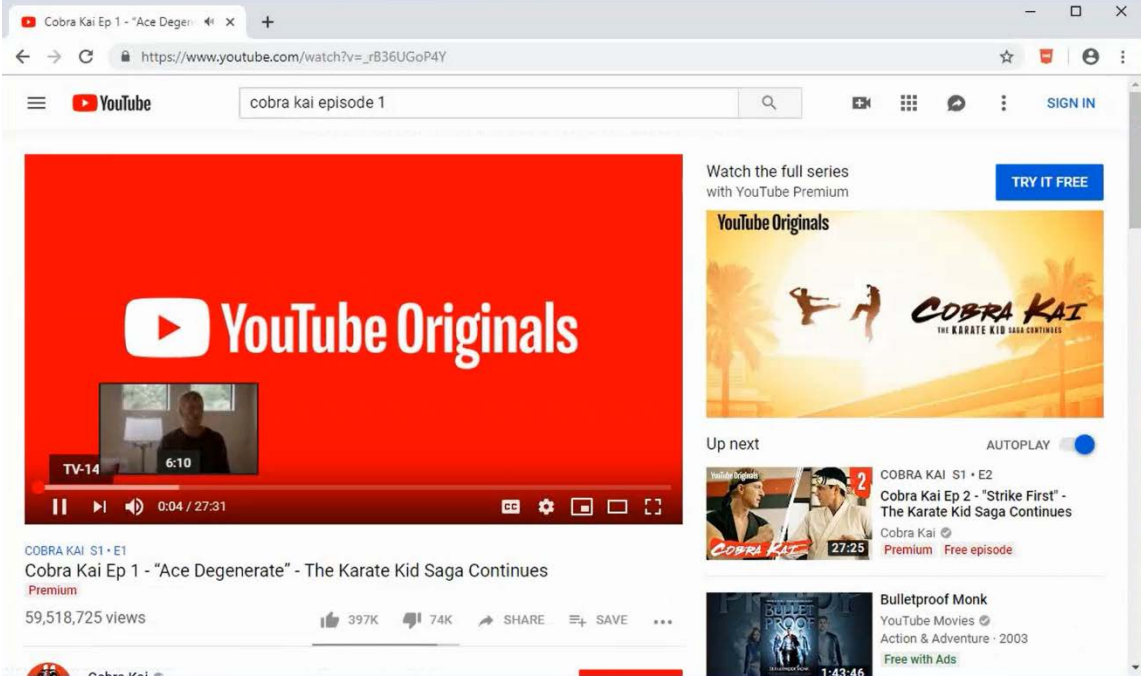
U.S. Patent No. 7,747,217 – Google YouTube

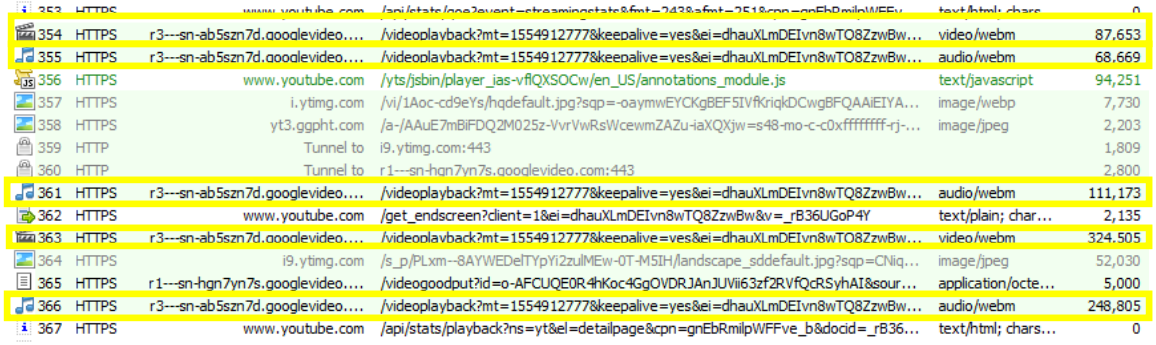
The following claim chart includes illustrations, diagrams, and references relating to the accused Google systems and services. Various systems, components and, and technical excerpts specifically cited herein are intended to illustrate theories of infringement, and are not intended to exclude other Google systems or components from allegations of infringement. Further, to the extent that multiple cases of infringement are set forth in the below charts, if no reference is made to a specific case with respect to a claim or claim element, the evidence of infringement applies to all cases of infringement set forth for that claim, or the claim(s) on which that claim depends.


Claim	Claim Element	Evidence of Infringement
1[a]	A method of outputting a multimedia presentation at a receiver station adapted to receive a plurality of signals, said method comprising the steps of:	<p>Google performs method of outputting a multimedia presentation at a receiver station adapted to receive a plurality of signals.</p> <p>For example, Google outputs multimedia presentations at devices running YouTube software (in app or website format), such as a phone, tablet, TV, computer, or a gaming console.</p> <p><i>See, e.g.,</i></p> <p>System requirements</p> <p>In order to watch YouTube videos, make sure you have the most up to date browser, operating system, and a good Internet connection:</p> <ul style="list-style-type: none"> • Most recent version of Google Chrome, Firefox, MS Edge, Safari, or Opera • Internet connection with 500+ Kbps <p>YouTube Help, System requirements, https://support.google.com/youtube/answer/78358?hl=en (PMCGOOGLETECH_00000685).</p> <p><i>See also</i> YouTube TV supported platforms:</p> <p>Mobile devices & computers</p> <ul style="list-style-type: none"> • You can watch YouTube TV on your mobile device, including certain smartphones and tablets. • YouTube TV also works in a web browser on your computer. • Check out System requirements below to see specific requirements by platform (mobile device, etc.) <p>Streaming media players, smart TVs & game consoles</p> <p>You can stream YouTube TV to your TV using:</p> <ul style="list-style-type: none"> • Chromecast devices. Note: If you're using a first generation Chromecast , you may experience a higher rate of errors. It may also take up to 30 seconds to load. • TVs with Chromecast built-in (e.g., Android TV) • AirPlay for Apple TV

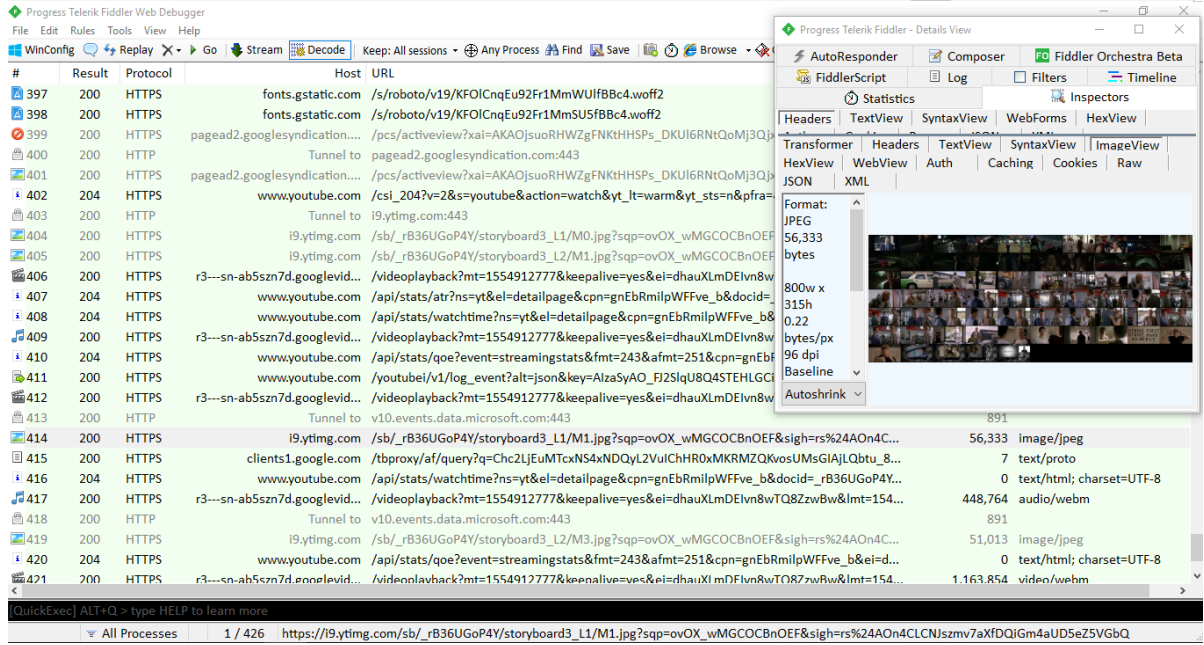
Claim	Claim Element	Evidence of Infringement
		<ul style="list-style-type: none"> Google Smart Displays <p>You can also download the YouTube TV app on select devices to watch YouTube TV on your TV.</p> <p>Our TV app is available on:</p> <ul style="list-style-type: none"> Android TV All Vizio SmartCast TVs Samsung & LG smart TVs (2016 models and newer) HiSense TVs (models: MTK5658, MTK5659, MSD6586) Apple TV (4th generation) and Apple TV 4K Xbox One, Xbox One S, and Xbox One X Roku: All Roku TVs, Roku Ultra, Roku Streaming Stick+, Roku Streaming Stick (3800x, 3600x), Roku Express/Express+ (3910x, 3900x, 3710x, 3700x), Roku Premiere+, Roku Premiere, Roku 4, Roku 3 (4200x, 4230x), and Roku 2 (4210x). <p>YouTube TV Help, Supported devices, https://support.google.com/youtubetv/answer/7129767 (PMCGOOGLETECH_00000682).</p> <p>The receiver station is adapted to receive plurality of signals, such as, for example, TCP/IP packets carrying audio and/or video signals and thumbnail images that appear during fast forward and rewind operations, or once the mouse or another pointer device is placed on the progress bar of the YouTube software player during a title playback, for the titles available and/or being transmitted for a given region through, for example, the Google content delivery network.</p>

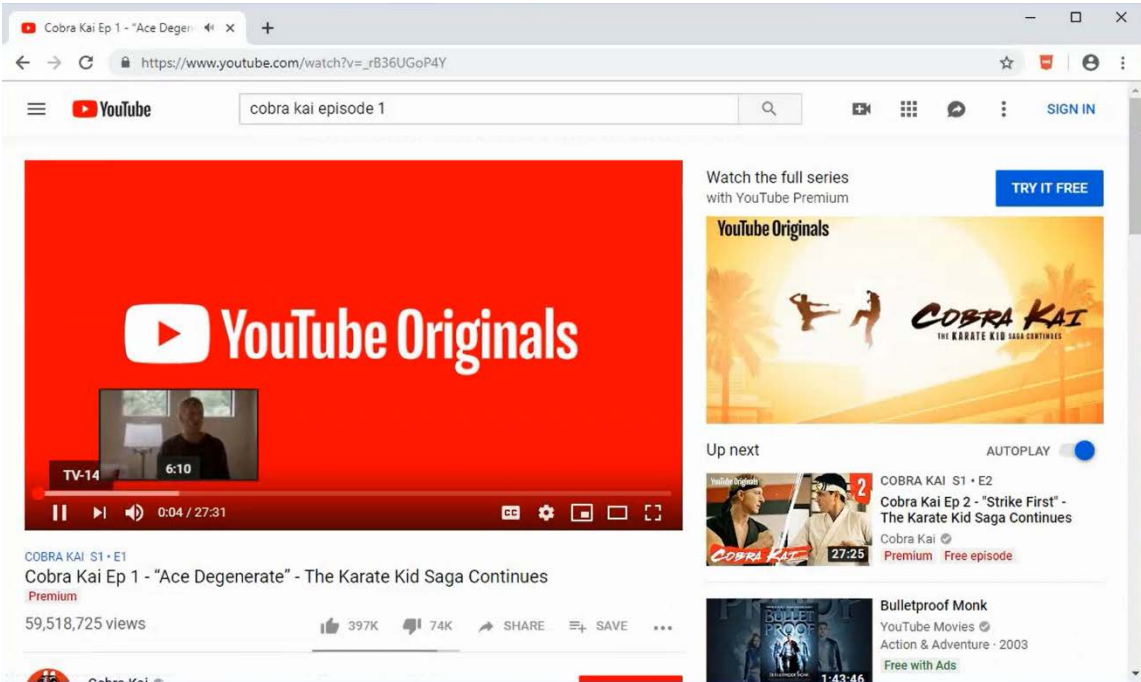
Claim	Claim Element	Evidence of Infringement
		 <p>Screenshot of YouTube stream on smartphone (PMCGOOGLETECH_00001452).</p>

Claim	Claim Element	Evidence of Infringement
		 <p>Screenshot of YouTube stream (PMCGOOGLETECH_00000494).</p>
1[b]	receiving said plurality of signals including at least two media which include a first medium received in a digital data channel from a source external to said receiver station;	<p>Google receives said plurality of signals including at least two media which include a first medium received in a digital data channel from a source external to said receiver station. Google receives the plurality of signals, such as TCP/IP packets. The TCP/IP packets include audio and/or video signals (first medium) for the title requested by the user through the YouTube software on the receiver station and preview thumbnail images for that title (second medium).</p> <p>For example, Google receives one or more TCP/IP packets that encapsulate audio and/or video information of the title, the first medium, from a source external to said receiver station, such as a Google edge node (PoP or Google Global Cache) or a core data center.</p>

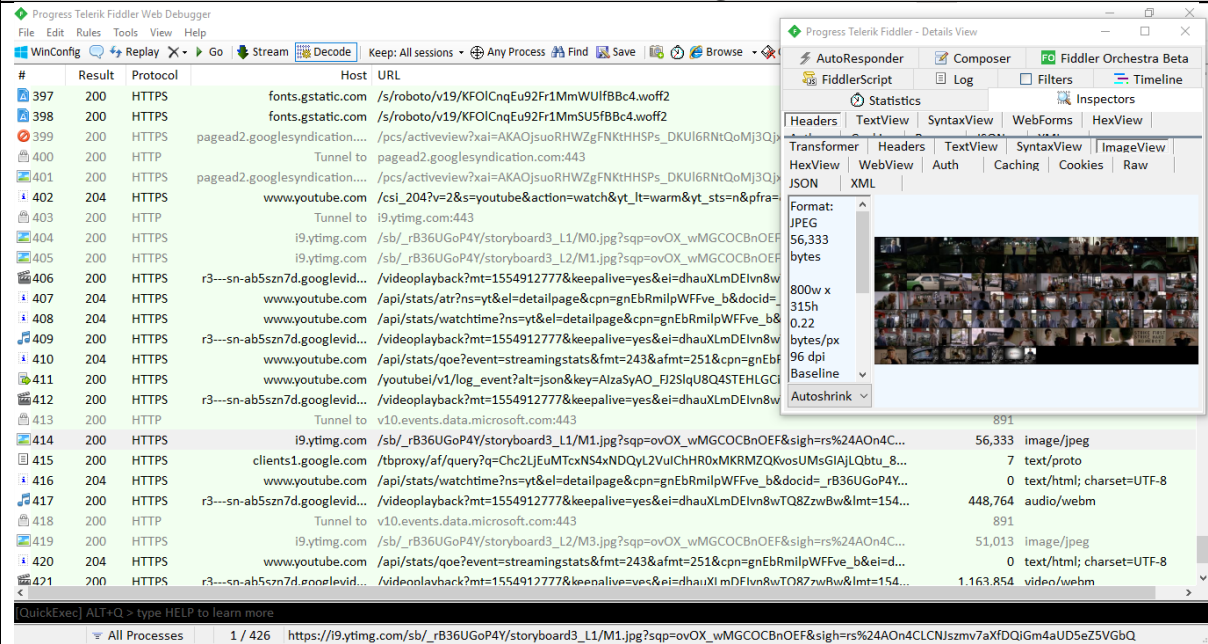
Claim	Claim Element	Evidence of Infringement
		<p><i>See, e.g.,</i></p>  <p>HTTP/HTTPS traffic capture for YouTube Video (yellow boxes added) (PMCGOOGLETECH_00000651).</p> <p>Google receives the first medium in a digital data channel, such as a TCP connection.</p> <p>Connections:</p> <p>The reliability and flow control mechanisms described above require that TCPs initialize and maintain certain status for each data stream. The combination of this information, including sockets, sequence numbers, and window sizes, is called a connection. Each connection is uniquely specified by a pair of sockets identifying its two sides.</p> <p>When two processes wish to communicate, their TCP's must first establish a connection (initialize the status information on each side). When their communication is complete, the connection is terminated or closed to free the resources for other uses.</p> <p>...</p> <p>2.7. Connection Establishment and Clearing</p> <p>To identify the separate data streams that a TCP may handle, the TCP provides a port identifier. Since port identifiers are selected independently by each TCP they might not be unique. To provide for unique addresses within each TCP, we concatenate an internet address identifying the TCP with a port identifier to create a socket which will be unique throughout all networks connected together.</p>

Claim	Claim Element	Evidence of Infringement
		<p>A connection is fully specified by the pair of sockets at the ends. A local socket may participate in many connections to different foreign sockets. A connection can be used to carry data in both directions, that is, it is "full duplex". https://tools.ietf.org/html/rfc793 (PMCGOOGLETECH_00003189).</p> <p>Google receives the first medium from a Google content server, such as a server with the domain name r3---sn-ab5sxn7d.googlevideo.com, which is a source external to the receiver station.</p>
1[c]	storing information from said first medium in a storage medium at a computer at said receiver station;	<p>Google stores information from said first medium in a storage medium at a computer at said receiver station.</p> <p>The receiver station comprises a computer that includes a storage medium, such as memory. Examples of such memory may be a volatile RAM, Flash, or hard drive.</p>  <p>Google stores the audio and/or video information from the first medium in such memory. Google stores the information from the medium containing audio and/or video content for the user selected title in various buffers and memories. For example, Google stores the medium in a buffer or memory when processing IP packets encapsulating the medium, TCP packets encapsulating the medium, when performing decoding, and prior to outputting on the screen, for example, when combining with the preview thumbnail images. The medium is further buffered in the memory of the receiver station after decoding to provide additional time for uninterrupted viewing experience in case of degraded or lost internet connection.</p>

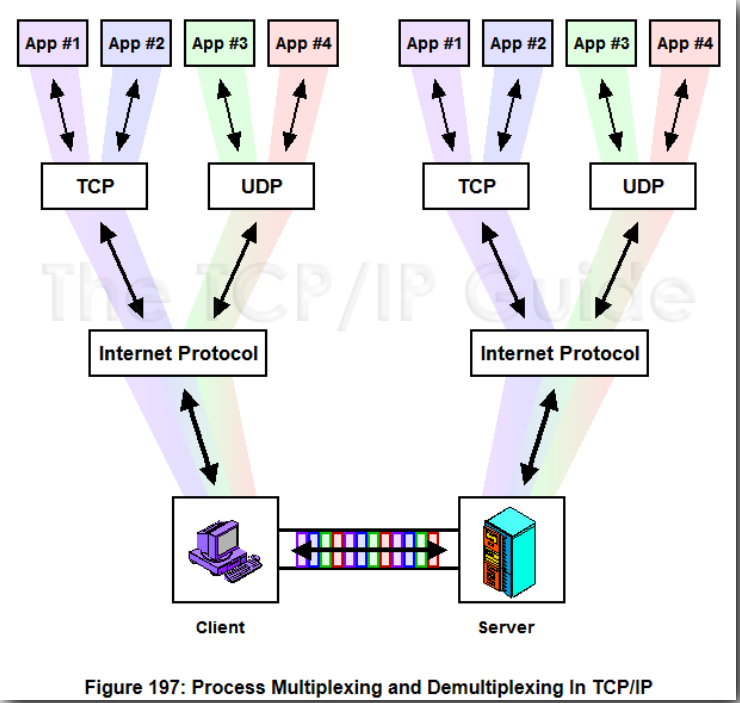
Claim	Claim Element	Evidence of Infringement
1[d]	determining content, through use of processor instructions resident on said computer at said receiver station, of each medium received after said first medium in said plurality of signals,	<p>Google determines content, through use of processor instructions resident on said computer at said receiver station, of each medium received after said first medium in said plurality of signals.</p> <p>For example, Google uses processor instructions resident on the computer, such as high-level or machine language instructions (via a YouTube app or Javascript and/or other Google code), to control the computer at the receiver station discussed above.</p> <p>After the first medium is received, using these processor instructions, Google determines content of each received medium, such as preview thumbnail images.</p> <p><i>See, e.g.,</i></p>  <p>The screenshot displays the Fiddler Web Debugger interface with a list of network sessions. Session 414 is highlighted, showing a GET request for a JPEG image from i9.ytimg.com. The corresponding details pane on the right shows the image's metadata: 800w x 315h, 56,333 bytes, and a preview of the thumbnail image. The Fiddler Viewer at the bottom shows the raw data of the session, including the image bytes.</p> <p>YouTube trace in Fiddler web debugger and viewer showing downloaded thumbnails (PMCGOOGLETECH_00000652).</p>

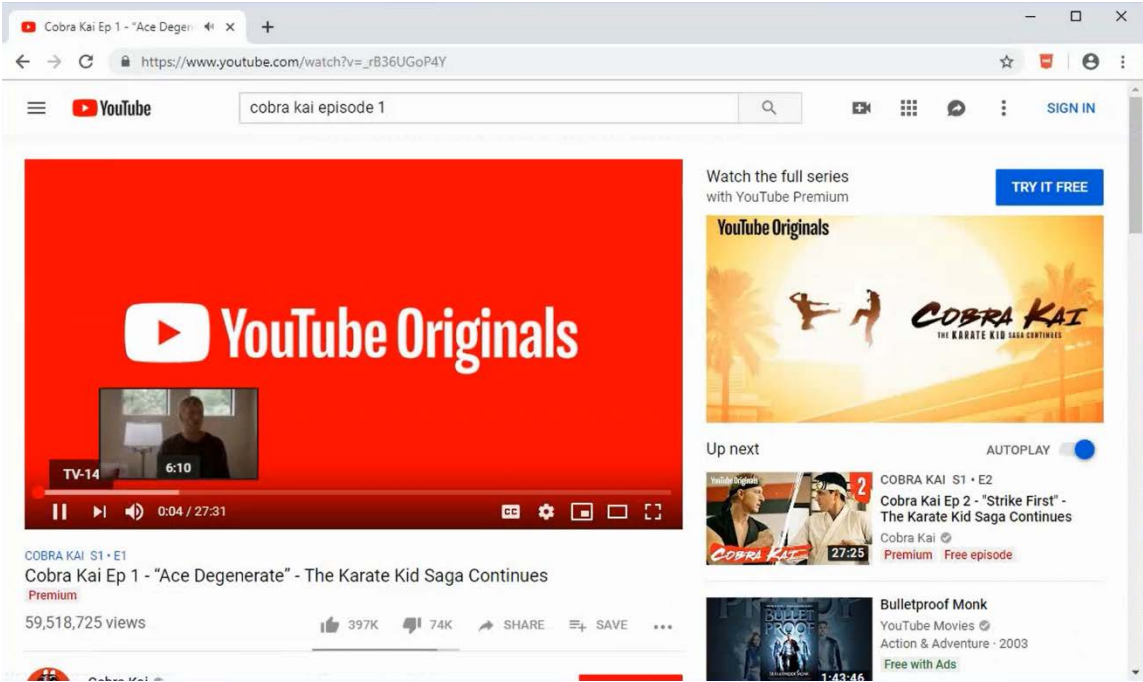
Claim	Claim Element	Evidence of Infringement
		<p>For example, Google determines content of the preview thumbnail images medium after the audio and/or video information of the title has been received.</p>  <p>Screenshot of YouTube stream (PMCGOOGLETECH_00000494).</p>
1[e]	wherein determining content of each medium comprises: processing an identifier which identifies said content of each of said medium: comparing said processed identifier to a predetermined identifier,	<p>Google's determining content of each medium comprises processing an identifier which identifies said content of each of said medium, comparing said processed identifier to a predetermined identifier, wherein said predetermined identifier is determined at a time prior to receiving said plurality of signals.</p> <p>For example, an identifier used by Google comprises a TCP destination port number and/or a media content marker, which are included in TCP packets, headers, media and file containers.</p>


Claim	Claim Element	Evidence of Infringement
	<p>wherein said predetermined identifier is determined at a time prior to receiving said plurality of signals;</p>	<p>When a connection is established between the receiver station and an external source, a port number is assigned to that connection by the processor.</p> <p>2.7. Connection Establishment and Clearing</p> <p>To identify the separate data streams that a TCP may handle, the TCP provides a port identifier. Since port identifiers are selected independently by each TCP they might not be unique. To provide for unique addresses within each TCP, we concatenate an internet address identifying the TCP with a port identifier to create a socket which will be unique throughout all networks connected together.</p> <p>https://tools.ietf.org/html/rfc793 (PMCGOOGLETECH_00003189).</p> <p>The assignment of the port to a connection and the establishment of the connection occur before the receiving station receives TCP/IP packets on that connection.</p> <p>Google processes each identifier discussed above using a processor at a receiver station. For example, headers of packets received by Google at the receiver station include a TCP destination port number. Google processes the header of each packet to compare the port number in the header to the port number assigned to the connection.</p> <p>In one example, the TCP destination port, content-type, and/or the image identifier (JPG/JFIF) identifies the content of a medium received after the first medium, such as the trace entry 414 in the illustration below carrying preview thumbnail images.</p>

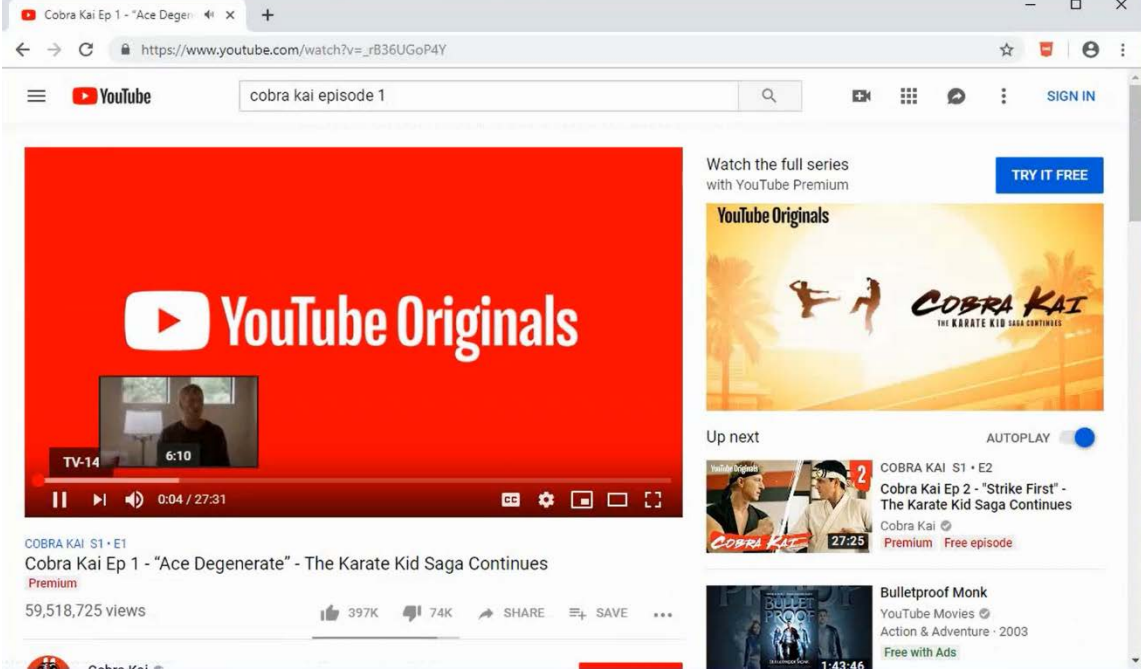
Claim	Claim Element	Evidence of Infringement
		 <p>The screenshot displays the Progress Telerik Fiddler Web Debugger interface. The main pane shows a list of network requests with columns for #, Result, Protocol, Host, and URL. A detailed view of a specific request (ID 414) is shown on the right, displaying the response body as a grid of small thumbnail images. The URL bar at the bottom shows the request URL: https://i9.ytimg.com/sb/_rB36UGoP4Y/storyboard3_L1/M1.jpg?sqp=ovOX_wMGCOCBnOEF&sig=rs%24AOn4CLCNjsmzv7aXfDQJGm4aUD5eZ5VGbQ.</p> <p>YouTube trace in Fiddler web debugger and viewer showing downloaded thumbnails (PMCGOOGLETECH_00000652).</p> <p>In another example, the TCP destination port, content-type, and/or audio/video markers identify audio and/or video content.</p>

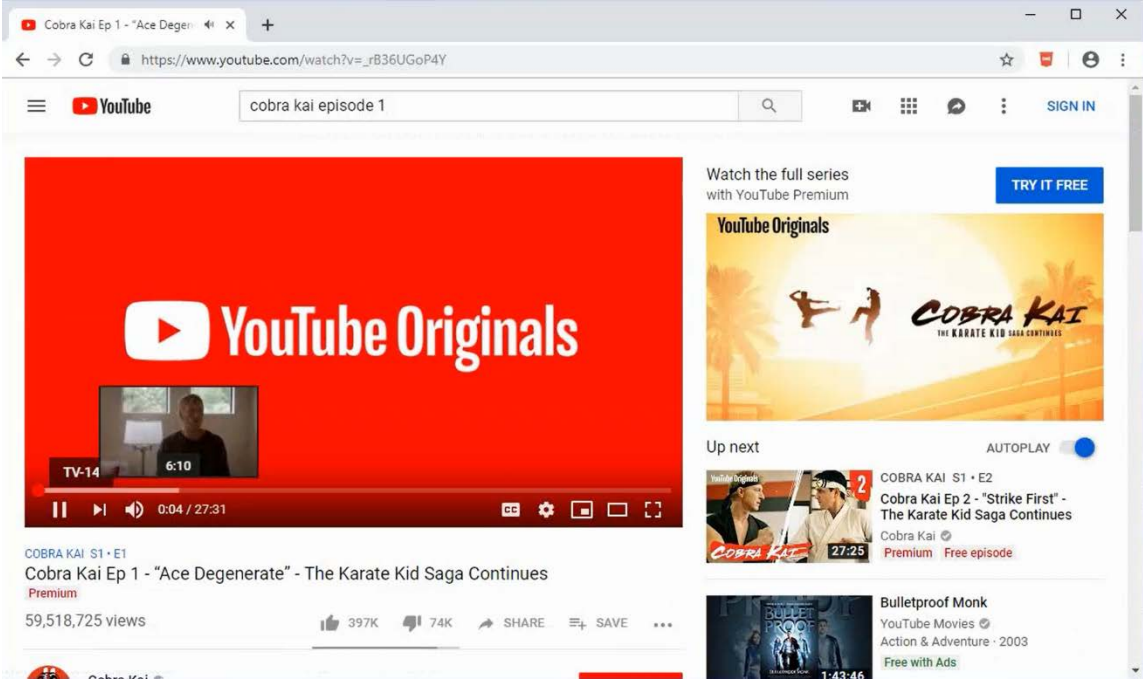
Claim	Claim Element	Evidence of Infringement																																																																																										
		<p>See, e.g.,</p> <table><tr><td>353</td><td>HTTPS</td><td>www.youtube.com</td><td>/api/stats/onevent-streamingstats&fmt=243&afmt=251&cpn=gnEbRmlpWFFve_b&docid=_rB36...</td><td>text/html; chars...</td><td>0</td></tr><tr><td>354</td><td>HTTPS</td><td>r3---sn-ab5sxn7d.googlevideo....</td><td>/videoplayback?mt=1554912777&keepalive=yes&ei=dhauXmDEIvn8wTO8ZzwBw...</td><td>video/webm</td><td>87,653</td></tr><tr><td>355</td><td>HTTPS</td><td>r3---sn-ab5sxn7d.googlevideo....</td><td>/videoplayback?mt=1554912777&keepalive=yes&ei=dhauXmDEIvn8wTO8ZzwBw...</td><td>audio/webm</td><td>68,669</td></tr><tr><td>356</td><td>HTTPS</td><td>www.youtube.com</td><td>/yts/jsbin/player_ias-vfQXSOcw/en_US/annotations_module.js</td><td>text/javascript</td><td>94,251</td></tr><tr><td>357</td><td>HTTPS</td><td>i.ytimg.com</td><td>/vi/1Aoc-cd9eYs/hqdefault.jpg?sqp=oaYmwEYCKgBEF5IVfkrqkDCwgBFQAAIEIYA...</td><td>image/webp</td><td>7,730</td></tr><tr><td>358</td><td>HTTPS</td><td>yt3.ggpht.com</td><td>/a-/AAuE7mBIFDQ2M025z-VvrVwRsWcewmZAZu-iaXQXjw=s48-mo-c-c0xffffff-rj-...</td><td>image/jpeg</td><td>2,203</td></tr><tr><td>359</td><td>HTTP</td><td>Tunnel to</td><td>i9.ytimg.com:443</td><td></td><td>1,809</td></tr><tr><td>360</td><td>HTTP</td><td>Tunnel to</td><td>r1---sn-hgn7yn7s.googlevideo.com:443</td><td></td><td>2,800</td></tr><tr><td>361</td><td>HTTPS</td><td>r3---sn-ab5sxn7d.googlevideo....</td><td>/videoplayback?mt=1554912777&keepalive=yes&ei=dhauXmDEIvn8wTO8ZzwBw...</td><td>audio/webm</td><td>111,173</td></tr><tr><td>362</td><td>HTTPS</td><td>www.youtube.com</td><td>/get_endscreen?client=1&ei=dhauXmDEIvn8wTO8ZzwBw&v=_rB36UGoP4Y</td><td>text/plain; char...</td><td>2,135</td></tr><tr><td>363</td><td>HTTPS</td><td>r3---sn-ab5sxn7d.googlevideo....</td><td>/videoplayback?mt=1554912777&keepalive=yes&ei=dhauXmDEIvn8wTO8ZzwBw...</td><td>video/webm</td><td>324,505</td></tr><tr><td>364</td><td>HTTPS</td><td>i9.ytimg.com</td><td>/s_p/PLxm--8AYWEdeITyPi2zulMEw-OT-MSIH/landscape_sddefault.jpg?sqp=CNliq...</td><td>image/jpeg</td><td>52,030</td></tr><tr><td>365</td><td>HTTPS</td><td>r1---sn-hgn7yn7s.googlevideo....</td><td>/videogoodput?id=o-AFCUQE0R4hKoc4GgOVDRIAnJUvi63zf2RVfQcRSyhAI&sour...</td><td>application/octe...</td><td>5,000</td></tr><tr><td>366</td><td>HTTPS</td><td>r3---sn-ab5sxn7d.googlevideo....</td><td>/videoplayback?mt=1554912777&keepalive=yes&ei=dhauXmDEIvn8wTO8ZzwBw...</td><td>audio/webm</td><td>248,805</td></tr><tr><td>367</td><td>HTTPS</td><td>www.youtube.com</td><td>/api/stats/playback?ns=yt&el=detailpage&cpn=gnEbRmlpWFFve_b&docid=_rB36...</td><td>text/html; chars...</td><td>0</td></tr></table> <p>HTTP/HTTPS traffic capture for YouTube Video (yellow boxes added) (PMCGOOGLETECH_00000651).</p> <p>At the Transport Layer a port takes the role of the office phone number extension for networked communications. A port number identifies the process on the host communicating. Just like the Data Link Layer and Network Layer addresses, for each networked communication there is a source port and a destination port. The source port identifies the process communicating on the source host, and the destination port identifies the process communicating on the destination host.</p> <p>U.S. Naval Academy, Cyber Battlefield, Transport Layer Lecture, https://www.usna.edu/CyberDept/sy110/lec/netTrans/lec.html (PMCGOOGLETECH_00000788).</p>	353	HTTPS	www.youtube.com	/api/stats/onevent-streamingstats&fmt=243&afmt=251&cpn=gnEbRmlpWFFve_b&docid=_rB36...	text/html; chars...	0	354	HTTPS	r3---sn-ab5sxn7d.googlevideo....	/videoplayback?mt=1554912777&keepalive=yes&ei=dhauXmDEIvn8wTO8ZzwBw...	video/webm	87,653	355	HTTPS	r3---sn-ab5sxn7d.googlevideo....	/videoplayback?mt=1554912777&keepalive=yes&ei=dhauXmDEIvn8wTO8ZzwBw...	audio/webm	68,669	356	HTTPS	www.youtube.com	/yts/jsbin/player_ias-vfQXSOcw/en_US/annotations_module.js	text/javascript	94,251	357	HTTPS	i.ytimg.com	/vi/1Aoc-cd9eYs/hqdefault.jpg?sqp=oaYmwEYCKgBEF5IVfkrqkDCwgBFQAAIEIYA...	image/webp	7,730	358	HTTPS	yt3.ggpht.com	/a-/AAuE7mBIFDQ2M025z-VvrVwRsWcewmZAZu-iaXQXjw=s48-mo-c-c0xffffff-rj-...	image/jpeg	2,203	359	HTTP	Tunnel to	i9.ytimg.com:443		1,809	360	HTTP	Tunnel to	r1---sn-hgn7yn7s.googlevideo.com:443		2,800	361	HTTPS	r3---sn-ab5sxn7d.googlevideo....	/videoplayback?mt=1554912777&keepalive=yes&ei=dhauXmDEIvn8wTO8ZzwBw...	audio/webm	111,173	362	HTTPS	www.youtube.com	/get_endscreen?client=1&ei=dhauXmDEIvn8wTO8ZzwBw&v=_rB36UGoP4Y	text/plain; char...	2,135	363	HTTPS	r3---sn-ab5sxn7d.googlevideo....	/videoplayback?mt=1554912777&keepalive=yes&ei=dhauXmDEIvn8wTO8ZzwBw...	video/webm	324,505	364	HTTPS	i9.ytimg.com	/s_p/PLxm--8AYWEdeITyPi2zulMEw-OT-MSIH/landscape_sddefault.jpg?sqp=CNliq...	image/jpeg	52,030	365	HTTPS	r1---sn-hgn7yn7s.googlevideo....	/videogoodput?id=o-AFCUQE0R4hKoc4GgOVDRIAnJUvi63zf2RVfQcRSyhAI&sour...	application/octe...	5,000	366	HTTPS	r3---sn-ab5sxn7d.googlevideo....	/videoplayback?mt=1554912777&keepalive=yes&ei=dhauXmDEIvn8wTO8ZzwBw...	audio/webm	248,805	367	HTTPS	www.youtube.com	/api/stats/playback?ns=yt&el=detailpage&cpn=gnEbRmlpWFFve_b&docid=_rB36...	text/html; chars...	0
353	HTTPS	www.youtube.com	/api/stats/onevent-streamingstats&fmt=243&afmt=251&cpn=gnEbRmlpWFFve_b&docid=_rB36...	text/html; chars...	0																																																																																							
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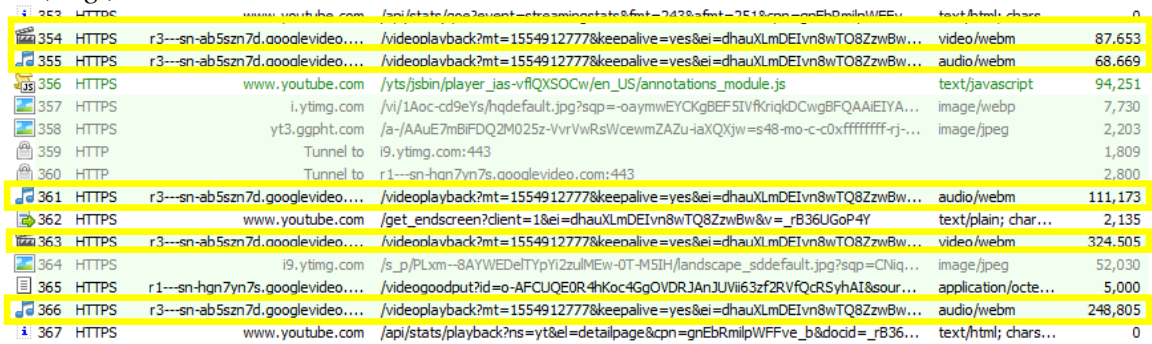
Claim	Claim Element	Evidence of Infringement
		 <p>Figure 197: Process Multiplexing and Demultiplexing In TCP/IP</p> <p>The TCP/IP Guide, TCP/IP Processes, Multiplexing and Client/Server Application Roles, http://www.tcpiipguide.com/free/t_TCPIPProcessesMultiplexingandClientServerApplicati-2.htm (PMCGOOGLETECH_00000687).</p>
1[f]	coordinating, through use of processor instructions resident on said computer at said receiver station, a presentation using said information with a presentation of a	<p>Google coordinates, through use of processor instructions resident on said computer at said receiver station, a presentation using said information with a presentation of a medium comprising an identifier that matches said predetermined identifier based on said step of determining content.</p> <p>Through the use of the processor instructions that reside and execute on the receiver station's computer, Google coordinates the presentation of the information such as audio and/or video information for the user requested title with a presentation of the medium comprising an</p>

Claim	Claim Element	Evidence of Infringement
	medium comprising an identifier that matches said predetermined identifier based on said step of determining content; and	<p>identifier that matches the predetermined identifier, such as preview thumbnail images as discussed above in 1[e].</p> <p>For example, the Google software displays an overlay of the playback of the requested title with the preview thumbnail corresponding to a location within the program timeline displayed when, for example the user hovers a pointing device over the progress bar or the user is fast forwarding or rewinding through the title.</p>  <p>Screenshot of YouTube stream (PMCGOOGLETECH_00000494).</p>

Claim	Claim Element	Evidence of Infringement
		 <p>Screenshot of YouTube stream on smartphone (PMCGOOGLETECH_00001452)</p>
1[g]	outputting and displaying said multimedia presentation to a user at said receiver station based on said step of coordinating	<p>Google outputs and displays said multimedia presentation to a user at said receiver station based on said step of coordinating.</p> <p>See 1[g].</p>

Claim	Claim Element	Evidence of Infringement
		 <p>Screenshot of YouTube stream (PMCGOOGLETECH_00000494).</p>
1[h]	such that said presentation using said information has a predetermined relationship to said content of said medium comprising an identifier that matches said predetermined identifier and	<p>Google outputs and displays said multimedia presentation to a user at said receiver station . . . such that said presentation using said information has a predetermined relationship to said content of said medium comprising an identifier that matches said predetermined identifier.</p> <p>For example, the displaying of the preview thumbnail images at a given location of the progress bar is related to the audio and/or video information at the corresponding time on the progress bar, with the relationship being predetermined before transmission and/or during encoding of the title.</p>

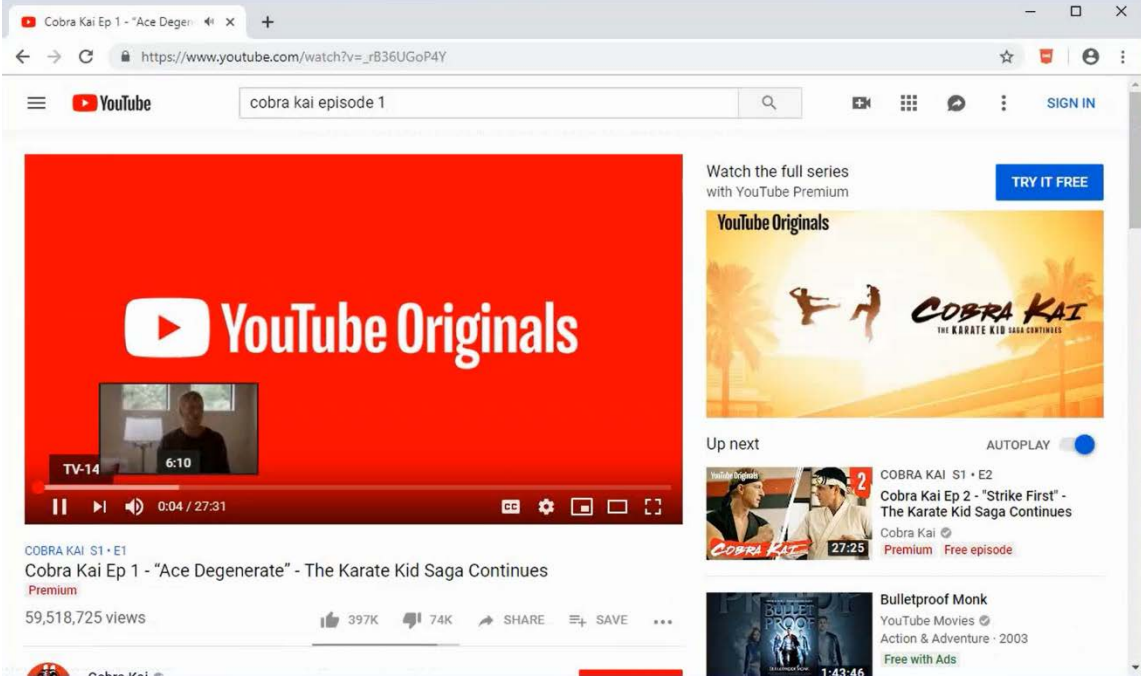
Claim	Claim Element	Evidence of Infringement
1[i]	said content of said medium comprising an identifier that matches said predetermined identifier explains a significance of said presentation using said information.	<p>Google outputs and displays said multimedia presentation to a user at said receiver station . . . such that . . . said content of said medium comprising an identifier that matches said predetermined identifier explains a significance of said presentation using said information.</p> <p>For example, the preview thumbnail images explain the significance of the audio and/or video information for the user requested title. For example, the preview thumbnail images explain a significance of the audio and/or video content that will follow or preceded that content that is currently playing.</p>  <p>Screenshot of YouTube stream (PMCGOOGLETECH_00000494).</p>
2	The method of claim 1, wherein each of said plurality of signals is	See claim 1.

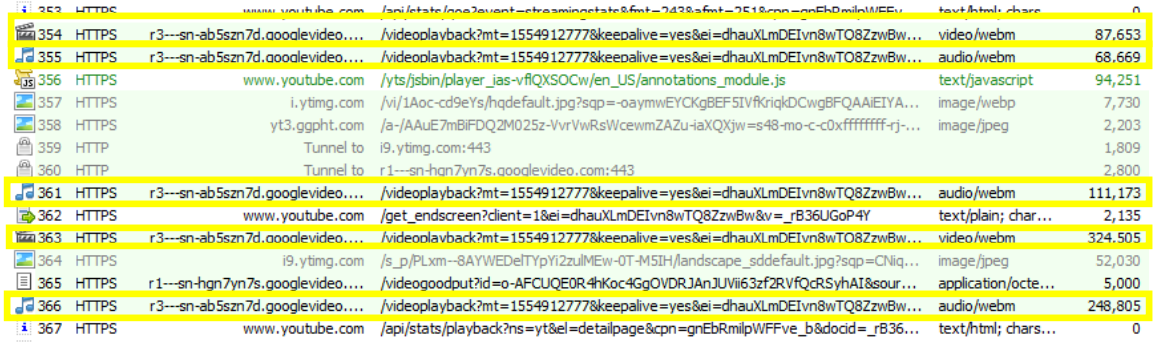
Claim	Claim Element	Evidence of Infringement
	received from an external transmitter station.	<p>In the method of claim 1, each of said plurality of signals is received from an external transmitter station.</p> <p>Google receives each TCP/IP packet from external sources such as the source with domain name i9.ytimg.com and the source with domain name r3---sn-ab5sxn7d.googlevideo.com.</p> <p><i>See, e.g.,</i></p>  <p>HTTP/HTTPS traffic capture for YouTube Video (yellow boxes added) (PMCGOOGLETECH_00000651).</p>
3	The method of claim 2, wherein said external transmitter station is an intermediate transmitter station.	<p><i>See claim 2.</i></p> <p>In one example, in claim 2, the external transmitter station is an edge node, such as a PoP or GGC, which is an intermediate transmitter station.</p> <p><i>See, e.g.,</i></p> <p>Edge Points of Presence (PoPs) Our Edge Points of Presence (PoPs) are where we connect Google's network to the rest of the internet via peering. We are present on over 90 internet exchanges and at over 100 interconnection facilities around the world.</p>

Claim	Claim Element	Evidence of Infringement
		<p>By operating an extensive global network of interconnection points we can bring Google traffic closer to our peers, thereby reducing their costs and providing users with a better experience.</p> <p>Google operates a large, global meshed network that connects our Edge PoPs to our data centers.</p> <p>Google Edge Network, Infrastructure, https://peering.google.com/#/infrastructure (PMCGOOGLETECH_00000603).</p> <p>Edge nodes (Google Global Cache, or GGC)</p> <p>Our edge nodes (called Google Global Cache, or GGC) represent the tier of Google's infrastructure closest to our users. With our edge nodes, network operators and internet service providers deploy Google-supplied servers inside their network.</p> <p>Static content that is very popular with the local host's user base, including YouTube and Google Play, is temporarily cached on edge nodes. Google's traffic management systems direct user requests to an edge node that will provide the best experience.</p> <p>Google Edge Network, Infrastructure, https://peering.google.com/#/infrastructure (PMCGOOGLETECH_00000604).</p>
9	The method of claim 1, further comprising the step of storing said medium comprising an identifier that matches said predetermined identifier at said receiver station.	<p><i>See claim 1.</i></p> <p>The method of claim 1 performed by Google further comprises the step of storing said medium comprising an identifier that matches said predetermined identifier at said receiver station.</p> <p>Google stores the medium containing the preview thumbnail images in various buffers and memories. For example, Google stores the medium in a buffer or memory when processing IP packets encapsulating the medium, TCP packets encapsulating the medium, when performing decoding, and prior to outputting on the screen, for example, when combining with the audio and/or video information of the title.</p>

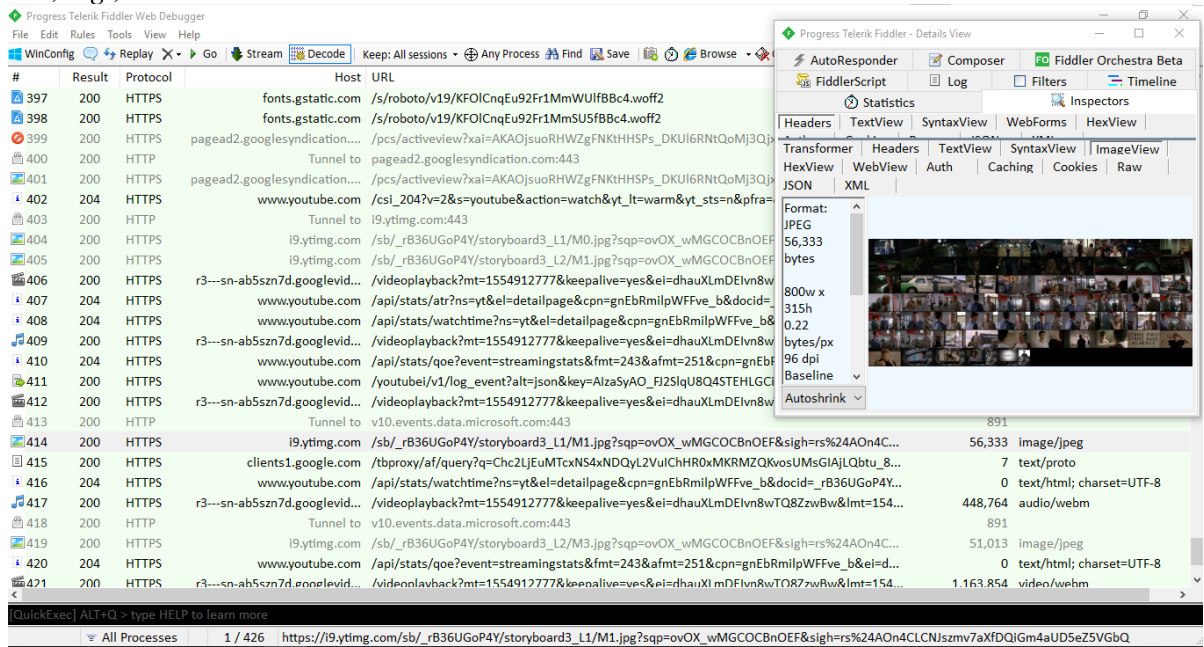
Claim	Claim Element	Evidence of Infringement
11[a]	A method of outputting a multimedia presentation at a receiver station adapted to process a plurality of signals, said plurality of signals including first and second media of said multimedia presentation, said method comprising the steps of:	<p>Google performs a method of outputting a multimedia presentation at a receiver station adapted to process a plurality of signals, said plurality of signals including first and second media of said multimedia presentation.</p> <p>For example, Google outputs multimedia presentations at devices running YouTube software (in app or website format), such as a phone, tablet, TV, computer, or a gaming console.</p> <p><i>See, e.g.,</i></p> <p>System requirements</p> <p>In order to watch YouTube videos, make sure you have the most up to date browser, operating system, and a good Internet connection:</p> <ul style="list-style-type: none"> • Most recent version of Google Chrome, Firefox, MS Edge, Safari, or Opera • Internet connection with 500+ Kbps <p>YouTube Help, System requirements, https://support.google.com/youtube/answer/78358?hl=en (PMCGOOGLETECH_00000685).</p> <p><i>See also</i> YouTube TV supported platforms:</p> <p>Mobile devices & computers</p> <ul style="list-style-type: none"> • You can watch YouTube TV on your mobile device, including certain smartphones and tablets. • YouTube TV also works in a web browser on your computer. • Check out System requirements below to see specific requirements by platform (mobile device, etc.) <p>Streaming media players, smart TVs & game consoles</p> <p>You can stream YouTube TV to your TV using:</p> <ul style="list-style-type: none"> • Chromecast devices. Note: If you're using a first generation Chromecast , you may experience a higher rate of errors. It may also take up to 30 seconds to load. • TVs with Chromecast built-in (e.g., Android TV)

Claim	Claim Element	Evidence of Infringement
		<ul style="list-style-type: none"> • AirPlay for Apple TV • Google Smart Displays <p>You can also download the YouTube TV app on select devices to watch YouTube TV on your TV.</p> <p>Our TV app is available on:</p> <ul style="list-style-type: none"> • Android TV • All Vizio SmartCast TVs • Samsung & LG smart TVs (2016 models and newer) • HiSense TVs (models: MTK5658, MTK5659, MSD6586) • Apple TV (4th generation) and Apple TV 4K • Xbox One, Xbox One S, and Xbox One X • Roku: All Roku TVs, Roku Ultra, Roku Streaming Stick+, Roku Streaming Stick (3800x, 3600x), Roku Express/Express+ (3910x, 3900x, 3710x, 3700x), Roku Premiere+, Roku Premiere, Roku 4, Roku 3 (4200x, 4230x), and Roku 2 (4210x). <p>YouTube TV Help, Supported devices, https://support.google.com/youtubetv/answer/7129767 (PMCGOOGLETECH_00000682).</p> <p>The receiver station is adapted to process a plurality of signals, such as, for example, TCP/IP packets carrying audio and/or video signals and thumbnail images that appear during fast forward and rewind operations, or once the mouse or another pointer device is placed on the progress bar of the YouTube software player during a title playback for the titles available and/or being transmitted for a given region through, for example, the Google content delivery network.</p> <p>The plurality of signals includes a first media, for example, audio and/or video signals for a title requested by the user through the Google software and a second media, such as corresponding preview thumbnail images for the title.</p> <p>Google outputs multimedia presentation at the receiver station discussed above.</p>

Claim	Claim Element	Evidence of Infringement
		 <p>Screenshot of YouTube stream (PMCGOOGLETECH_00000494).</p>
11[b]	<p>receiving a subset of said plurality of signals from a source external to said receiver station, each signal of said subset of said plurality of signals including an identifier, wherein said subset of said plurality of signals comprises a plurality of said plurality of signals;</p>	<p>Google receiver station receives a subset of said plurality of signals from a source external to said receiver station, each signal of said subset of said plurality of signals including an identifier, wherein said subset of said plurality of signals comprises a plurality of said plurality of signals.</p> <p>For example, Google receiver station receives from a source external to said receiver station, such as a Google server, TCP/IP packets that encapsulate audio and/or video information of the title.</p> <p>Each packet of the subset that carry encoded audio and/or video information for the user-requested title includes an identifier, such as a TCP Destination Port and/or a media content marker.</p>

Claim	Claim Element	Evidence of Infringement
		<p><i>See, e.g.,</i></p>  <p>HTTP/HTTPS traffic capture for YouTube Video (yellow boxes added) (PMCGOOGLETECH_00000651).</p> <p><i>See, e.g.,</i></p> <p>At the Transport Layer a port takes the role of the office phone number extension for networked communications. A port number identifies the process on the host communicating. Just like the Data Link Layer and Network Layer addresses, for each networked communication there is a source port and a destination port. The source port identifies the process communicating on the source host, and the destination port identifies the process communicating on the destination host.</p> <p>U.S. Naval Academy, Cyber Battlefield, Transport Layer Lecture, https://www.usna.edu/CyberDept/sy110/lec/netTrans/lec.html (PMCGOOGLETECH_00000788).</p> <p>2.7. Connection Establishment and Clearing</p> <p>To identify the separate data streams that a TCP may handle, the TCP provides a port identifier. Since port identifiers are selected independently by each TCP they might not be unique. To provide for unique addresses within each TCP, we concatenate an internet address identifying the TCP with a port identifier to create a socket which will be unique throughout all networks connected together.</p> <p>https://tools.ietf.org/html/rfc793 (PMCGOOGLETECH_00003189).</p>

Claim	Claim Element	Evidence of Infringement
		<div> <p>Figure 197: Process Multiplexing and Demultiplexing In TCP/IP</p> </div> <p>The TCP/IP Guide, TCP/IP Processes, Multiplexing and Client/Server Application Roles, http://www.tcpiipguide.com/free/t_TCPIIPProcessesMultiplexingandClientServerApplicati-2.htm (PMCGOOGLETECH_00000687).</p> <p>The subset discussed above (TCP/IP packets carrying the audio and/or video information for the requested title) comprises a plurality of packets, i.e., a plurality of said plurality of signals.</p>
11[c]	receiving said second medium in a digital data channel from a source external to said receiver	Google receives said second medium in a digital data channel from a source external to said receiver station, wherein said second medium is not included in said subset of said plurality of signals.

Claim	Claim Element	Evidence of Infringement
	station, wherein said second medium is not included in said subset of said plurality of signals;	<p>For example, Google receives the second medium, such as preview thumbnail images for the requested title.</p> <p><i>See, e.g.,</i></p>  <p>The screenshot shows the Fiddler Web Debugger interface. The main pane displays a list of HTTP sessions. The 'Details View' pane on the right shows the details of a selected session, including the 'Format' tab which displays a thumbnail image. The 'Headers' tab shows the request and response headers. The 'Timeline' pane at the bottom shows the sequence of events for the selected session.</p> <p>YouTube trace in Fiddler web debugger and viewer showing downloaded thumbnails (PMCGOOGLETECH_00000652).</p> <p>Google receives the second medium in a digital channel, such as a TCP/IP connection.</p> <p>Connections:</p> <p>The reliability and flow control mechanisms described above require that TCPs initialize and maintain certain status information for each data stream. The combination of this information, including sockets, sequence numbers, and window sizes, is called a</p>

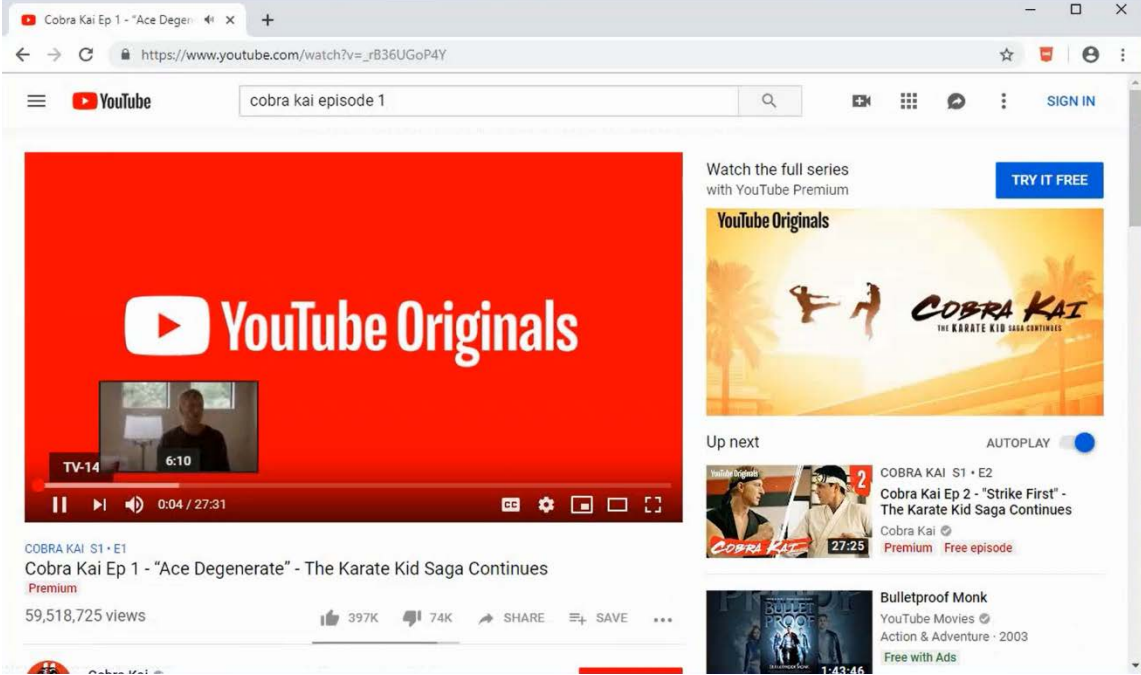
Claim	Claim Element	Evidence of Infringement
		<p>connection. Each connection is uniquely specified by a pair of sockets identifying its two sides.</p> <p><u>When two processes wish to communicate, their TCP's must first establish a connection (initialize the status information on each side).</u> When their communication is complete, the connection is terminated or closed to free the resources for other uses.</p> <p>...</p> <p>2.7. Connection Establishment and Clearing</p> <p>To identify the separate data streams that a TCP may handle, the TCP provides a port identifier. Since port identifiers are selected independently by each TCP they might not be unique. To provide for unique addresses within each TCP, we concatenate an internet address identifying the TCP with a port identifier to create a socket which will be unique throughout all networks connected together.</p> <p><u>A connection is fully specified by the pair of sockets at the ends. A local socket may participate in many connections to different foreign sockets. A connection can be used to carry data in both directions, that is, it is "full duplex".</u></p> <p>https://tools.ietf.org/html/rfc793 (unerlines added) (PMCGOOGLETECH_00003189).</p> <p>Google receives the second medium from a Google content server with the domain name i9.ytimg.com, which is a source external to the receiver station.</p> <p>The second medium discussed above is not included in the subset of signals discussed in 11[b] because, for example, it uses a different TCP connection with a different TCP destination port and is sent separately.</p>
11[d]	controlling a microcomputer at said receiver station, through execution of processor instructions, to: process each identifier of each	<p>Google controls a microcomputer at said receiver station, through execution of processor instructions, to: process each identifier of each signal of said subset of said plurality of signals, compares each processed identifier to a predetermined identifier, wherein said predetermined identifier is determined at a time prior to receiving said plurality of signals and identifies content of said first medium, processes only a signal of said subset of said plurality of signals that includes an identifier that matches said predetermined identifier to provide said first medium of said multimedia presentation</p>

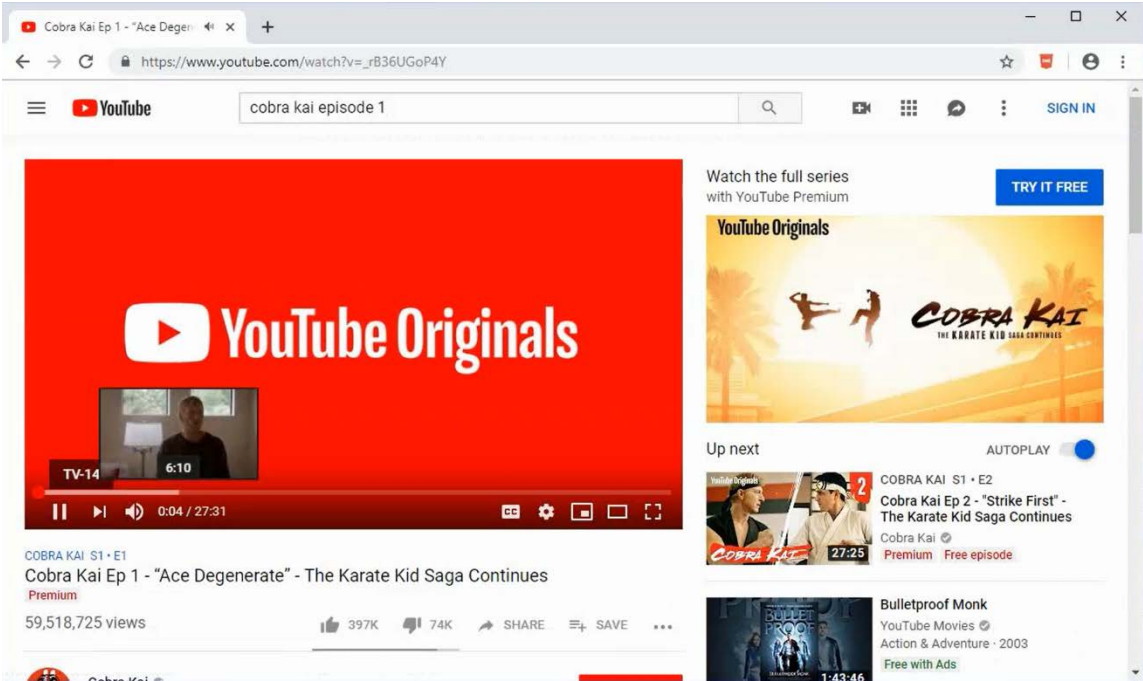
Claim	Claim Element	Evidence of Infringement
	<p>signal of said subset of said plurality of signals,</p> <p>compare each processed identifier to a predetermined identifier, wherein said predetermined identifier is determined at a time prior to receiving said plurality of signals and identifies content of said first medium,</p> <p>process only a signal of said subset of said plurality of signals that includes an identifier that matches said predetermined identifier to provide said first medium of said multimedia presentation,</p>	<p>The receiver station discussed above comprises a microcomputer. Google controls the microcomputer through the execution of processor instructions, such as high-level or machine language instructions (via a YouTube app or Javascript and other Google code). The following steps are accomplished as a result of execution of such processor instructions at the receiver station.</p> <p>For example, identifiers used by Google comprise a TCP destination port number and/or media content markers. When a connection is established between the receiver station and an external source, a port number is assigned to that connection by the processor.</p> <p>2.7. Connection Establishment and Clearing</p> <p>To identify the separate data streams that a TCP may handle, the TCP provides a port identifier. Since port identifiers are selected independently by each TCP they might not be unique. To provide for unique addresses within each TCP, we concatenate an internet address identifying the TCP with a port identifier to create a socket which will be unique throughout all networks connected together.</p> <p>https://tools.ietf.org/html/rfc793 (PMCGOOGLETECH_00003189).</p> <p>The assignment of the port to a connection and establishing the connection occur before the receiving station receives TCP/IP packets on that connection.</p> <p>Google processes each identifier discussed above using a processor at a receiver station, such as TCP destination port of the packets in the subset discussed in 11[b]. Headers of packets received by the receiving station include a TCP destination port number. Google processes the header of each packet to compare the port number in the header to the port number assigned to the connection.</p> <p>In one example, a TCP destination port identifies the content of the first medium. For example, the destination TCP port in packets carrying data associated with entries 354 and 363 in this example identifies the video content for the requested title. In another example, the identifier comprises a media content marker.</p>

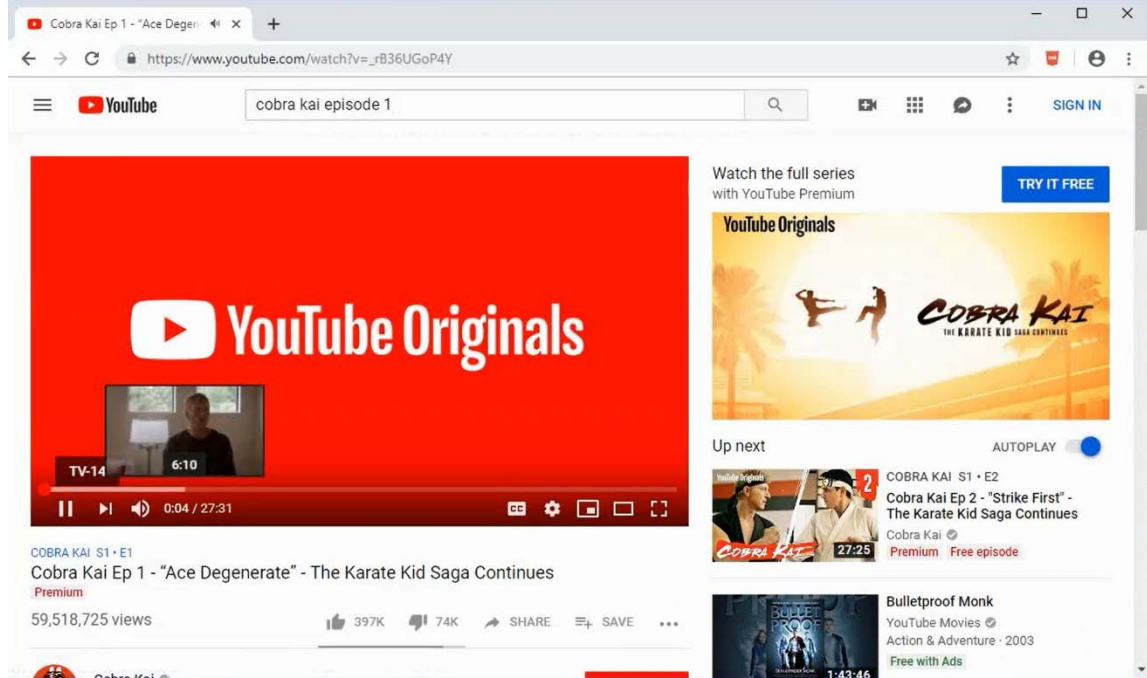
Claim	Claim Element	Evidence of Infringement
		<p>HTTP/HTTPS traffic capture for YouTube Video (yellow boxes added) (PMCGOOGLETECH_00000651).</p> <p><i>See, e.g.,</i></p> <p>At the Transport Layer a port takes the role of the office phone number extension for networked communications. A port number identifies the process on the host communicating. Just like the Data Link Layer and Network Layer addresses, for each networked communication there is a source port and a destination port. The source port identifies the process communicating on the source host, and the destination port identifies the process communicating on the destination host.</p> <p>U.S. Naval Academy, Cyber Battlefield, Transport Layer Lecture, https://www.usna.edu/CyberDept/syl110/lec/netTrans/lec.html (PMCGOOGLETECH_00000788).</p>

Claim	Claim Element	Evidence of Infringement
		<p>Figure 197: Process Multiplexing and Demultiplexing In TCP/IP</p> <p>The TCP/IP Guide, TCP/IP Processes, Multiplexing and Client/Server Application Roles, http://www.tcpiipguide.com/free/t_TCPIPProcessesMultiplexingandClientServerApplicati-2.htm (PMCGOOGLETECH_00000687).</p> <p>To provide the audio and/or video information for the requested title, Google processes only packets of the subset discussed in 11[b] that include the TCP destination port number that matches the port number assigned to the corresponding TCP connection.</p>
11[e]	identify content of said second medium, generate information based on said second	Google identifies content of said second medium, generates information based on said second medium based on identifying said content of said second medium, and coordinates presentation of said first medium and said information based on said second medium.

Claim	Claim Element	Evidence of Infringement
	medium based on identifying said content of said second medium, and coordinate presentation of said first medium and said information based on said second medium; and	<p>Google identifies the preview thumbnail image content.</p> <p>In one example, Google identifies the packets that carry the thumbnail images in the TCP/IP connection, by matching, for example, a predetermined TCP destination port, as discussed above.</p>  <p>YouTube trace in Fiddler web debugger and viewer showing downloaded thumbnails (PMCGOOGLETECH_00000652).</p> <p>Google generates information, such as preview thumbnail images. Google generates this information based on the identification of content as the preview thumbnail images based on the predetermined TCP port, as discussed above.</p>

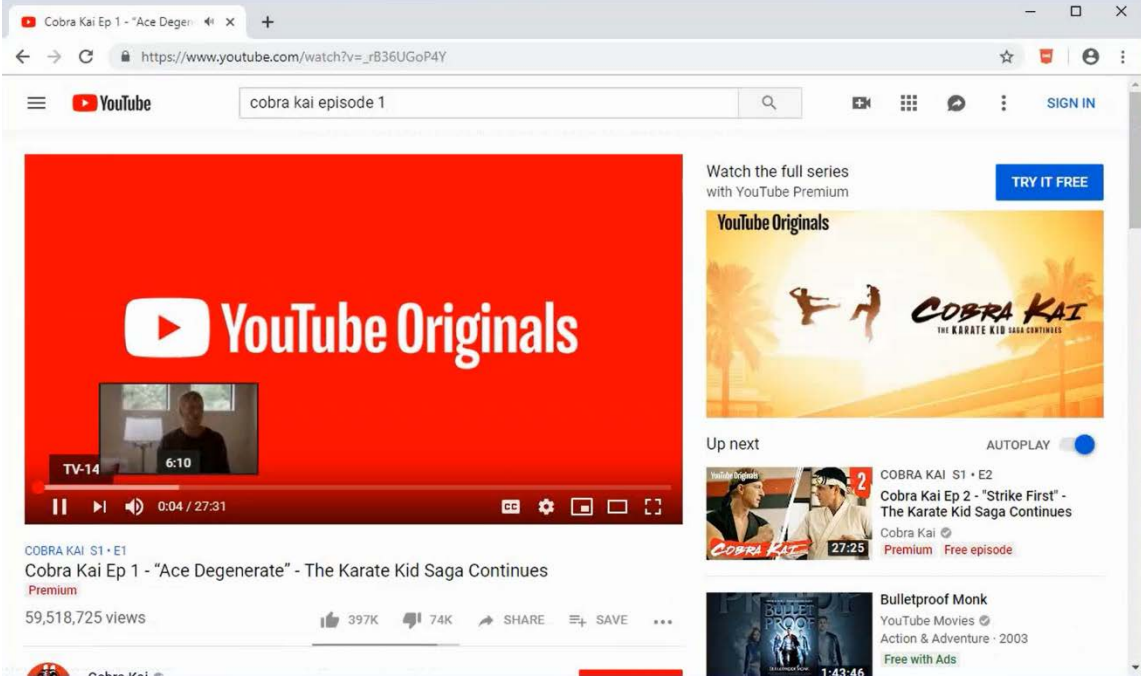
Claim	Claim Element	Evidence of Infringement
		 <p>Screenshot of YouTube stream (PMCGOOGLETECH_00000494).</p> <p>Google coordinates a presentation of the first medium such as playback of audio and/or video of the title, and the information based on the second medium, the preview thumbnails. For example, the YouTube software displays an overlay of the playback of the requested title with the preview thumbnail corresponding to the location of the progress bar over which the user hovers the pointing device.</p>
11[f]	outputting and displaying said multimedia presentation to a user at said receiver station based on said step of controlling such that	<p>Google outputs and displays said multimedia presentation to a user at said receiver station based on said step of controlling such that content of said first medium has a predetermined relationship to said information based on said second medium and said content of said first medium explains a significance of said information based on said second medium.</p> <p>Google outputs and displays the multimedia presentation through the screen and speakers.</p>

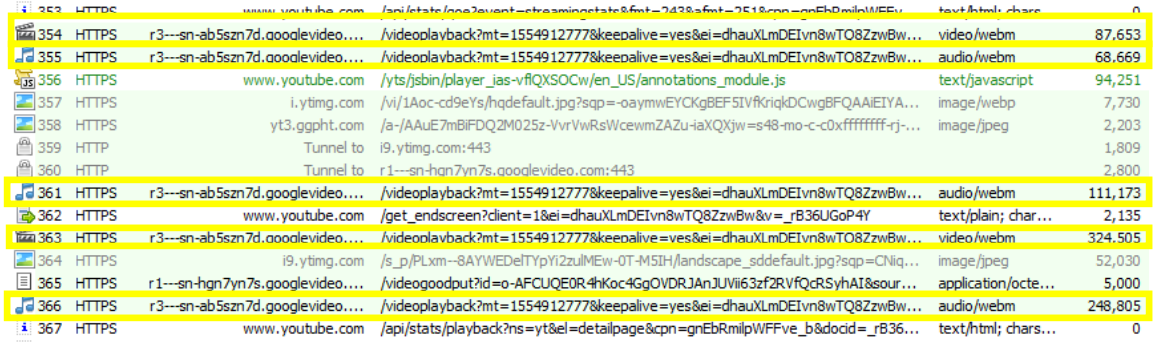
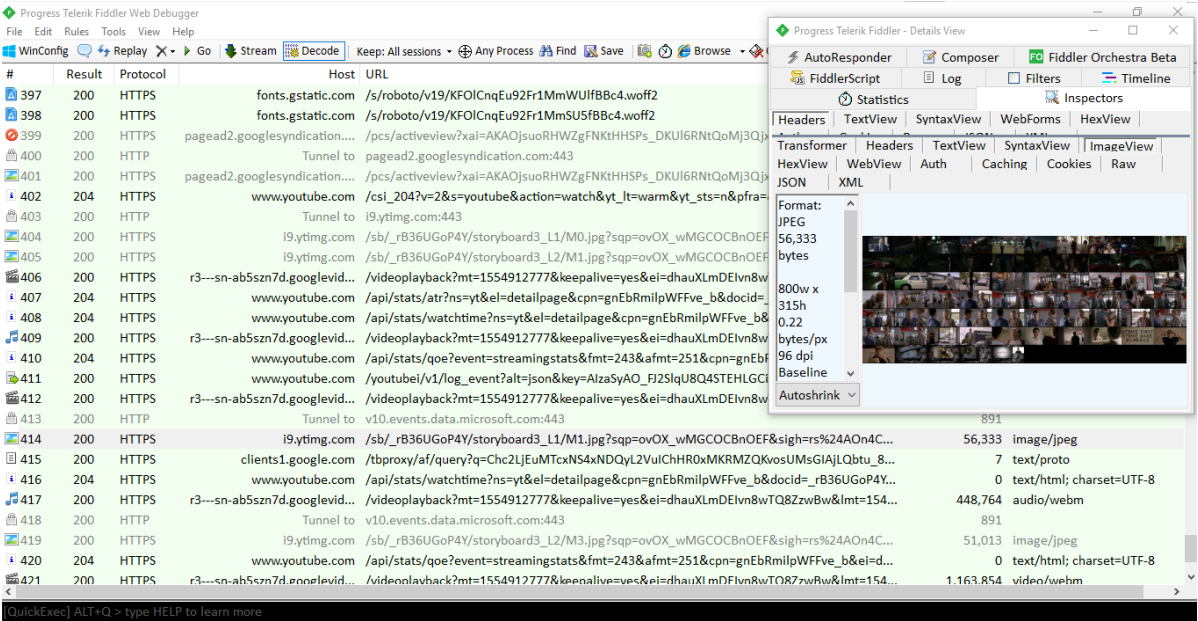
Claim	Claim Element	Evidence of Infringement
	content of said first medium has a predetermined relationship to said information based on said second medium and said content of said first medium explains a significance of said information based on said second medium.	<p>Google performs outputting and displaying based on the step of controlling in 11[d]. Content of the first medium, such as the audio and/or video information of the requested title has a predetermined relationship to the information based on the second medium such as the preview thumbnail images. For example, the displaying of the preview thumbnail images at a given location of the progress bar is related to the audio and/or video information at the corresponding time on the progress bar, with the relationship being predetermined before transmission and/or during encoding of the title.</p>  <p>Screenshot of YouTube stream (PMCGOOGLETECH_00000494).</p> <p>The content of said first medium explains a significance of said information based on said second medium. For example, audio and/or video content of the requested title at a particular time explains a significance of the one or more preview thumbnail images which provide a snapshot of a scene in the future or in the past.</p>

Claim	Claim Element	Evidence of Infringement
12	The method of claim 11, wherein said first medium comprises a television program including video and audio.	<p>See claim 11.</p> <p>The first medium comprises a television program including video and audio.</p> <p>See, e.g.,</p>  <p>Screenshot of YouTube stream (PMCGOOGLETECH_00000494).</p>
16[a]	A method of outputting a multimedia presentation at a receiver station adapted to receive a plurality of media, said method comprising the steps of:	<p>Google performs a method of outputting a multimedia presentation at a receiver station adapted to receive a plurality of media:</p> <p>For example, Google outputs multimedia presentations at devices running YouTube software (in app or website format), such as a phone, tablet, TV, computer, or a gaming console.</p>

Claim	Claim Element	Evidence of Infringement
		<p><i>See, e.g.,</i></p> <p>System requirements</p> <p>In order to watch YouTube videos, make sure you have the most up to date browser, operating system, and a good Internet connection:</p> <ul style="list-style-type: none"> • Most recent version of Google Chrome, Firefox, MS Edge, Safari, or Opera • Internet connection with 500+ Kbps <p>YouTube Help, System requirements, https://support.google.com/youtube/answer/78358?hl=en (PMCGOOGLETECH_00000685).</p> <p><i>See also</i> YouTube TV supported platforms:</p> <p>Mobile devices & computers</p> <ul style="list-style-type: none"> • You can watch YouTube TV on your mobile device, including certain smartphones and tablets. • YouTube TV also works in a web browser on your computer. • Check out System requirements below to see specific requirements by platform (mobile device, etc.) <p>Streaming media players, smart TVs & game consoles</p> <p>You can stream YouTube TV to your TV using:</p> <ul style="list-style-type: none"> • Chromecast devices. Note: If you're using a first generation Chromecast , you may experience a higher rate of errors. It may also take up to 30 seconds to load. • TVs with Chromecast built-in (e.g., Android TV) • AirPlay for Apple TV • Google Smart Displays <p>You can also download the YouTube TV app on select devices to watch YouTube TV on your TV.</p>

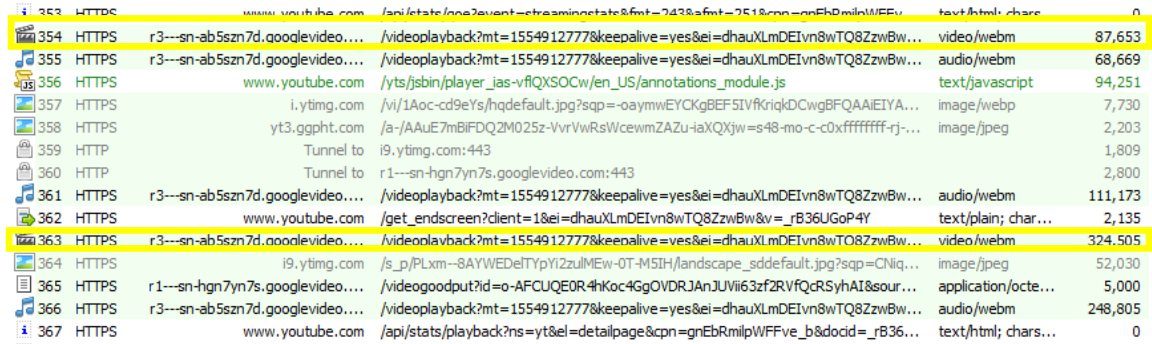
Claim	Claim Element	Evidence of Infringement
		<p>Our TV app is available on:</p> <ul style="list-style-type: none"> • Android TV • All Vizio SmartCast TVs • Samsung & LG smart TVs (2016 models and newer) • HiSense TVs (models: MTK5658, MTK5659, MSD6586) • Apple TV (4th generation) and Apple TV 4K • Xbox One, Xbox One S, and Xbox One X • Roku: All Roku TVs, Roku Ultra, Roku Streaming Stick+, Roku Streaming Stick (3800x, 3600x), Roku Express/Express+ (3910x, 3900x, 3710x, 3700x), Roku Premiere+, Roku Premiere, Roku 4, Roku 3 (4200x, 4230x), and Roku 2 (4210x). <p>YouTube TV Help, Supported devices, https://support.google.com/youtubetv/answer/7129767 (PMCGOOGLETECH_00000682).</p> <p>The receiver station is adapted to receive a plurality of media, such as audio and/or video medium and the medium of thumbnail images that appear during fast forward and rewind operations, or once the mouse or another pointer device is placed on the progress bar of the YouTube software player during a title playback for the titles available and/or being transmitted for a given region through, for example, the Google content delivery network.</p>

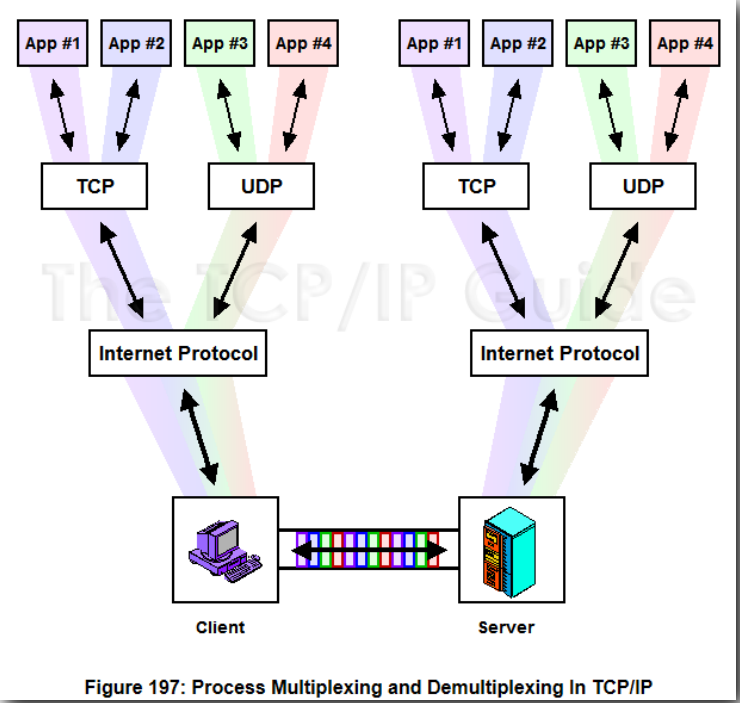
Claim	Claim Element	Evidence of Infringement
		 <p>Screenshot of YouTube stream (PMCGOOGLETECH_00000494).</p>
16[b]	receiving, at said receiver station, at least two of said plurality of media from different sources, a first medium of said plurality of media being received in a plurality of signals and a second medium of said plurality of media being received in a digital data	<p>Google receives, at said receiver station, at least two of said plurality of media from different sources, a first medium of said plurality of media being received in a plurality of signals and a second medium of said plurality of media being received in a digital data channel from a remote transmitter station.</p> <p>Google receives at least the two media discussed above from different sources. The audio and/or video medium is received from the source with domain name r3---sn-ab5sxn7d.googlevideo.com and the preview thumbnail images are received from the source with domain name i9.ytimg.com, which is an example of a remote transmitter station.</p>


Claim	Claim Element	Evidence of Infringement
	channel from a remote transmitter station;	<p><i>See, e.g.,</i></p>  <p>HTTP/HTTPS traffic capture for YouTube Video (yellow boxes added) (PMCGOOGLETECH_00000651).</p> <p><i>See also:</i></p> 

Claim	Claim Element	Evidence of Infringement
		<p>YouTube trace in Fiddler web debugger and viewer showing downloaded thumbnails (PMCGOOGLETECH_00000652).</p> <p>The first (audio and/or video) medium discussed above is received in the plurality of signals, such as TCP/IP packets.</p> <p>Google receives the second (preview thumbnail images) medium in a digital data channel, such as a TCP connection.</p> <p>Connections:</p> <p>The reliability and flow control mechanisms described above require that TCPs initialize and maintain certain status for each data stream. The combination of this information, including sockets, sequence numbers, and window sizes, is called a connection. Each connection is uniquely specified by a pair of sockets identifying its two sides.</p> <p>When two processes wish to communicate, their TCP's must first establish a connection (initialize the status information on each side). When their communication is complete, the connection is terminated or closed to free the resources for other uses.</p> <p>...</p> <p>2.7. Connection Establishment and Clearing</p> <p>To identify the separate data streams that a TCP may handle, the TCP provides a port identifier. Since port identifiers are selected independently by each TCP they might not be unique. To provide for unique addresses within each TCP, we concatenate an internet address identifying the TCP with a port identifier to create a socket which will be unique throughout all networks connected together.</p> <p>A connection is fully specified by the pair of sockets at the ends. A local socket may participate in many connections to different foreign sockets. A connection can be used to carry data in both directions, that is, it is "full duplex".</p> <p>https://tools.ietf.org/html/rfc793 (PMCGOOGLETECH_00003189).</p>
16[c]	identifying, using a processor, content of a	Google identifies, using a processor, content of a first medium of said at least two of said plurality of media processing each signal of said plurality of signals, each signal of said plurality

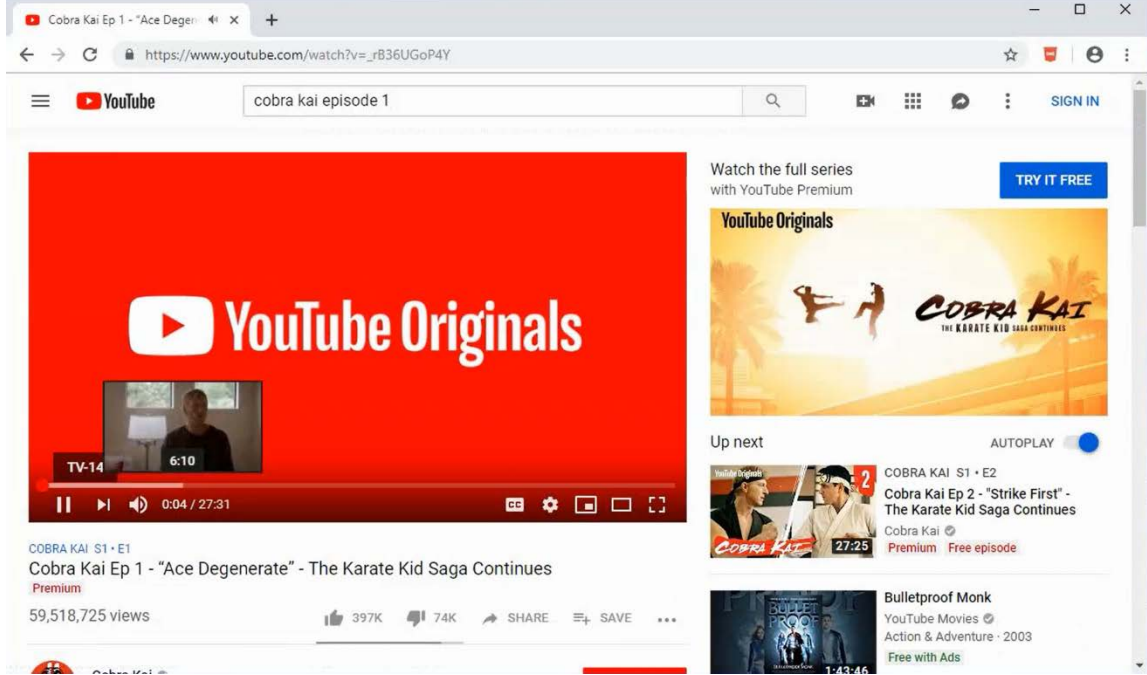
Claim	Claim Element	Evidence of Infringement
	<p>first medium of said at least two of said plurality of media</p> <p>processing each signal of said plurality of signals, each signal of said plurality of signals including an identifier, and comparing each processed identifier to a predetermined identifier, said predetermined identifier being determined prior to receiving said plurality of media and identifying content of said first medium;</p>	<p>of signals including an identifier, and comparing each processed identifier to a predetermined identifier, said predetermined identifier being determined prior to receiving said plurality of media and identifying content of said first medium.</p> <p>For example, the receiver station discussed above comprises a processor. Google controls the processor through the execution of processor instructions, such as high-level or machine language instructions (via a YouTube app or Javascript and other Google code). The following steps are accomplished as a result of execution of such processor instructions at the receiver station.</p> <p>For example, identifiers used by Google comprise a TCP destination port number and/or media content markers. When a connection is established between the receiver station and an external source, a port number is assigned to that connection by the processor. A TCP destination port is an example of an identifier.</p> <p>2.7. Connection Establishment and Clearing</p> <p>To identify the separate data streams that a TCP may handle, the TCP provides a port identifier. Since port identifiers are selected independently by each TCP they might not be unique. To provide for unique addresses within each TCP, we concatenate an internet address identifying the TCP with a port identifier to create a socket which will be unique throughout all networks connected together.</p> <p>https://tools.ietf.org/html/rfc793 (PMCGOOGLETECH_00003189).</p> <p>The assignment of the port to a connection and establishing the connection occur before the receiver station receives TCP/IP packets on that connection.</p> <p>In one example, the processor identifies content of the first medium discussed above by processing each TCP/IP packet containing the audio and/or video information for the user requested title, including the TCP destination port number in the TCP header. Headers of packets received by Google at the receiver station include a TCP destination port number.</p>

Claim	Claim Element	Evidence of Infringement
		<p>Google processes the header of each packet to compare the port number in the header to the port number assigned to the connection.</p> <p>The TCP destination port identifies the content of the first medium. For example, the destination TCP port in packets carrying data associated with trace entries 354 and 363 in this example identifies the video portion of audio and/or video content of the requested title. In another example, the identifier comprises a media content marker.</p>  <p>HTTP/HTTPS traffic capture for YouTube Video (yellow boxes added) (PMCGOOGLETECH_00000651).</p> <p><i>See, e.g.,</i></p> <p>At the Transport Layer a port takes the role of the office phone number extension for networked communications. A port number identifies the process on the host communicating. Just like the Data Link Layer and Network Layer addresses, for each networked communication there is a source port and a destination port. The source port identifies the process communicating on the source host, and the destination port identifies the process communicating on the destination host.</p> <p>U.S. Naval Academy, Cyber Battlefield, Transport Layer Lecture, https://www.usna.edu/CyberDept/sy110/lec/netTrans/lec.html (PMCGOOGLETECH_00000788).</p>

Claim	Claim Element	Evidence of Infringement
		 <p>Figure 197: Process Multiplexing and Demultiplexing In TCP/IP</p> <p>The TCP/IP Guide, TCP/IP Processes, Multiplexing and Client/Server Application Roles, http://www.tcpiipguide.com/free/t_TCPIPProcessesMultiplexingandClientServerApplicati-2.htm (PMCGOOGLETECH_00000687).</p>
16[d]	processing only a signal of said plurality of signal that includes an identifier that matches said predetermined identifier to provide said first medium;	<p>Google processes only a signal of said plurality of signal that includes an identifier that matches said predetermined identifier to provide said first medium.</p> <p>In one example, to display the audio and/or video content of the user requested title, Google processes only packets containing the first medium that include the TCP destination port number that matches the port number assigned to the corresponding TCP connection, as discussed above. In another example, the match is based on the destination port number and/or a media content marker.</p>

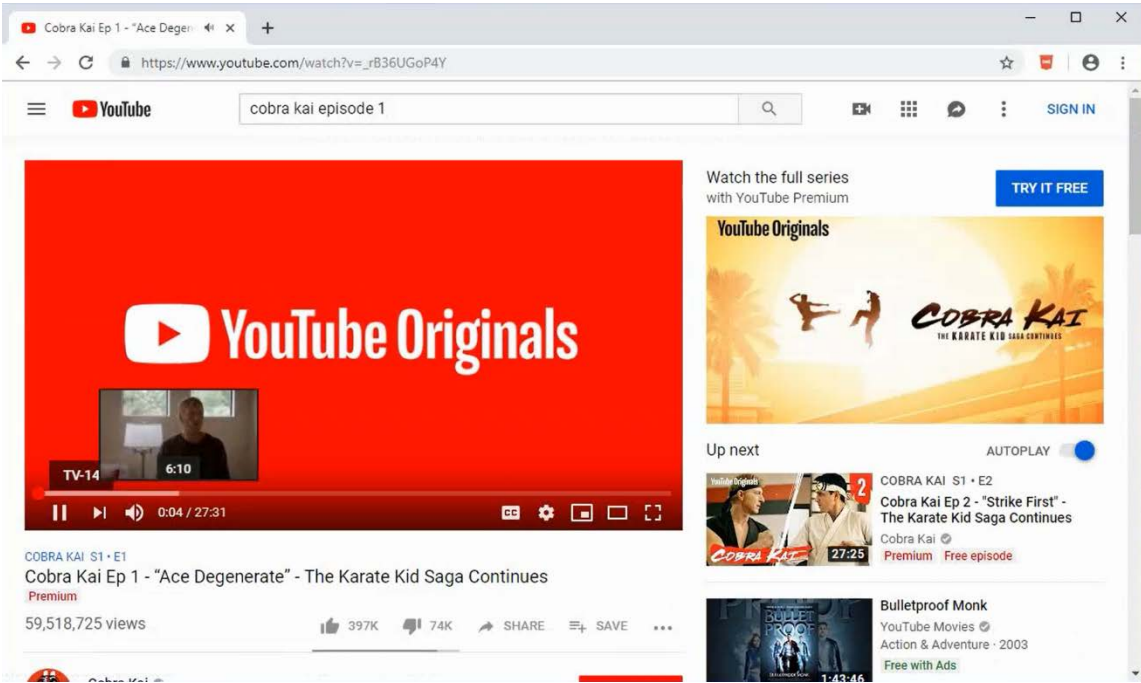
Claim	Claim Element	Evidence of Infringement
16[e]	storing said first medium at said receiver station; and	<p>Google stores said first medium at said receiver station.</p> <p>The receiver station comprises a computer that includes a storage medium, such as memory. Examples of such memory may be a volatile RAM, Flash, or hard drive.</p>  <p>Google stores the audio and/or video information from the first medium in such memory. Google stores the information from the medium containing audio and/or video content for the user selected title in various buffers and memories. For example, Google stores the medium in a buffer or memory when processing IP packets encapsulating the medium, TCP packets encapsulating the medium, when performing decoding, and prior to outputting on the screen, for example, when combining with the preview thumbnail images. The medium is further buffered in the memory of the receiver station after decoding to provide additional time for uninterrupted viewing experience in case of degraded or lost internet connection.</p>
16[f]	identifying content of said second medium;	<p>Google identifies content of said second medium.</p> <p>Google identifies content of the second medium containing preview thumbnail images by matching the destination port field in the TCP header of the packets carrying the preview thumbnail images in the way described above in connection with the first medium.</p>
16[g]	processing, based on said content of said second medium, said second	<p>Google processes, based on said content of said second medium, said second medium to generate information based on said second medium</p>


Claim	Claim Element	Evidence of Infringement
	medium to generate information based on said second medium;	Google processes the second medium to generate information, such as preview thumbnail images for the selected titles. Google generates this information based on the identification of content as the preview thumbnail images based on the predetermined TCP port, as discussed above.
16[h]	outputting and displaying said multimedia presentation, said multimedia presentation comprising a coordinated presentation of information included in said first medium and said generated information based on said second medium, said information included in said first medium having a predetermined relationship to said generated information based on said second medium and said information included in said first medium explaining a significance of said generated information based on said second medium	<p>Google outputs and displays said multimedia presentation, said multimedia presentation comprising a coordinated presentation of information included in said first medium and said generated information based on said second medium, said information included in said first medium having a predetermined relationship to said generated information based on said second medium and said information included in said first medium explaining a significance of said generated information based on said second medium.</p> <p>Google output and displays the multimedia presentation that comprises a coordinated presentation of information included in the first medium the audio and/or video content of the user requested title and the generated information based on the second medium. For example, the YouTube software displays an overlay of the playback of the requested title with the preview thumbnail corresponding to the location of the progress bar over which the user hovers the pointing device.</p>

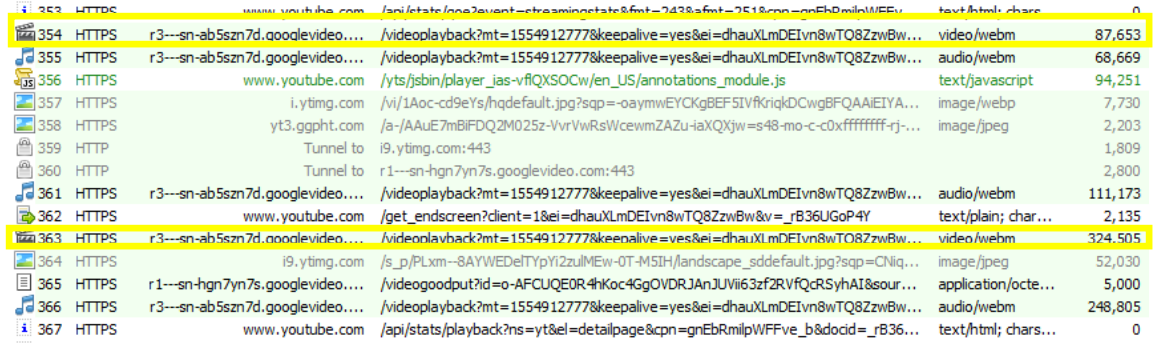
Claim	Claim Element	Evidence of Infringement
		<div>  </div> <p>Screenshot of YouTube stream (PMCGOOGLETECH_00000494).</p> <p>The information included in said first medium has a predetermined relationship to said generated information based on said second medium. For example, the displaying of the audio and/or video information has a predetermined relationship to the preview thumbnail images based on the second medium, including because a particular preview thumbnail image at a given location of the progress bar is related to the audio and/or video content at the corresponding time on the progress bar, with the relationship being predetermined before transmission and/or during encoding of the title.</p> <p>The information included in said first medium explains the significance of said generated information based on said second medium. For example, audio and/or video content of the requested title at a particular time explains a significance of the one or more preview thumbnail images which provide a snapshot of a scene in the future or in the past.</p>

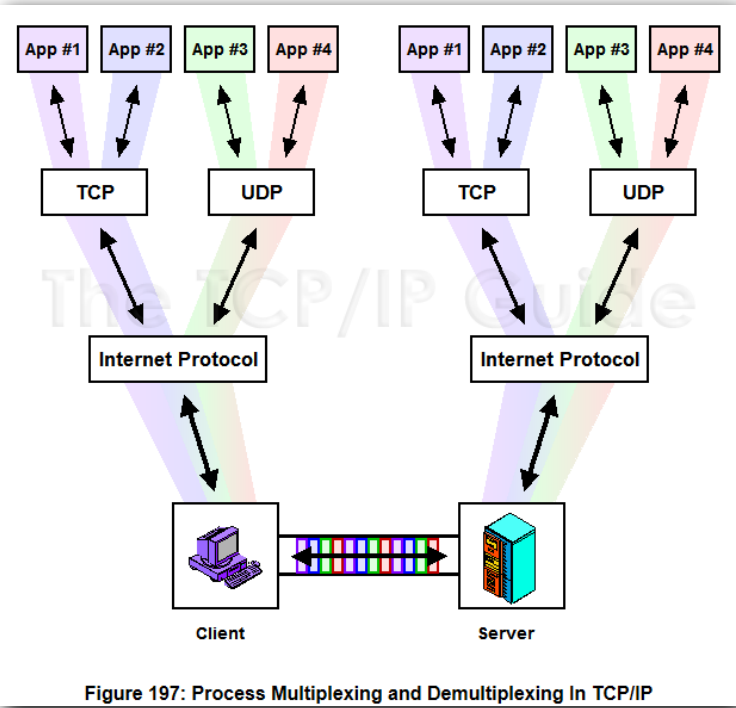
Claim	Claim Element	Evidence of Infringement
17	The method of claim 16, said method further comprising the step of storing said information based on said second of said at least two of said plurality of media at said receiver station.	<p><i>See</i> claim 16.</p> <p>The method of claim 16 performed by Google, further comprises the step of storing said information based on said second of said at least two of said plurality of media at said receiver station.</p> <p>Google stores the information discussed above (such as preview thumbnail images) in the memory of the receiver station after decoding but prior and during their output to the screen.</p>
18	The method of claim 16, wherein said first medium comprises a television program including video and audio.	<i>See</i> claim 16 and 12.
20[a]	A method of outputting a multimedia presentation at a receiver station having an output device, said method comprising the steps of:	<p>Google performs a method of outputting a multimedia presentation at a receiver station having an output device.</p> <p>For example, Google outputs multimedia presentations at devices running YouTube software (in app or website format), such as a phone, tablet, TV, computer, or a gaming console.</p> <p><i>See, e.g.,</i></p> <p>System requirements</p> <p>In order to watch YouTube videos, make sure you have the most up to date browser, operating system, and a good Internet connection:</p> <ul style="list-style-type: none"> • Most recent version of Google Chrome, Firefox, MS Edge, Safari, or Opera • Internet connection with 500+ Kbps <p>YouTube Help, System requirements, https://support.google.com/youtube/answer/78358?hl=en (PMCGOOGLETECH_00000685).</p>

Claim	Claim Element	Evidence of Infringement
		<p><i>See also</i> YouTube TV supported platforms:</p> <p>Mobile devices & computers</p> <ul style="list-style-type: none"> • You can watch YouTube TV on your mobile device, including certain smartphones and tablets. • YouTube TV also works in a web browser on your computer. • Check out System requirements below to see specific requirements by platform (mobile device, etc.) <p>Streaming media players, smart TVs & game consoles</p> <p>You can stream YouTube TV to your TV using:</p> <ul style="list-style-type: none"> • Chromecast devices. Note: If you're using a first generation Chromecast , you may experience a higher rate of errors. It may also take up to 30 seconds to load. • TVs with Chromecast built-in (e.g., Android TV) • AirPlay for Apple TV • Google Smart Displays <p>You can also download the YouTube TV app on select devices to watch YouTube TV on your TV.</p> <p>Our TV app is available on:</p> <ul style="list-style-type: none"> • Android TV • All Vizio SmartCast TVs • Samsung & LG smart TVs (2016 models and newer) • HiSense TVs (models: MTK5658, MTK5659, MSD6586) • Apple TV (4th generation) and Apple TV 4K • Xbox One, Xbox One S, and Xbox One X • Roku: All Roku TVs, Roku Ultra, Roku Streaming Stick+, Roku Streaming Stick (3800x, 3600x), Roku Express/Express+ (3910x, 3900x, 3710x, 3700x), Roku Premiere+, Roku Premiere, Roku 4, Roku 3 (4200x, 4230x), and Roku 2 (4210x).

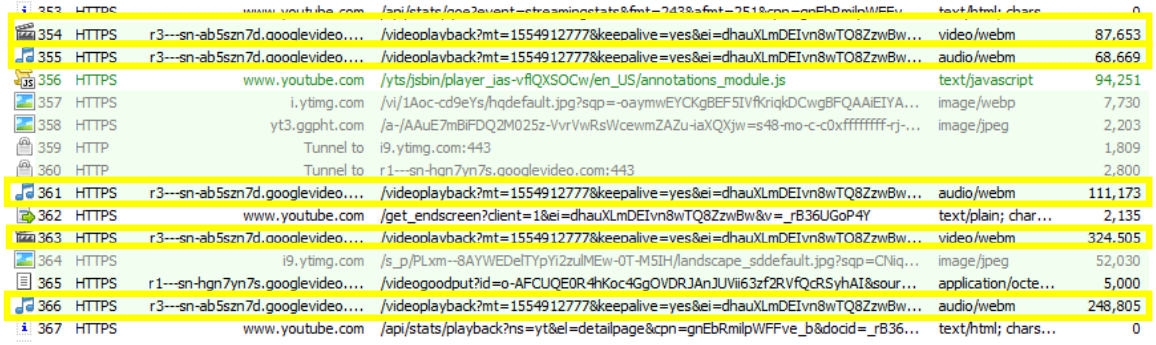
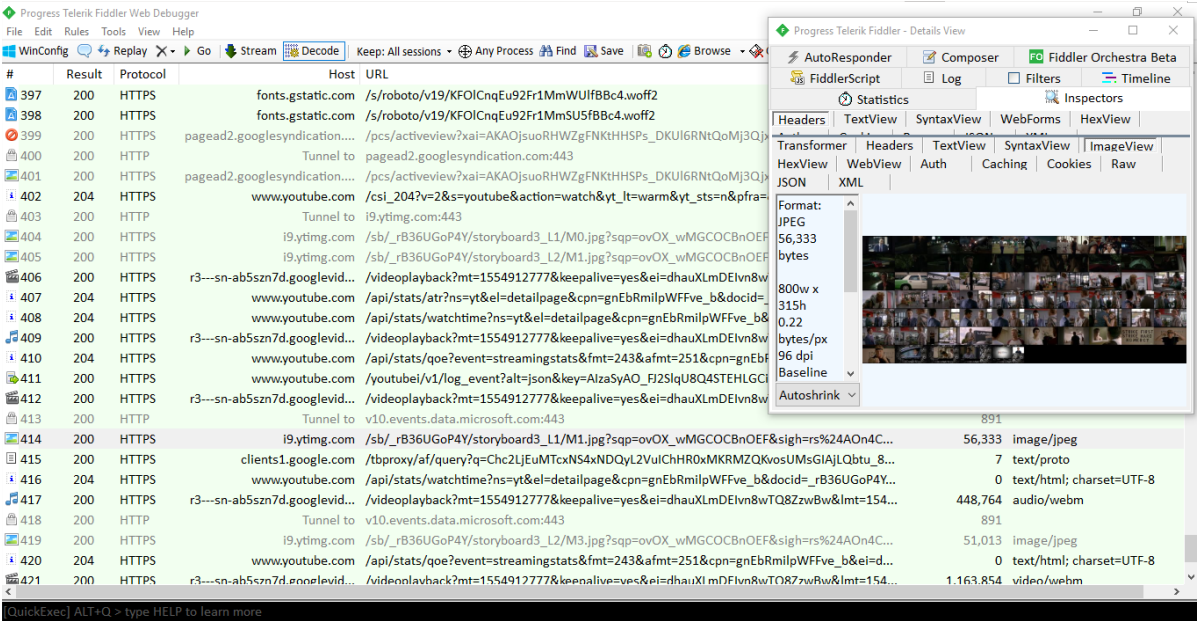
Claim	Claim Element	Evidence of Infringement
		<p>YouTube TV Help, Supported devices, https://support.google.com/youtubetv/answer/7129767 (PMCGOOGLETECH_00000682).</p>  <p>Screenshot of YouTube stream (PMCGOOGLETECH_00000494).</p> <p>The receiver station has an output device, such as, for example a display and/or one or more speakers.</p>
20[b]	receiving a plurality of signals from a source external to said receiver station:	<p>Google receives a plurality of signals from a source external to said receiver station.</p> <p>For example, Google receives a plurality of signals, such as, for example, TCP/IP packets carrying audio and/or video information for the title requested by the user.</p>

Claim	Claim Element	Evidence of Infringement
		<p>This plurality of signals is received from a source external to the receiver station, such as a server with the domain name r3---sn-ab5sxn7d.googlevideo.com.</p> <p><i>See, e.g.,</i></p>  <p>HTTP/HTTPS traffic capture for YouTube Video (yellow boxes added) (PMCGOOGLETECH_00000651).</p>
20[c]	<p>identifying, using a processor, content of a first medium to be output in said multimedia presentation by:</p> <p>processing said plurality of signals, each of said plurality of signals including an identifier, and comparing each said identifier with a predetermined identifier, said predetermined identifier determined prior to receiving said</p>	<p>Google identifies, using a processor, content of a first medium to be output in said multimedia presentation by processing said plurality of signals, each of said plurality of signals including an identifier, and comparing each said identifier with a predetermined identifier, said predetermined identifier determined prior to receiving said plurality of signals and identifying content of said first medium; processing only a signal of said plurality of signal that includes an identifier that matches said predetermined identifier to provide said first medium.</p> <p>The receiver station discussed above comprises a processor. Google controls the processor through the execution of processor instructions, such as high-level or machine language instructions (via a YouTube app or Javascript and other Google code). The following steps are accomplished as a result of execution of such processor instructions at the receiver station.</p> <p>For example, identifiers used by Google comprise a TCP destination port number and/or media content markers. When a connection is established between the receiver station and an external source, a port number is assigned to that connection at the receiver station.</p>

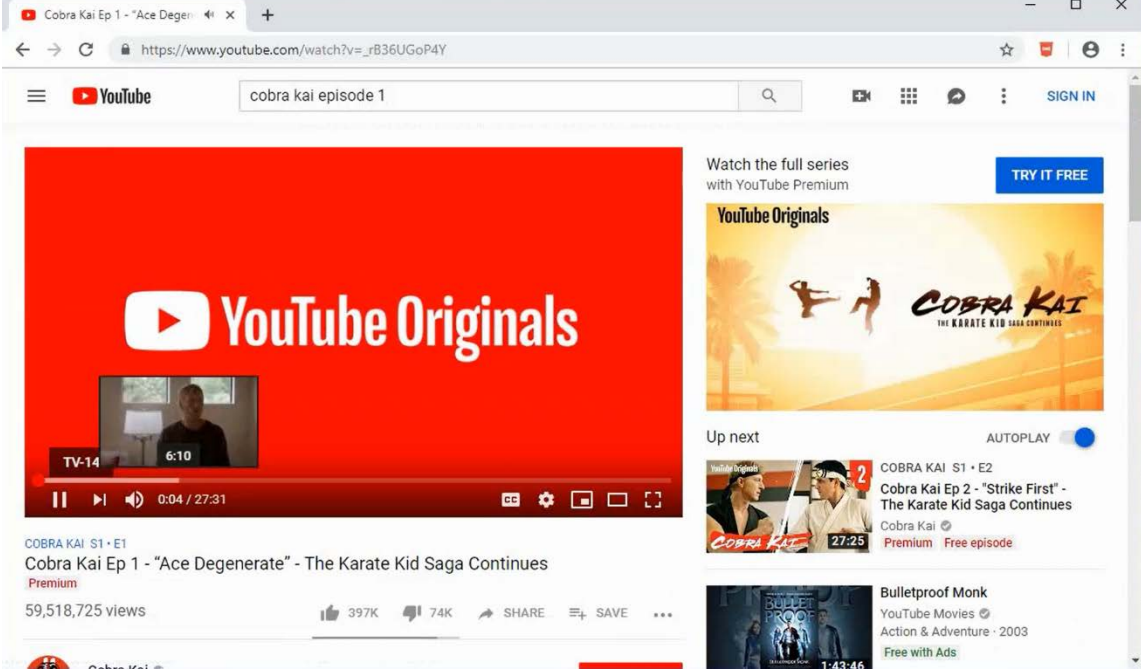
Claim	Claim Element	Evidence of Infringement
	<p>plurality of signals and identifying content of said first medium; processing only a signal of said plurality of signal that includes an identifier that matches said predetermined identifier to provide said first medium;</p>	<p>2.7. Connection Establishment and Clearing</p> <p>To identify the separate data streams that a TCP may handle, the TCP provides a port identifier. Since port identifiers are selected independently by each TCP they might not be unique. To provide for unique addresses within each TCP, we concatenate an internet address identifying the TCP with a port identifier to create a socket which will be unique throughout all networks connected together.</p> <p>https://tools.ietf.org/html/rfc793 (PMCGOOGLETECH_00003189).</p> <p>The assignment of the port to a connection and establishing the connection occur before the receiver station receives TCP/IP packets on that connection.</p> <p>Google processes the plurality of signals discussed above using a processor at a receiver station. Headers of packets received by the receiving station include a TCP destination port number. Google processes the header of each packet to compare the port number in the header to the port number assigned to the connection.</p> <p>In one example, the TCP destination port identifies the content of the first medium. For example, the destination TCP port in packets carrying data from trace entries 354 and 363 in this example identifies the video portion of audio and/or video content of the requested title. In another example, the identifier comprises a media content marker.</p>  <p>HTTP/HTTPS traffic capture for YouTube Video (yellow boxes added) (PMCGOOGLETECH_00000651).</p>

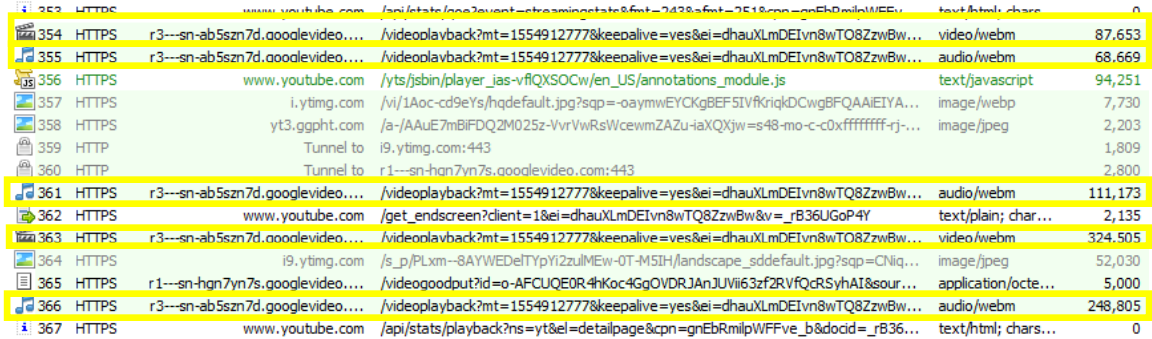
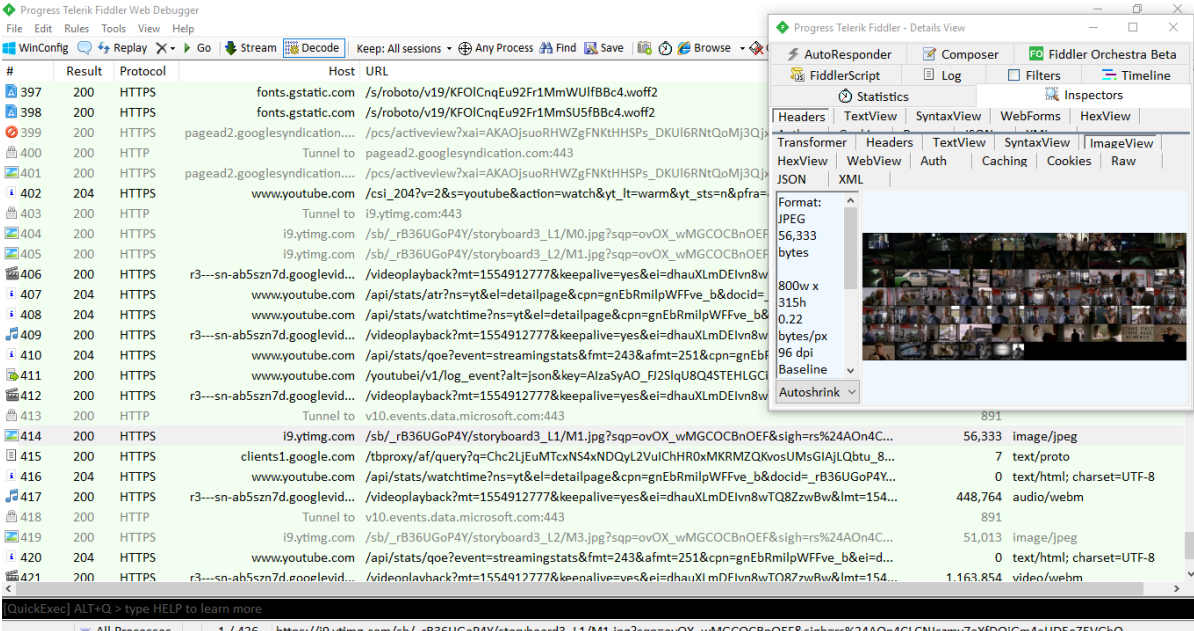
Claim	Claim Element	Evidence of Infringement
		<p><i>See, e.g.,</i></p> <p>At the Transport Layer a port takes the role of the office phone number extension for networked communications. A port number identifies the process on the host communicating. Just like the Data Link Layer and Network Layer addresses, for each networked communication there is a source port and a destination port. The source port identifies the process communicating on the source host, and the destination port identifies the process communicating on the destination host.</p> <p>U.S. Naval Academy, Cyber Battlefield, Transport Layer Lecture, https://www.usna.edu/CyberDept/syl110/lec/netTrans/lec.html (PMCGOOGLETECH_00000788).</p>  <p>Figure 197: Process Multiplexing and Demultiplexing In TCP/IP</p>

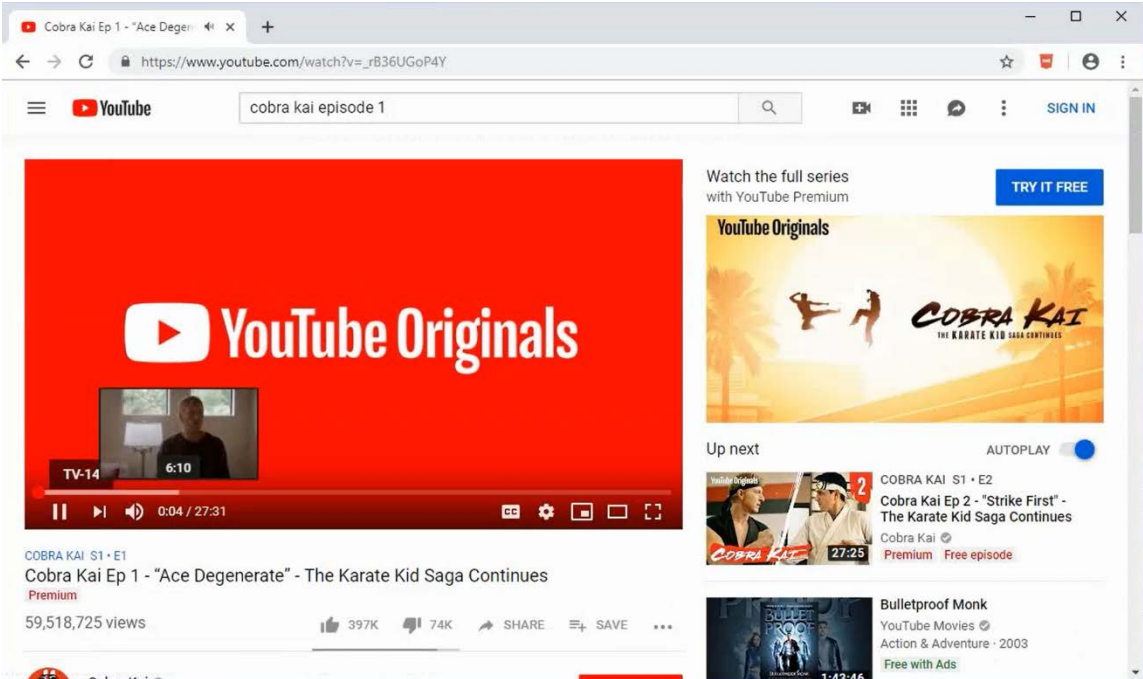
Claim	Claim Element	Evidence of Infringement
		<p>The TCP/IP Guide, TCP/IP Processes, Multiplexing and Client/Server Application Roles, http://www.tcpipguide.com/free/t_TCPIPProcessesMultiplexingandClientServerApplicati-2.htm (PMCGOOGLETECH_00000687).</p> <p>In one example, to display the audio and/or video content of the user requested title, Google processes only packets containing the first medium that include the TCP destination port number that matches the port number assigned to the corresponding TCP connection, as discussed above. In another example, the match is based on the destination port number and/or a media content marker.</p>
20[d]	processing a control signal at said receiver station that causes execution of processor instructions to process data received in a second medium from an external source to create a series of discrete video images, wherein said second medium is not included in said plurality of signals;	<p>Google processes a control signal at said receiver station that causes execution of processor instructions to process data received in a second medium from an external source to create a series of discrete video images, wherein said second medium is not included in said plurality of signals.</p> <p>In one example, Google generates a control signal once the user places a pointing device at a location on the progress bar of the title presently being played by the YouTube software. Google processes the control signal discussed above. In another example, Google processes a control signal identifying a thumbnail image or indicating the location of a thumbnail image.</p> <p>The processing of this control signal causes execution of processor instructions to process preview thumbnail images that were received in a second medium. The preview thumbnail images are received from the source with domain name i9.ytimg.com, which is an example of a remote transmitter station.</p> <p>Google receives audio and/or video information corresponding to the title requested by the user from the external source, such as the source with domain name r3---sn-ab5szn7d.googlevideo.com.</p>

Claim	Claim Element	Evidence of Infringement
		<p><i>See, e.g.,</i></p>  <p>HTTP/HTTPS traffic capture for YouTube Video (yellow boxes added) (PMCGOOGLETECH_00000651).</p> <p><i>See also:</i></p> 

Claim	Claim Element	Evidence of Infringement
		<p>YouTube trace in Fiddler web debugger and viewer showing downloaded thumbnails (PMCGOOGLETECH_00000652).</p> <p>The processing of data received in the second medium results in the creation of a series of discrete video images, such as video images corresponding to various location on the progress bar of the currently being played title requested by the user.</p> <p>The second medium is not included in the plurality of signals discussed above because, for example, it uses a different TCP connection with a different TCP destination port and is sent separately.</p>
20[e]	causing a video image of said series of discrete video images to be output and displayed subsequent to said step of identifying; and	<p>Google causes a video image of said series of discrete video images to be output and displayed subsequent to said step of identifying.</p> <p>Google causes outputting of video image of the series of discrete video images to be output and displayed as shown below:</p>

Claim	Claim Element	Evidence of Infringement
		 <p>Screenshot of YouTube stream (PMCGOOGLETECH_00000494).</p> <p>The outputting occurs after the step of identifying content of a first medium because at least some of the audio and/or video packets for the title are received and processed (including the step of identifying) before the preview thumbnail images are received.</p>

Claim	Claim Element	Evidence of Infringement
		<p>See, e.g., audio and/or video content:</p>  <p>HTTP/HTTPS traffic capture for YouTube Video (yellow boxes added) (PMCGOOGLETECH_00000651).</p> <p>See also thumbnails:</p> 

Claim	Claim Element	Evidence of Infringement
		YouTube trace in Fiddler web debugger and viewer showing downloaded thumbnails (PMCGOOGLETECH_00000652).
20[f]	combining said outputted video image into said multimedia presentation at said output device based on said step of causing to be output, said multimedia presentation comprising said first medium and said outputted video image of said series of discrete video images, said first medium having a predetermined relationship to said series of discrete video images and said first medium explaining a significance of said video image of said series of discrete video images.	<p>Google combines said outputted video image into said multimedia presentation at said output device based on said step of causing to be output, said multimedia presentation comprising said first medium and said outputted video image of said series of discrete video images, said first medium having a predetermined relationship to said series of discrete video images and said first medium explaining a significance of said video image of said series of discrete video images</p> <p>Google combines on the display of the receiver station into a multimedia presentation the outputted video, discussed above, with one of the preview thumbnail images.</p>  <p>Screenshot of YouTube stream (PMCGOOGLETECH_00000494).</p>

Claim	Claim Element	Evidence of Infringement
		<p>The first medium has a predetermined relationship to the series of the series of the discrete video images, the series of the preview thumbnail images. For example, the displaying of the preview thumbnail images at a given location of the progress bar is related to the audio and/or video information at the corresponding time on the progress bar, with the relationship being predetermined before transmission and/or during encoding of the title.</p> <p>The first medium explains the significance of said video image of said series of discrete video images. For example, audio and/or video content of the requested title at a particular time explains a significance of the one or more preview thumbnail images which provide a snapshot of a scene in the future or in the past.</p>
21	The method of claim 20, wherein said first medium comprises a television program including video and audio.	See claim 20 and 12.
22	The method of claim 20, wherein said second medium is received in a digital data channel.	<p>See claim 20.</p> <p>In the method of claim 20 performed by Google, the second medium is received in a digital data channel.</p> <p>Google receives the second medium in a digital channel, such as a TCP/IP connection.</p> <p>Connections:</p> <p>The reliability and flow control mechanisms described above require that TCPs initialize and maintain certain status information for each data stream. The combination of this information, including sockets, sequence numbers, and window sizes, is called a connection. Each connection is uniquely specified by a pair of sockets identifying its two sides.</p>

Claim	Claim Element	Evidence of Infringement
		<p><u>When two processes wish to communicate, their TCP's must first establish a connection (initialize the status information on each side).</u> When their communication is complete, the connection is terminated or closed to free the resources for other uses.</p> <p>...</p> <p>2.7. Connection Establishment and Clearing</p> <p>To identify the separate data streams that a TCP may handle, the TCP provides a port identifier. Since port identifiers are selected independently by each TCP they might not be unique. To provide for unique addresses within each TCP, we concatenate an internet address identifying the TCP with a port identifier to create a socket which will be unique throughout all networks connected together.</p> <p><u>A connection is fully specified by the pair of sockets at the ends. A local socket may participate in many connections to different foreign sockets. A connection can be used to carry data in both directions, that is, it is "full duplex".</u></p> <p>https://tools.ietf.org/html/rfc793 (underlines added) (PMCGOOGLETECH_00003189).</p>