UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AYLO FREESITES LTD,
Petitioner
v.

DISH TECHNOLOGIES L.L.C.,
Patent Owner

U.S. Patent 10,757,156
Issue Date: August 25, 2020
Title: APPARATUS, SYSTEM, AND METHOD FOR ADAPTIVE-RATE SHIFTING OF STREAMING CONTENT

Inter Partes Review No. IPR2024-00147

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT 10,757,156 CHALLENGING CLAIMS 1-17 UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42.1 *et seq.*

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PETITIONER'S EXHIBIT LIST

Table of Exhibits for U.S. Pat. 10,757,156 Petition for *Inter Partes* Review

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1001	U.S. Pat. 10,757,156 ("the '156 Patent")
1002	File History of U.S. Pat. 10,757,156
1003	Declaration of Dr. Henry Houh including Curriculum Vitae ("Houh")
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1005	<RESERVED>
1006	Synchronized Multimedia Integration Language (SMIL 2.0) ("SMIL 2.0")
1007	U.S. Patent No. 6,848,004 to Chang ("Chang")
1008	WO1997044942 to Kliger ("Kliger")
1009	337-TA-1265 ITC Investigation Initial Determination
1010	337-TA-1265 ITC September 11, 2023 Enforcement Complaint
1011	Internet Archive Affidavit for URLs including EX1006 and EX1019
1012	<RESERVED>
1013	U.S. Patent No. 6,637,031 to Chou ("Chou")
1014	U.S. Provisional Application No. 60/041,770 ("Ogdon Provisional")
1015	File History of U.S. Pat. 6,161,137 to Ogdon
1016	U.S. Patent No. 7,529,806 to Shteyn ("Shteyn")
1017	U.S. Patent Publication No. 2003/0055995 to Ala-Honkola ("Ala-Honkola")

1018	File History of U.S. Patent No. 8,868,772
1019	HTTP 1.1 Protocol - RCF2616 (https://web.archive.org/web/20020802040147/https://www.ietf.org/rfc/rfc2616.txt)

TABLE A: LISTING OF CLAIMS

Claim Designation	Claim Language
Claim 1	
1[Pre]	An apparatus for rendering a video that is adaptively received as a digital stream from a video server over a network, the apparatus comprising;
1[A][1]	a media player operating on the apparatus,
1[A][2]	wherein the media player is configured to stream the video from the video server via at least one transmission control protocol (TCP) connection over the network,
1[A][3]	wherein the video server stores multiple different copies of the video encoded at different bit rates as multiple sets of streamlets,
1[A][4]	wherein each of the streamlets yields a different portion of the video on playback,
1[A][5]	wherein the streamlets across the different copies yield the same portions of the video on playback,
1[A][6]	and wherein the streamlets in the different copies are aligned in time such that the streamlets that play back the same portion of the video for the different copies each begin at the same playback time in relation to the beginning of the video, and wherein the media player streams the video by:
1[B][1]	requesting sequential streamlets of one of the copies from the video server according to the playback times of the streamlets by transmitting hypertext transport protocol (HTTP) GET requests that identify the selected streamlets stored by the video server,
1[B][2]	wherein the sequential streamlets are selected by the media player from the based upon successive determinations to shift the playback quality to a higher or lower quality one of the different copies of the video;
1[C]	repeatedly generating, by the media player, a factor relating to the performance of the network that is indicative of an ability to sustain the streaming of the video;
1[D]	adapting the successive determinations to shift the playback quality based on the factor to achieve continuous playback of the video using the streamlets of the highest quality copy of the video that is determined to be sustainable at that time; and

1[E]	presenting the video for playback by providing the requested streamlets in order of ascending start time.
Claim 2	
[2]	The apparatus of claim 1, wherein the apparatus is configured to establish multiple Transmission Control Protocol (TCP) connections with a content server, and request streamlets of varying bitrates.
Claim 3	
[3]	The apparatus of claim 1, wherein each streamlet further comprises a portion of a content file provided by the server.
Claim 4	
[4]	The apparatus of claim 1, wherein the requesting the sequential streamlets comprises the apparatus transmitting hypertext transport protocol (HTTP) GET requests for selected streamlets, wherein each of the HTTP GET requests identifies the separate file stored by the video server that corresponds to the requested streamlet.
Claim 5	
[5]	The apparatus of claim 1 wherein each of the streamlets of each of the different copies is independently requestable and playable by the apparatus.
Claim 6	
[6]	The apparatus of claim 4, wherein the requesting of the sequential streamlets comprises the end user device transmitting hypertext transport protocol (HTTP) GET requests for selected streamlets.
Claim 7	
[7]	The apparatus of claim 1 wherein each of the streamlets in each of the plurality of different copies is a separate file stored by the video server.
Claim 8	
[8]	The apparatus of claim 1 wherein the media player upshifts to a higher quality one of the different copies when the factor is greater than a first threshold and downshifts to a lower quality one of the different copies when the factor is less than a second threshold.
Claim 9	
[9]	The apparatus of claim 1, wherein the requesting the sequential streamlets comprises the apparatus transmitting hypertext transport protocol (HTTP) GET requests for selected streamlets, and wherein each of the HTTP GET requests identifies a separately-identifiable portion of the one or more files that corresponds to the requested streamlet.

Claim 10	
[10]	The apparatus of claim 1, wherein the apparatus is configured to initially request low quality streamlets to enable instant playback of the content file, and subsequent upshifting according to the performance factor.
Claim 11	
[11]	The end user device of claim 1 wherein each of the streamlets in each of the plurality of different copies is a separately-identifiable portion of one or more files stored by the video server.
Claim 12	
[12]	The apparatus of claim 1 wherein the apparatus is a mobile computing device comprising a processor and a non-transitory data storage.
Claim 13	
13[PRE]	A method executable by an end user device to stream a video received via a connection with a server over a network, the method comprising:
13[A][1]	requesting, by the end user device, wherein the end user device streams the video from the video server via at least one transmission control protocol (TCP) connection over the network,
13[A][2]	a plurality of sequential streamlets of one of the copies from the server based on playback times of the streamlets wherein multiple different copies of the video encoded at different bit rates are stored as multiple sets of streamlets on the server,
13[A][3]	wherein each of the streamlets yields a different portion of the video on playback,
13[A][4]	wherein the streamlets across the different copies yield the same portions of the video on playback,
13[A][5]	and wherein each of the streamlets comprises a playback time such that each of the streamlets for each of the different copies that encode the same portion of the video begins at the same playback time in relation to the beginning of the video,
13[A][6]	wherein the end user device requests the streamlets by transmitting hypertext transport protocol (HTTP) GET requests that each identify one of the requested streamlets stored by the server; and wherein the end user device streams the video by:
13[B]	repeatedly generating, by the end user device, a factor that is indicative of an ability to sustain the streaming of the video;
13[C]	making successive determinations by the end user device to shift the playback quality based on the factor to achieve continuous playback

	of the video using the streamlets of the highest quality copy determined sustainable at that time; and
13[D]	presenting the video by playing back the requested media streamlets on the end user device in order of ascending playback time.
Claim 14	
[14]	The method of claim 13 wherein the making of the successive determinations to shift comprises upshifting to a higher quality one of the different copies when the at least one factor is greater than a first threshold and downshifting to a lower quality one of the different copies when the at least one factor is less than a second threshold.
Claim 15	
[15]	The method of claim 14 wherein each of the streamlets of each of the different copies is independently requestable and playable by the end user device.
Claim 16	
[16]	The method of claim 13 wherein each of the streamlets in each of the plurality of different copies is a separately-identifiable portion of one or more files stored by the video server.
Claim 17	
[17]	The method of claim 16 wherein the requesting of the sequential streamlets comprises the end user device transmitting hypertext transport protocol (HTTP) GET requests for selected streamlets, and wherein each of the HTTP GET requests identifies the separately-identifiable portion of the one or more files that corresponds to the requested streamlet.

I. INTRODUCTION

Aylo Freesites Ltd ("Petitioner") petitions under 35 U.S.C. § 312 and 37 C.F.R. § 42 for *inter partes* review of claims 1-17 ("Challenged Claims") of U.S. Patent No. 10,757,156 ("the '156 Patent") (EX1001). The '156 Patent is assigned to DISH Technologies L.L.C. ("DISH") and, based on information and belief, Sling TV L.L.C. is an exclusive licensee.

The '156 Patent relates to adaptive-rate shifting of streaming content, including a server storing sets of files at different bit rates and the client repeatedly generating a factor relating to the network that is indicative of an ability to sustain streaming at the highest quality set of files determined sustainable at that time. The Grounds advanced here were not relied upon during prosecution of the '156 Patent and teach such adaptive-rate shifting of content streaming.

II. MANDATORY NOTICES

A. Real Party-in-Interest – § 42.8(b)(1)

Petitioner certifies that Aylo Freesites Ltd (f/k/a MG Freesites Ltd), Aylo Premium Ltd (f/k/a MG Premium Ltd), and Aylo Billing Limited (f/k/a MG Billing Limited) are the only real parties-in-interest.

B. Related Proceedings – § 42.8(b)(2)

The '156 Patent is currently asserted in the below proceedings. Petitioner and its RPIs are only named parties in the District Court Litigation defined below:

- *MG Freesites Ltd et al. v. DISH Technologies LLC et al.* 3:23-cv-03674 (N.D. Cal.) (the "District Court Litigation")

- *iFIT Inc. v. ITC* CAFC-23-1965 (Fed. Cir.), *which* is an appeal from Investigation No. 337-TA-1265 (ITC) (the "ITC Investigation")

- *DISH Technologies LLC et al. v. ICON Health & Fitness, Inc.* 1:21-cv-00531 (D. Del.)

- *DISH Technologies LLC v. A Parent Media Co. Inc. et al.* 1:23-*cv*-01000 (D. Del.)

- *DISH Technologies LLC v. fuboTV Media Inc.* 1:23-c-v-00986 (D. Del.)

- *DISH Technologies LLC v. Beachbody, LLC d/b/a/BODi* 1:*23*-cv-00987 (D. Del.)

- *DISH Technologies LLC v. Vidgo Inc.* 2:23-cv-00624 (D. Utah)

- *DISH Technologies LLC v. BritBox, LLC* 1:23-cv-08971 (S.D.N.Y)

Additionally, Petitioner has filed IPRs on related U.S. Patent Nos. 8,868,772 (IPR2024-00048); 9,407,564 (IPR2024-00047); 11,470,138 (IPR2024-00044); 10,469,554 (IPR2024-00045); 10,951,680 (IPR2024-00046); and 11,677,798 (IPR2024-00043). Petitioner is contemporaneously filing an IPR for related U.S. Patent No. 10,469,555.

C. Counsel – § 42.8(b)(3) and (b)(4); Service Information; Fees

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A Power of Attorney is filed concurrently herewith under 37 C.F.R. § 42.10(b). The Office is authorized to charge the fee set forth in 37 C.F.R. § 42.15(a) or other fees to Deposit Account No. 22-0261.

III. CERTIFICATION OF GROUNDS FOR STANDING

Petitioner certifies that the ’156 Patent is available for IPR and that Petitioner is not barred or estopped from requesting IPR challenging the patent claims on the grounds identified in this Petition.

IV. UNPATENTABILITY GROUNDS

Petitioner requests cancellation of claims 1-17 based on the grounds below.

Ground	Reference(s)	Challenged Claims	Basis
1	Ogdon	1-17	103
2	Ogdon in view of Ala-Honkola	1-17	103
3	Ogdon in view of Shteyn or, *alternatively*, Ogdon in view of Ala-Honkola and Shteyn	4 and 7	103
4	Ogdon in view of Chou or, *alternatively*,	10 and 12	103

	Ogdon in view of Ala-Honkola and Chou		
5	Ogdon in view of SMIL 2.0 or, *alternatively*, Ogdon in view of Ala-Honkola and SMIL 2.0	8 and 14	103

These Grounds are supported by the Declaration of Dr. Henry Houh (EX1003) and other supporting evidence in the Exhibit List. EX1003, ¶¶ 46-47.

V. '156 PATENT

A. Summary

The '156 Patent (Application No. 16/291,343) was filed on March 4, 2019, which is a continuation of Application No. 15/207,172 (U.S. 10,225,304), which is a continuation of Application No. 14/516,303 (U.S. 9,407,564), which is a continuation of Application No. 11/116,783 (U.S. 8,868,772), which claims priority to U.S. Provisional No. 60/566,831 filed on Apr. 30, 2004. The '156 Patent issued on August 25, 2020. EX1001, Cover.

The '156 Patent relates to "adaptive-rate shifting of streaming content," such as video, over the Internet. EX1001, Abstract, 1:25-28.

The ’156 Patent teaches “a content server 102” and “end user 104” coupled by a data communications network (*e.g.*, the Internet 106) wherein the “end user station 104” may be a personal computer, entertainment system, or a portable electronic device configured to present content. *Id.*, FIG. 1, 6:20-34. As shown in Figure 2b below, the ’156 Patent describes encoding the same content file into three different “quality” streams: low, medium, and high.

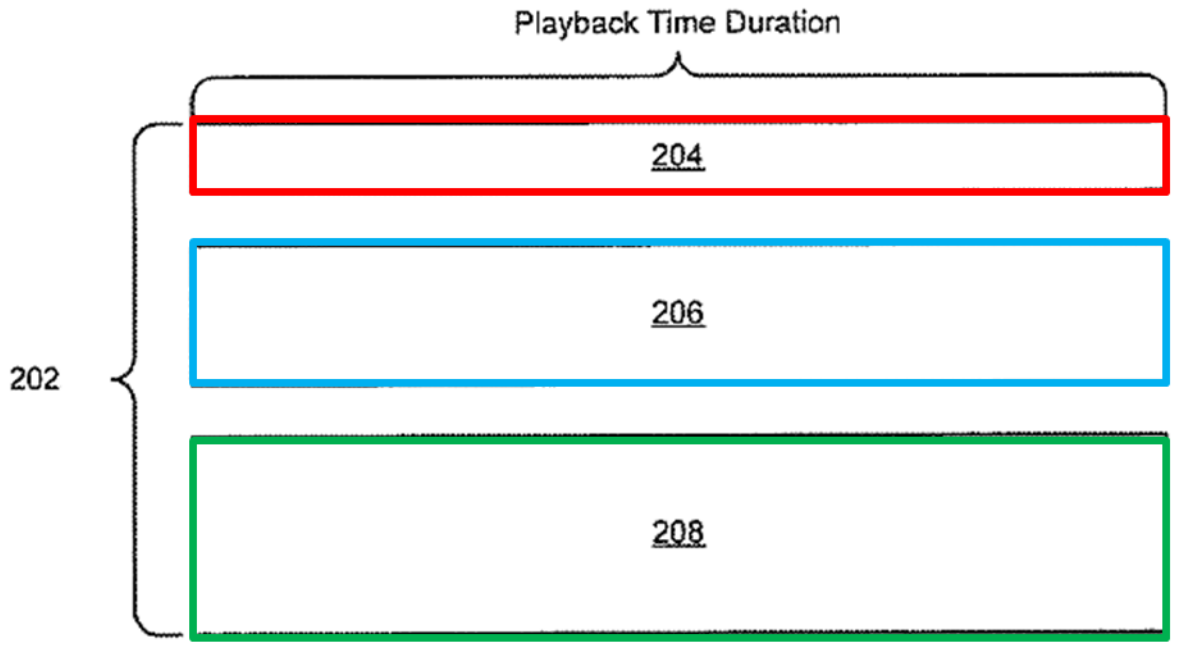


FIG. 2b

Id., FIG. 2b (annotated, low quality (red, 204), medium quality (blue, 206), and high quality (green, 208)), 6:64-7:8.

Each stream (204, 206, and 208) is “divided into a plurality of streamlets 212” where “streamlet 0 may have a time index of 00:00 representing the beginning of

content playback, and streamlet 1 may have a time index of 00:02, and so on." *Id.*, 7:9-21. This is shown in Figure 2c below.

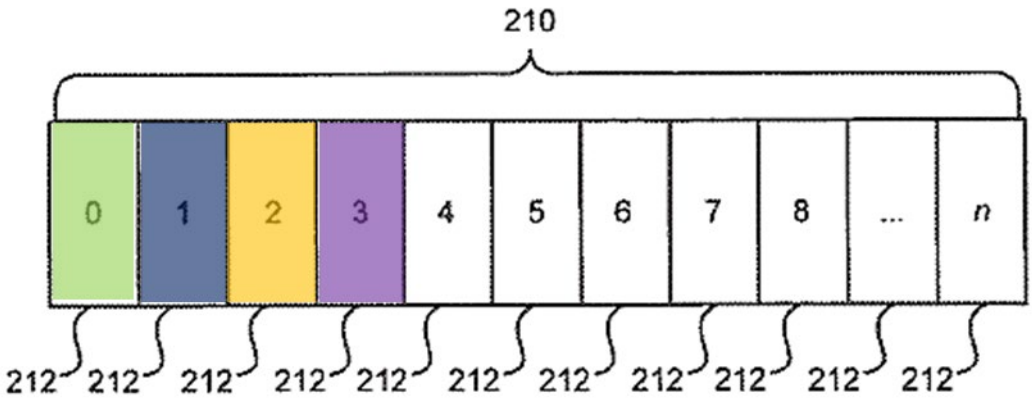


FIG. 2c

Id., FIG. 2c (annotated).

As the client receives a streamlet, it "calculates 708 a performance ratio" and "obtain[s] a performance factor." *Id.*, 12:28-65, FIGs. 6 and 7. Thereafter, the client determines whether to upshift or downshift the stream quality based upon comparing the performance factor versus trigger thresholds and makes a "determination of whether use of the higher quality stream is sustainable." *Id.*, 13:1-40.

B. Prosecution History

The '156 Patent was filed as Application No. 16/291,343 on March 4, 2019. On August 23, 2019, the United States Patent Office ("USPTO") Examiner issued a non-final rejection of all pending claims. EX1002, 69-83. For instance, claims 1, 3,

5, 7, 9-11, 13-20 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Publication No. 2002/0144276 to Radford; claims 2, 12 were rejected under 35 U.S.C. § 103(a) as being obvious in view of Radford and U.S. Patent No. 6,880,017 to Maree; and claims 4, 6, 8 were rejected under 35 U.S.C. § 103(a) as being obvious in view of Radford and U.S. Publication No. 2003/0055995 to Ala-Honkola. *Id*. The Examiner found that Ala-Honkola taught that "the streamlet comprises a Hyper Text Transfer Protocol file" and "selecting a suitable transmission speed rate for the media stream and correspondingly a suitable data source" such that "the need of special media stream server is avoided." *Id.*, 81.

On February 24, 2020, Applicant did not traverse the above findings of the Examiner with respect to Ala-Honkola in its response, but significantly amended the claims including deleting limitations that were rejected under 35 U.S.C. § 112. *Id.*, 91-102.

Based on the newly-amended language, Applicant argued the prior art "lacks any teaching . . . that the video server stores multiple different copies of the video encoded at different bit rates as multiple sets of streamlets, wherein each of the streamlets yields a different portion of the video on playback, wherein the streamlets across the different copies yield the same portions of the video on playback, and wherein the streamlets in the different copies are aligned in time such that the

streamlets that play back the same portion of the video for the different copies each begin at the same playback time in relation to the beginning of the video." *Id.*, 91.

Then, after an Examiner-initiated interview where Applicant agreed to make all independent claims parallel to claim 1 (*id.*, 122), the Examiner issued a Notice of Allowance on April 30, 2020 (*id.*, 123-138).

C. Priority Date

Petitioner assumes for the purpose of this Petition a priority date of April 30, 2004 (the "Priority Date") based on the claimed priority to the Provisional application No. 60/566,831 (EX1001, 2), but Petitioner reserves the right to contest this priority date (and priority chain) in other proceedings.

VI. LEVEL OF ORDINARY SKILL IN THE ART

Petitioner submits that a person having ordinary skill in the art ("POSITA") as of the Priority Date would have had at least a B.S. degree in computer science or electrical engineering (or comparable degree) and two years of experience in networking or streaming media, or a M.S. in computer science or electrical engineering (or comparable degree). EX1003, ¶ 42. A higher level of education or specific skill might make up for less experience, and vice-versa. *Id*.

VII. CLAIM CONSTRUCTION

Petitioner submits that, for purposes of institution, no constructions are necessary. However, Petitioner acknowledges that in the ITC Investigation between

Patent Owner and iFIT Inc., the Chief Administrative Law Judge ("ALJ") construed "streamlet" as "any sized portion of the content file." EX1009, 38-43. The ALJ also construed "a factor relating to the performance of the network that is indicative of an ability to sustain the streaming of the video" according to its plain and ordinary meaning, "*e.g.*, one or more factors relating to the performance of the network that is indicative of an ability to sustain the streaming of the video." *Id.*, 53-61. Finally, the ALJ construed "repeatedly generating . . . a factor" as "generating a factor more than once" and construed "successive determinations" according to its plain and ordinary meaning. *Id.*, 61-64.

The PTAB is not bound by the ITC's constructions. *Mediatek Inc. v. Advanced Micro Devices, Inc.*, IPR2018-00102, Paper 48 (Final Written Decision), at 10-11 (PTAB Apr. 29, 2019) (citing *Nobel Biocare Servs. AG v. Instradent USA, Inc.*, 903 F.3d 1365, 1375 (Fed. Cir. 2018)). Nevertheless, as shown herein, the asserted grounds render claims 1-17 of the '156 Patent unpatentable even under the ITC's constructions. By asserting that the '156 Patent claims are unpatentable under the ITC's constructions, Petitioner is not conceding that those constructions are correct and reserves its rights to challenge those constructions in any future proceeding.

In the ITC Investigation, iFIT proposed a design-around with respect to certain limitations of other patents in the family of the '156 Patent. In response, DISH argued that even where limitations "require repeated up- and down-shifting,

the single, initial adaptive stream selection performed by iFIT's Redesigned Products ***is equivalent***." EX1010, 32 (emphasis added). Thus, although Petitioner does not necessarily agree with Patent Owner, Patent Owner should be held to its argument that a "single, initial adaptive stream selection" is equivalent to limitations that require repeated up- and down-shifting.

VIII. OVERVIEW OF THE PRIOR ART

A. State of the Art

The '156 Patent admits in the "Description of Related Art" section that "streaming media" was known, including streaming of "audio/video," including on demand and live broadcasts. EX1001, 1:41-51. The '156 Patent further admits that TCP connections were known and that "[m]ost streaming solutions use a TCP connection" (*id.*, 2:16-50) and admits later in the Specification that HTTP GET requests were "standard" (*id.*, 9:40-42). Further, Patent Owner admits that the "standard HTTP/TCP protocol" is "the web standard upon which the Internet is built." *See DISH Technologies LLC et al v. Aylo Premium Limited et al* Case No. 2:23-cv-00552-HCN, D.I. 1 at ¶ 30.

Before the Priority Date, "client-pull" streaming systems were known in the art wherein a client requested from a server sequential portions of a file at different encoded quality levels based on network bandwidth. EX1003, ¶¶ 48-49. For example, Chang describes "real time measurement and prediction of bandwidth for

adaptive content delivery of rich media according to available user bandwidth." EX1007, Abstract. Chang discloses a client (via java applets) that performs real time bandwidth measurement according to user's available bandwidth and fetches the corresponding bandwidth sensitive track content from the server via HTTP requests. *Id.*, 7:43-53, 8:59-9:5, 9:45-51, 10:15-14, 10:35-58. In another example, Kliger teaches a media player device that requests from a server the appropriate bandwidth object depending on network bandwidth. EX1008, 3:25-32, 5:25-28, 9:32-10:4, 12:33:13:8, claim 3.

B. Ogdon

Ogdon (EX1004) was filed on March 31, 1998 and issued on December 12, 2000. Ogdon is prior art under at least (pre-AIA) 35 U.S.C. § 102(b). Ogdon is not cited on the face of the '156 Patent nor was it considered in the ITC Investigation.

Ogdon discloses a system for distributing a video presentation, during the performance of the presentation, over the Internet via webservers to a plurality of client nodes at a quality level appropriate for each client node based upon the transmission characteristics of the network, such as data transmission rate. EX1004, Abstract, 1:9-15, 2:21-35. Ogdon discloses that each presentation includes presentation "elements" (also referred to as "collections" or "subcollections") containing "one or more segments" of the presentation and being "an indivisible portion of a presentation performance" wherein each such element has multiple

versions of the same content and same duration at a different quality levels such that each version of each element can be substituted for the other as an alternative based upon network performance. *Id.*, 2:36-66, 13:47-49. Ogdon further discloses that each client node selects and requests each element at the appropriate quality level based upon its calculated network characteristics. *Id.*, 4:29-36, 6:40-51, 7:10-15, 21:40-45, 22:10-33, 23:40-24:3, 25:24-30.

C. Ala-Honkola

Ala-Honkola (EX1017) was filed on October 10, 2001 and published on March 20, 2003. Ala-Honkola is prior art under at least (pre-AIA) 35 U.S.C. § 102(b). Ala-Honkola is cited on the face of the ’156 Patent and was used as a secondary reference to reject the claims during prosecution, but was not considered in the ITC Investigation. The grounds involving Ala-Honkola are new and combine Ala-Honkola with a primary reference that was not considered by the Examiner.

Ala-Honkola discloses adaptive streaming of content including video. EX1017, Abstract. Ala-Honkola further teaches storing multiple copies of the content at different bitrates at a server and indexing the different quality copies of the content by time. *Id.*, ¶¶ 10, 22, 24, 25, 30-32, 46, 45, FIG. 1. Ala-Honkola further teaches a client making HTTP GET requests over multiple TCP connections for copies of a file at a server at different quality levels by requesting specific byte ranges (timing marks) and the client repeatedly checking the sustainability of

streaming at the current bitrate and making repeated requests for higher or lower qualities at the present timing marks based on changing bandwidth. *Id.*, ¶¶ 4, 7-12, 14, 15, 30-45, FIGs. 1-2.

D. Shteyn

Shteyn (EX1016) was filed on November 4, 1999 and issued on May 5, 2009. Shteyn is prior art under at least (pre-AIA) 35 U.S.C. § 102(e). Shteyn is not cited on the face of the ’156 Patent, nor was it considered in the ITC Investigation.

Shteyn discloses partitioning a content file into segments at a server including storing alternates encoded at different bitrates for each segment. EX1016, Abstract, FIGs. 1-2, claims 1, 9, 11. Shteyn discloses that the client connects to the server and downloads the control XML file that enables the client to request, download, and play out each segment of the content file sequentially. *Id.*, 2:57-3:36, 3:44-61, 4:8-16. Shteyn further discloses that the client application may detect a change in bandwidth and select a different quality (higher or lower quality) segment when requesting subsequent segments. *Id.*, 4:20-31, FIG. 2, claim 1.

E. Chou

Chou (EX1013) was filed on December 4, 1998 and issued on October 21, 2003. Chou is prior art under at least (pre-AIA) 35 U.S.C. § 102(e). Chou is not cited on the face of the ’156 Patent, nor was it considered in the ITC Investigation.

Chou discloses obtaining real-time responses with interactive multimedia servers providing at least two different audio/visual data streams, with a first data stream having fewer bits per frame and providing a video image much more quickly than a second data stream with a higher number of bits and quality. EX1013, Abstract. Chou discloses that the first data stream is available much faster and may be more quickly displayed on demand. *Id.* Chou further discloses that start-up delay and seek delay occur in order to guard against future buffer underflow due to network jitter. *Id.*, 2:59-3:8.

F. SMIL 2.0

Synchronized Multimedia Integration Language 2.0 ("SMIL 2.0") is an XML markup language for multimedia presentations and was publicly accessible on the World Wide Web Consortium's ("W3C") website at least as of November 9, 2001. *See* EX1006 (SMIL 2.0); EX1011 (Wayback Affidavit showing SMIL 2.0 available on November 9, 2001); EX1003, ¶ 58.

Thus, SMIL 2.0 is prior art under at least (pre-AIA) 35 U.S.C. § 102(b). SMIL 2.0 is not cited on the face of the '156 Patent and was not considered by the ALJ in the ITC Investigation.

SMIL 2.0 discusses these elements. SMIL 2.0 discloses that, using "<seq>", a client can request and play media elements one after the other. EX1006, 123-126. SMIL 2.0 further teaches that a client can select different encoded files based on the

client's available bandwidth. EX1006, 61-63. Specifically, the "<switch>" element can be used to list different quality files with a "systemBitrate," and, depending on the client's bandwidth, only one will be selected. *Id.*

G. Analogous Art

Each prior art reference is analogous art to the claimed invention in the'156 Patent, and each is in the same field of endeavor of adaptive-rate streaming based on network conditions. *Compare* EX1001, title, Abstract, 1:25-28, 2:57-60, 3:5-4:12, FIGs. 2c, 4, and 7, *with* EX1004, Abstract, 1:9-15, 3:38-63, 7:10-15, 7:40-63, 21:40-22:33, 23:40-24:3, FIG. 2; EX1016, Abstract, 1:6-14, 2:53-63, 3:44-64, 4:20-31, FIGs. 1-2; EX1017, Abstract, ¶¶ 1, 10-11, 14, 25, 31-33, 38, FIGs. 1-2; EX1013, Abstract, 2:7-3:19, 3:29-60, 6:50-7:30, FIG. 2; EX1006, 61-62, 123-126; EX1003, ¶ 61.

Additionally, each prior art reference is reasonably pertinent to any purported problem addressed in the '156 Patent, such as "alleviat[ing] the problems of reliability, efficiency, and latency" and "offer[ing] instantaneous viewing" using "multiple connections between a source and a destination, requesting varying bitrate streams depending upon network conditions" *Id.*; EX1001, 2:51-2:60; EX1003, ¶ 62.

IX. SPECIFIC GROUNDS

A. Ground 1: Claims 1-17 Would Have Been Obvious in view of Ogdon

1. Claim 1

a. 1[Pre]: "An apparatus for rendering a video that is adaptively received as a digital stream from a video server over a network, the apparatus comprising;"

Whether or not the preamble is limiting, Ogdon teaches 1[Pre]. Ogdon discloses an apparatus (client node 56) for rendering a video (video presentation) received as a digital stream from a video server (webserver(s)) over a network (Internet). EX1004, Abstract ("distributing a performance of a presentation synchronously to a plurality of client nodes" via "the Internet"), 7:40-48 ("at least one of a client node 56 (e.g., a personal computer) . . . may receive video . . . from a communications network 70 such as the Internet"), 8:27-40 ("content webservers 96a, and alternate content web servers 96b" provide "presentation data to client sites 54 requesting such data via client nodes"), FIGs. 1A-1B.

Ogdon further teaches that each client node adaptively receives the video data and switches between versions of the video presentation based on network characteristics. EX1004, 3:38-41 ("**dynamically and adaptively switch**[1] between .

[1] All emphases in prior art citations are added unless otherwise noted.

. . versions of the presentation according to network transmission characteristics at each client network node"), 22:10-23 ("the client node 56 uses its most recent network 70 data transmission characteristics together with the host 200 transmitted list of current network 70 addresses for content webservers 96 to select an appropriate content webserver and an appropriate version of the next collection of segments to be retrieved."); EX1003, ¶¶ 63-64.

b. 1[A][1]: "a media player operating on the apparatus,"

Ogdon teaches 1[A][1]. Ogdon discloses a media player (client presentation software 88 and/or browser 78) operating on the apparatus (client node). EX1004, 7:52-63 ("if the client node 56 is resident at a client site 54, then a network interface **software package** is required for receiving, e.g., video presentation information from the communications network 70 . . . includ[ing] a network browser 78 such as the Internet browsers offered by Microsoft and Netscape, together with a **client presentation software system 88** that coordinates with the browser 78 for requesting, receiving and displaying presentation segments (from the network 70) as appropriate during the presentation."); EX1003, ¶ 65.

Because Ogdon refers to the client presentation software and the browser as part of a "software package" that "together" perform functions of the invention, a POSITA would have considered the client presentation software and the browser as together forming "a media player." EX1003, ¶ 66.

Alternatively, if "a media player" is interpreted as requiring one single computer program, Ogdon contemplates receiving and displaying presentation data via just "an internet browser" or a plug-in within the browser (EX1004, 5:28-36), and a POSITA would have been motivated to modify the system such that each of the functions performed in Ogdon collectively by the client presentation software and browser be performed by a single program alone to simplify the system, reduce the number of programs that are required to run on the client node, and make it easier to debug. EX1003, ¶ 67. Further, this would have been a straightforward modification because it would have been a simple matter of programming one computer program to perform all functionality that the client presentation software and the browser are disclosed to perform collectively. *Id*.

c. 1[A][2]: "wherein the media player is configured to stream the video from the video server via at least one transmission control protocol (TCP) connection over the network,"

Ogdon teaches 1[A][2]. Ogdon discloses that the media player (client presentation software and/or browser) is configured to stream the video from the video server (webserver(s)) via at least one TCP connection over the network (Internet). EX1004, 7:59-63 ("client presentation software system 88 that coordinates with the browser 78 for requesting, receiving and displaying presentation segments (**from the network 70**) as appropriate during the presentation"), 2:1-10 ("the present invention may communicate the video portion

of a presentation to a user site via the Internet (more generally, via any **TCP/IP network**) . . . both the video and audio portions of the presentation may be provided solely by a **TCP/IP network** such as the Internet"), 19:34-44 ("when the time for the presentation arrives, the client's client presentation software 88 via the network 70 establishes a network 70 connection between the client's client node 56 and the host 200 controlling the presentation performance. . . . After the host 200 is contacted, it instructs the client presentation software 88 to establish a connection with one of the internal webservers 248 for dynamic content."), claim 7 ("a network using **TCP/IP** for communicating between at least one of: (a) one of said content supplying nodes and said first client node; (b) said presentation controlling node and said first client node; (c) one of the content supplying nodes and said presentation controlling node."); EX1003, ¶ 68.

d. 1[A][3]: "wherein the video server stores multiple different copies of the video encoded at different bit rates as multiple sets of streamlets,"

Ogdon teaches 1[A][3]. Ogdon discloses that each copy of the video presentation is made up of set(s) of "streamlets" ("segments") and each segment has alternative bitrate versions for the client nodes to choose from. Ogdon uses the term "segment" to mean a portion of the video presentation and explains that "one or more" segments may be grouped into an "element," "collection," or "subcollection." *E.g.*, EX1004, 2:36-49, 4:29-36, 18:40-45, 22:10-29. EX1003, ¶ 69. Ogdon explains

that this is "an indivisible portion" of the video presentation. EX1004, 2:36-42. The entire presentation is therefore a set of streamlets (segments). *Id.*

Ogdon further discloses that the video presentation has multiple different copies (*e.g.*, high quality (*e.g.*, full-animation video) and lower quality (*e.g.*, limited-animation video) versions) encoded at different bitrates because these streamlets (segments) can each be for "[d]ifferent versions of the same presentation" with "different network requirements," for example, "a first version of a presentation may require a network transmission rate sufficient for real time or **animated video**" and "another version of the presentation may only require a transmission rate sufficient for **graphic slides**." EX1004, 2:30-66. Further, "if a low transmission data rate is detected . . . presentation elements of a reduced size can be retrieved" or "if a higher transmission rate is detected . . . presentation elements of a greater size (and **corresponding enhanced quality of presentation**) can be retrieved." *Id.*, Abstract; *see also id*, 22:44-47 ("better presentation quality presentation elements may be retrieved (e.g., the presentation quality may be enhanced from **limited** or no animation **to full animation**)"), 13:47-49 ("**several variations** of presentation content can be provided to clients based on the available bandwidth"), 24:55 ("alternative segment collections that are smaller"), claim 9 ("said first subcollection includes a first video portion, and said second subcollection includes a different second video portion that corresponds in content with said first video portion, and

wherein said first and second video portions have substantially different expected data transmission rates for being transmitted to said first client node"); EX1003, ¶ 70. A POSITA would have understood the smaller size and lower transmission rate for "limited or no animation" video to be encoded at a lower bitrate than the larger size, higher quality, and higher transmission rate requirement "full animation" video, which would be encoded at a higher bitrate. *Id*.

Ogdon further discloses that the video server (webserver(s)) stores the streamlets (segments) of the video presentation as "[d]ifferent versions of the same presentation, accessible from the one or more of the content webservers." EX1004, 2:30-31, 9:30-31, 22:60-64; *see also id.*, 9:44-46 ("content manager 104 distributes presentation content (e.g., presentation segments) to the content webservers 96"); claim 21 ("storing a plurality of segments of a presentation for network access via one or more content supply nodes"), FIG. 2C (step 508 "list of network 70 addresses (URLs) of the content webserver(s) 96 from which this next collection of segments can be retrieved"). EX1003, ¶ 71.

e. 1[A][4]: "wherein each of the streamlets yields a different portion of the video on playback,"

Ogdon teaches 1[A][4]. *See* 1[A][2]. Ogdon discloses that each of the streamlets (segments) yields a different portion of the video on playback because, the "subcollection of segments (i.e. presentation elements) [are] ordered according

to their presentation sequence." EX1004, 2:44-45, 3:46-47 ("presentation as an **ordered series of presentation segments**"), claim 21 ("there are subcollections of one or more segments, each subcollection having a predetermined presentation order"), FIG. 2C (step 508 "next collection of one or more (video) segments"); EX1003, ¶ 72.

f. 1[A][5]: "wherein the streamlets across the different copies yield the same portions of the video on playback,"

Ogdon teaches 1[A][5]. *See* 1[A][3]. Ogdon discloses that the streamlets (segments) across the different copies contains the same portions of the video on playback because each version (*e.g.*, high quality (full animation) and lower quality (limited animation) versions) of the stream encodes the same portion of the presentation at different quality levels. EX1004, 2:43-49 ("each version of a presentation typically has its subcollection of segments (i.e. presentation elements) ordered according to their presentation sequence" and "**every segment** (or subcollections thereof) in one version corresponds with a segment (or subcollections thereof) **having the same presentation order in each of the other versions**."); *see also id.*, 2:49-55 ("**corresponding segments** (or subcollections thereof) in different versions" are the same such that "any of the corresponding alternative segments (or subcollections thereof) from different versions can be **presented as a replacement for another such corresponding segment** (or subcollection) during the

presentation."), claim 21 ("said first subcollection is replaceable with said second subcollection"); EX1003, ¶ 73.

g. 1[A][6]: "and wherein the streamlets in the different copies are aligned in time such that the streamlets that play back the same portion of the video for the different copies each begin at the same playback time in relation to the beginning of the video, and wherein the media player streams the video by:"

Ogdon teaches 1[A][6]. Ogdon discloses that the streamlets (elements) in the different copies (versions) are aligned in time such that each begin at the same playback time in relation to the beginning of the video because they have the same video presentation order (just different quality levels). EX1004, 2:44-49 ("substantially every segment (or subcollections thereof) in one version corresponds with a segment (or subcollections thereof) having **the same presentation order**, in each of the other versions."); 3:11-15 ("ordering of predefined segments (or subcollections thereof) is capable of being presented and archived . . . such ordering can take into account alternative segments for the presentation."). Additionally, the provisional application of Ogdon (U.S. 60/041,770) also discloses that "corresponding presentations segments in the collection can have identical audio portions" (EX1014, 35 (claim 25)), meaning that corresponding alternate video presentation segments versions with identical audio portions also have identical (*i.e.,* same or equal) playback time durations. Further, during prosecution of the Ogdon

patent, the Applicant characterized the Ogdon invention as having different versions "with identical (and/or content corresponding) portions of the presentation" (EX1015, 239), meaning the corresponding video segments (portions) are in the same order and each of the corresponding segments have identical (*i.e.,* same or equal) playback time durations in each version. EX1003, ¶ 74.

Here, as explained above, Ogdon teaches that each segment for each quality level is sequentially ordered in the same order starting from the beginning of the video presentation, which corresponds to the playback times and are requested in order. EX1004, FIG. 2 (step 508: "The host 200 sends one or more commands to the client presentation software 88 at each client node 56 indicating; (A) **the next** collection of one or more (video) segments", then at step 560, when there are no more segments to present, the process loops back to step 476 for identifying **the next** collection of presentation segments).

Additionally, Ogdon teaches presenting the video presentation "synchronously to a plurality of client nodes" such that each corresponding segment begins at the same playback time. EX1004, Abstract, *see also id.*, 3:38-63 ("it is an aspect of the present invention to dynamically and adaptively switch between . . . versions of the presentation according to network transmission characteristics at each client network node so that the clients at the client nodes have **presented to them simultaneously, synchronously and in real time, corresponding (in**

content) segments of the presentation. For example, a first client (at a **first client node**) may experience the presentation as an ordered series of presentation segments, wherein the **first and second ordered segments are presented in full animation** . . . synchronously with the presentation to the first client, a second client (at a **second client node**) may experience **the presentation in a slide show format** . . . wherein the initial two segments presented are corresponding alternative segments to the first and second segments presented to the first client. . . . a **third client** may synchronously experience the **first segment** of the presentation . . . but subsequently experience the corresponding **slide show alternative to the second segment** . . . due to, for example, network transmission slowdowns.”).

As discussed above, the streamlets (segments), starting with the first segment, play back the same portion of video for the different copies. *See* 1[A][5]. And the media player (client presentation software and/or browser) streams the video. *See* 1[A][1]-1[A][2]; EX1003, ¶¶ 74-77.

h. 1[B][1]: “requesting sequential streamlets of one of the copies from the video server according to the playback times of the streamlets by transmitting hypertext transport protocol (HTTP) GET requests that identify the selected streamlets stored by the video server,”

Ogdon teaches 1[B][1].

Requesting sequential streamlets

Ogdon discloses requesting sequential streamlets of one of the copies from the video server. Ogdon discloses that the streamlets of each of the copies are in the same sequential order. *See* 1[A][3], 1[A][5]-[A][6]. Ogdon further teaches that end user device client nodes request (via client presentation software and/or browser) each of the sequential streamlets (segments) of one of the copies from the video server because Ogdon is a "client-request" system that requires the client to request each sequential collection of one or more segments where "each client node" must "request presentation content from a given set of communications network servers rather than having such servers push presentation content to the client node." EX1004, 6:41-44. More specifically, "the present invention employs a '**client-request**' technology, where each presentation member's browser **requests** information from a communication network server." *Id.*, 7:10-13, claim 12 ("a network interface component, residing on said first client node, for receiving said presentation control information and transmitting a request for a subcollection of said collection of data segments to one of said content supplying nodes, wherein said network interface component includes a network browser for communicating with said communications network"), FIG. 2C (step 528: "the browser, in turn, sends a network 70 (Internet) **request** to the selected content webserver 96 for the selected collection of segments"), 6:18-23 ("Thus, when the data required for a segment is

not timely cached prior to its intended performance at a client's node, alternate segment data is automatically **requested** from the communications network by the client node.").

Ogdon discloses that "requesting sequential streamlets" may include a request for a **single** segment per request or **multiple** segments per request because Ogdon discloses that each requested "element" (a/k/a "subcollection" or "collection") of segments contains "**one or more** segments." EX1004, 2:39-40, 22:30-33. Thus, each requested element may contain one segment (streamlet) or, alternatively, each requested element may contain two or more segments (streamlets). In the latter case, the request would be for multiple segments (streamlets) at once. EX1003, ¶¶ 78-79.

Requesting according to the playback times of the streamlets

Ogdon also teaches that the client requests the segments "according to the playback times of the streamlets." In the ITC Investigation, the ALJ did not explicitly construe "requesting sequential streamlets of one of the copies from the video server according to the playback times of the streamlets." However, the ALJ did find that requesting sequential media segments by unique filenames (*i.e.*, where each segment in the sequence has "a unique identifying number" corresponding to position in playback sequence) satisfied this limitation of requesting streamlets "according to the playback times." EX1009, 118-120.

Here, as explained above, Ogdon teaches that each element / collection / subcollection of one or more segments is sequentially ordered starting from the beginning of the presentation, which corresponds to the playback times of each segment in the larger video presentation, and the elements are requested in such sequential order. *See* 1[A][6]. Further, Ogdon teaches that each streamlet (segment) has a unique "resource name" and/or path name at the server(s) indicative of segment ordering and may also include an "item number." EX1004, 28:14-28 (the "Resource Name" in the script "provide[s] an identification of a presentation resource (e.g. presentation data segment file)" while "Path—Denotes a path name to a file directory relative to the resource location" and "File—Denotes a name of a resource file"), FIG. 3 (616 "item number"). This is in line with the '156 Patent's description of "identifying" streamlets "with a unique filename." EX1001, 8:66-67. Thus, Ogdon teaches that segments are requested according to the playback times under the ITC interpretation because each segment has a unique identifying name indicative of the sequence of the segments (*e.g.*, via resource name and/or item number) and that the segments are requested in order. EX1003, ¶ 81.

To the extent requesting "according to the playback time" requires files to be named and requested with some indication of playback time, Ogdon also teaches this limitation. For example, Ogdon contemplates a "virtual time" identification for segments of the video presentation. EX1004, 25:63-26:14 ("A 'virtual time' column

620"), FIG. 3 (620: "Virtual Time HR:MN:SEC"). A POSITA would have been motivated to name each segment of a video presentation according to its playback time (*e.g.* in the format of HR:MN:SEC), and thus request said files by this resource name (playback time), because a naming convention in this format would provide each streamlet with a unique and separately-identifiable filename in order to simplify the system such that when a client requests a segment (or collection of segments) the client requests the name of the file in the format HR:MN:SEC (*e.g.* Segment 1 = 00:00:00; Segment 2 = 00:00:05; etc.). EX1003, ¶ 82. Further, a POSITA would have been motivated to make such a combination because naming segments according to their playback times would allow for ordering the segments in proper playback order when arranging by name such that when a POSITA viewed the directory of files saved on the servers the segments would be in order of how they will be played. *Id.* A POSITA would have had a reasonable expectation of success with such a modification because it would simply involve changing the file names of segments stored on the web servers. EX1003, ¶ 82.

HTTP GET Requests

Finally, Ogdon teaches that the client requests can be made by transmitting HTTP requests. EX1003, ¶ 83. Ogdon discloses that "the presentation element(s) selected is dependent upon network protocols such as HTTP" noting that "as the size of the presentation data and the time for retrieval decreases, the present invention

tends to use HTTP" and, for example, "there is a primary webserver 96a and an alternative webserver 96b, and each has presentation versions for both HTTP and FTP as well as both having animated and non-animated interchangeable presentation elements." EX1004, 22:48-64.

It was known to a POSITA that HTTP requests are made by a client transmitting GET requests. *See* EX1019, 46 (HTTP 1.1 protocol describing "GET" as the means by which to "retrieve whatever information (in the form of an entity) is identified by the Request-URI"); EX1003, ¶ 84. Further, a Request-URI stands for Request-Uniform Resource Identifier and "Uniform Resource Identifiers are simply formatted strings which identify—via name, location, or any other characteristic—a resource" (EX1019, 16) such that an HTTP GET request is "used to identify a resource on an origin server or gateway" (EX1019, 32). In fact, the '156 Patent also admits that HTTP GET requests were "standard" (EX1001, 9:40-42).

Further, to the extent Ogdon does not explicitly teach HTTP GET requests, a POSITA would have been motivated to modify Ogdon to request elements from servers via standard HTTP GET requests because GET requests are one of a finite number of possible request solutions available in the HTTP protocol, and thus one of a finite number of identified predictable solutions for requesting files from a server with a reasonable expectation of success. EX1019, 45-47; EX1003, ¶ 85. There also would have been a reasonable expectation of success because HTTP is a

universally known and used protocol and GET requests are a standard method within that protocol for requesting data. *Id.* Finally, as noted above, the requested elements / collections / subcollections in Ogdon each contain "**one or more** segments" (EX1004, 2:39-40), and thus each requested element may contain one segment (streamlet) or, alternatively, each requested element may contain two or more segments (streamlets). EX1003, ¶ 85.

i. 1[B][2]: "wherein the sequential streamlets are selected by the media player from the based upon successive determinations to shift the playback quality to a higher or lower quality one of the different copies of the video;"

Ogdon teaches 1[B][2]. Ogdon discloses sequential streamlets selected by the media player. *See* 1[A][3]-[A][6]; EX1004, FIG. 2C (step 524: "The client presentation software 88 . . . select[s] . . . a next collection of segment(s)").

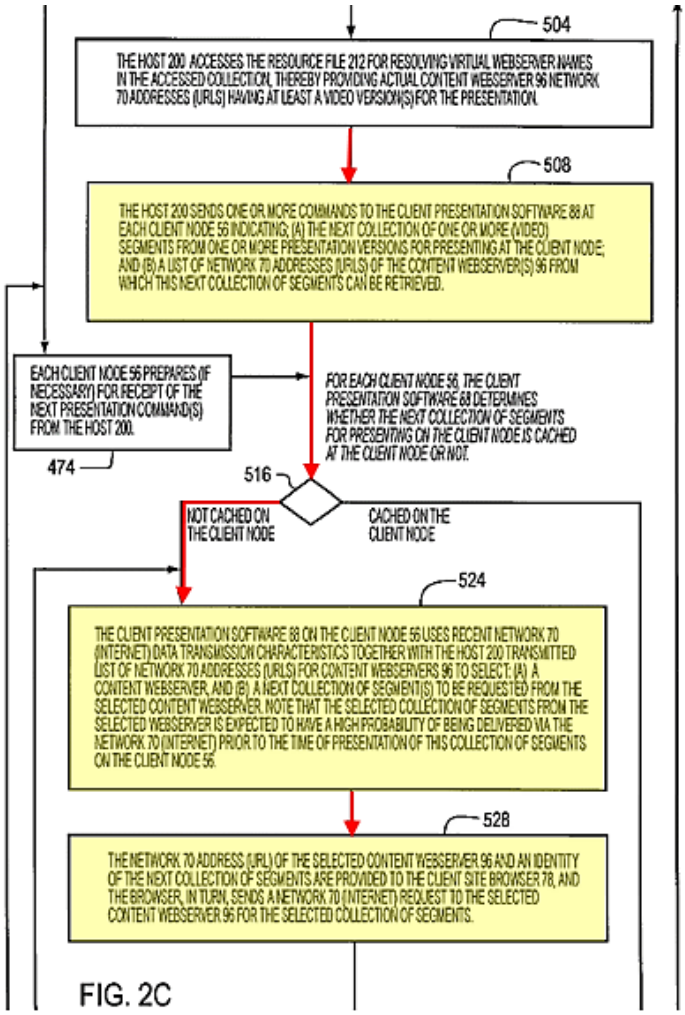
Ogdon also teaches that this selection is from the based upon [*sic*] successive determinations. EX1004, FIG. 2C-2D ((step 516) client **determines** whether segments are already cached; (step 532) after requesting, client **determines** whether the requested segments are cached within a desired time; (step 536) if no, client **determines** whether there is time to try again; (step 544) if yes, client **determines** network characteristics at client node), 24:50-57 ("on such **subsequent iterations for determining** an alternative way to present a particular portion of the presentation, the following steps may be performed: the **original calculation is**

again performed with new times and current bandwidth information . . . [a]n overall limit of three re-tries of any URL will force smaller alternative segment collections to be selected”).

Ogdon discloses making such successive determinations to shift the playback quality to a higher or lower quality of one of the different copies of the video because Ogdon repeatedly determines, based on bandwidth, in a loop to shift the quality of the segments.

> [I]f the next collection of segments is not cached on a client node 56, then step 524 is performed wherein the client presentation software 88 on the client node 56 uses its most recent network 70 data transmission characteristics together with the host 200 transmitted list of current network 70 addresses for content webservers 96 **to select** an appropriate content webserver and **an appropriate version of the next collection of segments to be retrieved**.

Id., 22:10-18, 23:5-22 (calculating bandwidth to "[s]elect the highest quality collection of presentation elements available"), 23:40-48, 24:50-57; EX1003, ¶¶ 86-87; *see also* EX1004, FIGs 2B-2D.



EX1004, FIG. 2C (annotated).

j. 1[C]: "repeatedly generating, by the media player, a factor relating to the performance of the network that is indicative of an ability to sustain the streaming of the video;"

Ogdon teaches 1[C]. Patent Owner contended in the file history of parent U.S. Patent No. 8,868,772 that there is allegedly sufficient disclosure for such a factor

being "indicative of latency, delays or losses of the requested portions, and available bandwidth of the TCP connections." EX1018, 447-448 (footnotes omitted).

Ogdon discloses repeatedly generating "a factor relating to the performance of the network that is indicative of an ability to sustain the streaming of the video" because it teaches repeatedly calculating data transmission characteristics such as the current client node bandwidth to select a quality version for each segment collection. EX1004, 22:10-23 ("the client node 56 uses its **most recent network 70 data transmission characteristics** together with the host 200 transmitted list of current network 70 addresses for content webservers 96 **to select** an appropriate content webserver and **an appropriate version of the next collection of segments to be retrieved**."), 23:5-22 (calculating "average bandwidth" for "[s]elect[ing] the highest quality collection of presentation elements available"), FIG. 2C ("Client node 56 uses recent network 70 (Internet) data transmission characteristics . . . to select . . . (B) a next collection of segment(s) to be requested from the selected content webserver."), 5:36-39 ("several variations of presentation content can be delivered **based on, e.g., the current bandwidth available** and the client's affiliated network server(s)."), 13:47-49, 24:50-57 ("on such subsequent iterations for determining an alternative way to present a particular portion of the presentation, the following steps may be performed: the original calculation is again performed with new times and current bandwidth information . . . [a]n overall limit of three re-

tries of any URL will force smaller alternative segment collections to be selected"), claim 2.

Ogdon also explains that additional factors may be calculated for selecting the quality segments such as "network 70 error rates, fluctuations in bandwidth, or a predictive statistical expectation of bandwidth." *Id.*, 23:6-28. Both current bandwidth and these additional factors also "indicative of an ability to sustain the streaming of the video" because bandwidth determines the capacity of the network and clients will select the most appropriate version to ensure the requested segments are delivered in time for presentation to sustain the stream. *Id.*, 23:18-20 ("Select the highest quality collection of presentation elements available"), 23:10-23 ("the goal of assuring that there is a **high probability** of this next collection of segments being delivered to the client node 56 **prior to the time that this collection is to be used in the presentation performance on the client**"), 21:62-63 ("attempt to assure a **timely caching** of this next collection of segments for timely performance"); EX1003, ¶¶ 88-89.

k. 1[D]: "adapting the successive determinations to shift the playback quality based on the factor to achieve continuous playback of the video using the streamlets of the highest quality copy of the video that is determined to be sustainable at that time; and"

Ogdon teaches 1[D]. As explained above, Ogdon discloses adapting the successive determinations to shift the playback quality based on the factor to achieve

continuous playback of the video using the streamlets (segments) of the highest quality copy of the video that is determined to be sustainable at that time. *See* 1[B][2]-1[C]. In Ogdon, the process for retrieving the next file and determining whether to shift the playback quality of the next file to the highest quality sustainable is carried out in a loop. *See* 1[B][2], 1[C]; EX1004, 23:18-20, 23:10-23, FIG. 2B (step 476 "first (next) collection of corresponding presentation segments"), FIG. 2C (step 508 "next collection of one or more (video) segments from one or more presentation versions" and steps 524, 528), FIG. 2D (step 552 present "the next segment" and loop at 560), 22:10-18, 23:5-22 (calculating bandwidth to "[s]elect the **highest quality** collection of presentation elements **available**"), 23:40-48, 24:50-57; EX1003, ¶ 90.

l. 1[E]: "presenting the video for playback by providing the requested streamlets in order of ascending start time."

Ogdon teaches 1[E]. Ogdon describes that the elements are played back by the client node(s) in order of ascending time. *See* 1[Pre], 1[B][1]-1[B][2], 1[D]; EX1004, 7:59-63 ("a client presentation software system 88 that coordinates with the browser 78 for requesting, receiving and displaying presentation segments (from the network 70) as appropriate during the presentation"), 26:37-39 ("provide a particular presentation content file (e.g., of presentation elements) at a client node 56 in time for display."), 2:45 ("ordered according to their presentation sequence"),

claim 21 ("each subcollection having a predetermined presentation order"); EX1003, ¶ 91.

2. Claim 2: "The apparatus of claim 1, wherein the apparatus is configured to establish multiple Transmission Control Protocol (TCP) connections with a content server, and request streamlets of varying bitrates."

Ogdon teaches claim 2. *See* 1[A][2], 1[B][2]; EX1004, 2:13-23 ("[t]he present invention distributes a presentation [] among network server nodes of a TCP/IP network . . . a version of the presentation may be accessed **synchronously from different network server nodes**, or different versions of the presentation may be accessed **synchronously from one or more of the network server nodes**."), claim 7, 22:48-64 ("the presentation element(s) selected is dependent upon network protocols such as HTTP" noting that "as the size of the presentation data and the time for retrieval decreases, the present invention tends to use HTTP" and, for example, "there is a primary webserver 96a and an alternative webserver 96b, and each has presentation versions for both HTTP and FTP as well as both having animated and non-animated interchangeable presentation elements."); EX1003, ¶ 83.

A POSITA would have understood the above disclosures of Ogdon to teach establishing multiple TCP connections with the content server. It was well-known to a POSITA at the time of the alleged Priority Date that simultaneously connecting

to different server nodes requires multiple TCP connections. EX1003, ¶¶ 92-93. For example, a POSITA understood that TCP connections are distinguished by their IP addresses and port numbers, and that different servers have different IP addresses. As such, synchronously connecting to more than one content server, as Ogdon discloses, requires multiple TCP connections. *Id.*

To the extent that Patent Owner argues that Ogdon does not teach multiple TCP connections, a POSITA would have been motivated to configure Ogdon's apparatus to establish multiple TCP connections between a client and content server. For example, a POSITA understood that having multiple TCP connections provides a back-up if one connection fails. It also allows parallel downloading of multiple segments at the same time, which increases efficiency, *e.g.*, where maximum TCP throughput is the limiting factor of performance. Multiple TCP connections also permits connections to an alternative webserver(s) for the user to request different quality segments, to ensure sufficient buffer of data for continuous playback. A POSITA would understand that multiple TCP connections would be required to access content parts residing on different server computers, since TCP connections are defined by the source/destination IP addresses and source/destination ports, and different server computers would have different IP addresses, and source port numbers for a TCP connection are selected at the time of the connection. EX1003, ¶ 94. A POSITA would have had a reasonable expectation of success with such a

modification because the TCP protocol allows for multiple connections and Ogdon teaches using TCP to request different quality versions or the same version from different server nodes. *Id.*

3. Claim 3: "The apparatus of claim 1, wherein each streamlet further comprises a portion of a content file provided by the server."

Ogdon teaches claim 3. *See* 1[Pre], 1[A][4] (explaining that each segment (streamlet) is a portion of a larger video presentation stored at the web server(s)); EX1003, ¶ 95.

4. Claim 4: "The apparatus of claim 1, wherein the requesting the sequential streamlets comprises the apparatus transmitting hypertext transport protocol (HTTP) GET requests for selected streamlets, wherein each of the HTTP GET requests identifies the separate file stored by the video server that corresponds to the requested streamlet."

Ogdon teaches claim 4. Ogdon teaches client nodes using HTTP GET requests for requesting selected sequential streamlets (segments) that identify the specific resource (segment) stored on the server (webserver(s)). *See* 1[B][1] (HTTP GET requests, which include Resource-URI string identifying the requested resource, for sequential streamlets). Additionally, Ogdon further teaches that the streamlets (segments) are separate files that are stored by the video server (webserver(s)); EX1004, 28:17-18 ("presentation data segment file"), FIG. 2C (step 508 "list of network 70 addresses (URLs) of the content webserver(s) 96 from which this next

collection of segments can be retrieved"). A POSITA would have understood separate URL addresses for each segment to indicate separate segment files stored by the video server. EX1003, ¶ 96.

5. Claim 5: "The apparatus of claim 1 wherein each of the streamlets of each of the different copies is independently requestable and playable by the apparatus."

Ogdon teaches claim 5. *See* 1[B][1] (different versions of each element / collection / subcollections (comprising one or more segments) are independently requestable), 1[E] (and playable); EX1003, ¶ 97.

6. Claim 6: "The apparatus of claim 4, wherein the requesting of the sequential streamlets comprises the end user device transmitting hypertext transport protocol (HTTP) GET requests for selected streamlets."

Ogdon teaches claim 6. Ogdon teaches a client node (end user device) transmitting HTTP GET requests for selected streamlets. *See* 1[B][1]; EX1003, ¶ 98.

7. Claim 7: "The apparatus of claim 1 wherein each of the streamlets in each of the plurality of different copies is a separate file stored by the video server."

Ogdon teaches claim 7. Ogdon discloses that the streamlets (segments), including in each of the plurality of different copies (quality levels), may be stored at the video server (webserver(s)) as separate files. *See* 1[Pre], 1[A][3], claim 4 (segments are separate files stored on server(s)); EX1003, ¶ 99.

8. Claim 8: "The apparatus of claim 1 wherein the media player upshifts to a higher quality one of the different copies when the factor is greater than a first threshold and downshifts to a lower quality one of the different copies when the factor is less than a second threshold."

Ogdon teaches claim 8. As explained above, Ogdon teaches generating a factor, according to responses from streamlet requests, from various measurements relating to network performance indicative of the ability to sustain the stream. *See* 1[C]. Ogdon also teaches that a client can "dynamically and adaptively **switch**" between "**versions** of the presentation according to network transmission characteristics at each client network node." EX1004, 3:38-41. Such switching to higher or lower quality version based on "network characteristics" teaches the existence of some "first" threshold of network characteristics (*e.g.*, client bandwidth) that, once exceeded, indicates that a client can and should request a higher quality version segment. EX1003, ¶ 100. Such switching to higher or lower quality version also teaches the existence of some "second" threshold of network characteristics (*e.g.*, client bandwidth) that, once exceeded, indicates that a client can and should request a lower quality version segment. *Id*.

Ogdon also teaches "**several** variations of presentation content." EX1004, 5:36-37, 13:47-48. A POSITA would have understood this teaching of "several" (which means more than two) to include at least three different versions at different quality levels (*e.g.*, a highest quality, a lowest quality, and a medium quality in

between). EX1003, ¶ 101. Further, it was well-known to a POSITA at the time of the alleged Priority Date to provide three or more alternatives of media at different bitrates (quality levels). *See, e.g.*, EX1007, 9:14-22 (three alternative files), 10:15-24 (four alternative video files encoded at four different bitrates (20 kbps; 50 kbps; 80 kbps; and 140 kbps) requested by the client based on client-determined bandwidth); EX1003, ¶ 101.

Thus, Ogdon further teaches that when the media player (client presentation software and/or browser) is streaming at a medium quality, it upshifts to a highest quality one of the different copies (*e.g.*, highest quality full animation version) when a certain first threshold (*i.e.*, bandwidth sufficient for streaming in highest quality) is exceeded such that the factor is greater than a first threshold (*e.g.*, bandwidth is high enough to timely cache highest quality segment(s)). EX1003, ¶ 102. Similarly, when the media player is streaming at a medium quality it downshifts to a lowest quality one of the different copies (*e.g.*, lowest quality reduced animation version) when the factor is less than a second threshold (*e.g.*, bandwidth sufficient to timely cache the medium quality stream). EX1003, ¶ 102; 1[B][1]-1[D]; EX1004, 6:14-23 ("the present invention monitors: . . . the data transmission rate . . . the amount of data cached on each client's node" and "when the data required for a segment is not timely cached prior to its intended performance at a client's node, alternative segment data is automatically requested"), FIG. 2C (step 524 selecting segments that

"have a high probability" of being delivered "prior to the time of presentation"), 2:62-66, 21:61-62; *see also id.*, 3:38-63 ("it is an aspect of the present invention to dynamically and adaptively switch" between "versions of the presentation according to network transmission characteristics at each client network node" and "a **third client** may synchronously experience the **first segment** of the presentation" then "subsequently experience the corresponding slide show **alternative to the second segment**" due to "network transmission slowdowns.") 1[C]-1[E]; EX1003 ¶ 102.

9. Claim 9: "The apparatus of claim 1, wherein the requesting the sequential streamlets comprises the apparatus transmitting hypertext transport protocol (HTTP) GET requests for selected streamlets, and wherein each of the HTTP GET requests identifies a separately-identifiable portion of the one or more files that corresponds to the requested streamlet."

Ogdon teaches claim 9. *See* 1[Pre], 1[A][4] (explaining that each segment (streamlet) is a different portion of a larger video presentation stored at the web server(s)), 1[B][1] (HTTP GET requests); EX1003, ¶ 103. As explained above in 1[B][1], Ogdon teaches requesting streamlets using a unique filename (resource name). *See* 1[B][1]. Ogdon thus teaches that each segment is a separately-identifiable portion of the one or more files (segments making up the entire video presentation) because each segment has its own unique file name (resource name)—just as contemplated by the '156 Patent (EX1001, 8:66-67)—and are thus separately-identifiable. EX1003, ¶ 103; EX1004, FIG. 2C ("content webserver 96 network 70

addresses (URLs)"), 12:40-44 ("identifiers with content webserver 96 URls and path names on these webservers where presentation content data resides").

Also, as explained above in 1[B][1], HTTP GET requests each include a Request-URI, *i.e.* "Uniform Resource Identifiers" which "are simply formatted strings which identify—via name, location, or any other characteristic—a resource" (EX1019, 16) such that an HTTP GET request is "used to identify a resource on an origin server or gateway" (EX1019, 32). EX1003, ¶ 104. Additionally, Ogdon further explains that presentation scripts sent to client nodes provide "identification of segments to be presented during the presentation" and "sequencing information regarding the order of presentation segments." EX1004, 18:39-43, FIG. 3 (showing script identifying segment). Thus, Ogdon teaches that each HTTP GET request identifies a separately identifiable portion (separately identifiable segment) of the one or more files (of the multiple segments that make up the entire video presentation) that corresponds to the requested resource (segment). EX1003, ¶ 104.

10. Claim 10: "The apparatus of claim 1, wherein the apparatus is configured to initially request low quality streamlets to enable instant playback of the content file, and subsequent upshifting according to the performance factor."

Ogdon teaches claim 10. Ogdon teaches that if lower network transmission characteristics exist prior to an initial request, the request for the first element (*i.e.*, subcollection of segments), the client node will initially request a low quality

element, which would enable instant playback, and if the network characteristics subsequently improve after requesting the low quality streamlets, the client node will select a higher quality next element. EX1004, Abstract ("if a **low** transmission data rate is **detected** at a first client node, **presentation elements of a reduced size can be retrieved**."), 3:38-63 (explaining that a second client node initially requests low quality segments); s*ee* 1[B][1]-1[D]; EX1003, ¶ 105. Thus, Ogdon expressly discloses an initial request for segments of low quality (*i.e.*, reduced size) where a client detects a low transmission data rate and also expressly teaches, when the bandwidth improves, selecting the highest quality copy available and sustainable—which would entail upshifting—and thus Ogdon's teachings meets these limitations. EX1004, 23:5-22 (calculating bandwidth to "[s]elect the highest quality collection of presentation elements available"); EX1003, ¶ 105.

Alternatively, a POSITA would have known that it was desirable to "reduce[] the start-up" for streaming content to beneficially allow the user to view the stream more quickly and thus request a low quality first then switch up to a better quality once there is sufficient buffering at the client. EX1013, 3:29-54; EX1003, ¶ 106. Therefore, a POSITA would have been motivated to modify the apparatus of Ogdon to initially request lower quality streamlets in order to have a quicker start-up time for the stream to minimize the wait for the user wishing to view the stream. EX1003, ¶ 106. A POSITA would have had a reasonable expectation of success with such a

combination because it would have been a straightforward modification of Ogdon to specify that a lower quality of collections of segments be retrieved initially to enable faster playback and then upshift to enhance the quality of the video presentation if bandwidth permits. *Id.*

11. Claim 11: "The end user device of claim 1 wherein each of the streamlets in each of the plurality of different copies is a separately-identifiable portion of one or more files stored by the video server."

Ogdon teaches claim 11. *See* 1[Pre], 1[A][4] (explaining that each segment (streamlet) is a portion of a larger video presentation stored at the web server(s)), claim 9 (explaining how streamlets are separately identifiable); EX1003, ¶ 107.

12. Claim 12: "The apparatus of claim 1 wherein the apparatus is a mobile computing device comprising a processor and a non-transitory data storage."

Ogdon teaches claim 12. Ogdon discloses "client node 56 (e.g., a personal computer)." EX1004, 7:45. A POSITA would have understood a "personal computer" to include mobile personal computers as laptops which contain processors and non-transitory data storage. EX1003, ¶ 108.

13. Claim 13

a. 13[Pre]: "A method executable by an end user device to stream a video received via a connection with a server over a network, the method comprising:"

Whether or not the preamble is limiting, Ogdon teaches 13[Pre].

Ogdon teaches a method executable by an end user device (client node(s) 56) to stream a video (presentation) received via a connection with a server (webserver(s)) over a network (network 70, *e.g.*, Internet); *See* 1[Pre]; EX1003, ¶ 109.

b. 13[A][1]: "requesting, by the end user device, wherein the end user device streams the video from the video server via at least one transmission control protocol (TCP) connection over the network,"

Ogdon teaches 13[A][1]. *See* 1[A][2], 1[B][1]-1[B][2], 1[D]; EX1003, ¶ 110.

c. 13[A][2]: "a plurality of sequential streamlets of one of the copies from the server based on playback times of the streamlets wherein multiple different copies of the video encoded at different bit rates are stored as multiple sets of streamlets on the server,"

Ogdon teaches 13[A][2]. *See* 1[A][3], 1[B][1]; EX1003, ¶ 111.

d. 13[A][3]: "wherein each of the streamlets yields a different portion of the video on playback,"

Ogdon teaches 13[A][3]. *See* 1[A][4]; EX1003, ¶ 112.

e. 13[A][4]: "wherein the streamlets across the different copies yield the same portions of the video on playback,"

Ogdon teaches 13[A][4]. *See* 1[A][5]; EX1003, ¶ 113.

f. 13[A][5]: "and wherein each of the streamlets comprises a playback time such that each of the streamlets for each of the different copies that encode the same portion of the video begins at the same playback time in relation to the beginning of the video,"

Ogdon teaches 13[A][5]. *See* 1[A][6]; EX1003, ¶ 114.

g. 13[A][6]: "wherein the end user device requests the streamlets by transmitting hypertext transport protocol (HTTP) GET requests that each identify one of the requested streamlets stored by the server; and wherein the end user device streams the video by:"

Ogdon teaches 13[A][6]. *See* 1[A][6] and 1[B][1]; EX1003, ¶ 115.

h. 13[B]: "repeatedly generating, by the end user device, a factor that is indicative of an ability to sustain the streaming of the video;"

Ogdon teaches 13[B]. *See* 1[C]; EX1003, ¶ 116.

i. 13[C]: "making successive determinations by the end user device to shift the playback quality based on the factor to achieve continuous playback of the video using the streamlets of the highest quality copy determined sustainable at that time; and"

Ogdon teaches 13[C]. *See* 1[B][2], 1[D]; EX1003, ¶ 117.

j. 13[D]: "presenting the video by playing back the requested media streamlets on the end user device in order of ascending playback time."

Ogdon teaches 13[D]. *See* 1[E]; EX1003, ¶ 118.

14. Claim 14: "The method of claim 13 wherein the making of the successive determinations to shift comprises upshifting to a higher quality one of the different copies when the at least one factor is greater than a first threshold and downshifting to a lower quality one of the different copies when the at least one factor is less than a second threshold."

Ogdon teaches claim 14. *See* claim 8; EX1003, ¶ 119.

15. Claim 15: "The method of claim 14 wherein each of the streamlets of each of the different copies is independently requestable and playable by the end user device."

Ogdon teaches claim 15. *See* 1[B][1], 1[E], claim 5; EX1003, ¶ 120.

16. Claim 16: "The method of claim 13 wherein each of the streamlets in each of the plurality of different copies is a separately-identifiable portion of one or more files stored by the video server."

Ogdon teaches claim 16. *See* 1[Pre], 1[A][4], claims 3, 9, 11; EX1003, ¶ 121.

17. Claim 17: "The method of claim 16 wherein the requesting of the sequential streamlets comprises the end user device transmitting hypertext transport protocol (HTTP) GET requests for selected streamlets, and wherein each of the HTTP GET requests identifies the separately-identifiable portion of the one or more files that corresponds to the requested streamlet."

Ogdon teaches claim 17. *See* 1[Pre], 1[A][4], 1[B][1], claims 3, 9; EX1003, ¶ 122.

B. Ground 2: Claims 1-17 Would Have Been Obvious in view of Ogdon and Ala-Honkola

The sections of Ground 1 (Section IX.A) are incorporated into this section by reference.

1. Claim 1-17

As explained above in Section IX.A, Ogdon teaches all limitations of claims 1-17 including all limitations of independent claims 1 and 13. To the extent it is argued that Ogdon lacks certain limitations, Ala-Honkola teaches these limitations.

a. 1[A][1]

While Ogdon alone teaches this limitation (*see* Section IX.A.1: 1[A][1]), Ala-Honkola teaches a single media player (video player) operating on the apparatus (running in the user terminal) that performs the functions of adaptive streaming including making requests to the server for video at a selected quality level based upon determined bandwidth and playing back the received requested video. EX1017, ¶ 33 ("**video player client** running in the user terminal sends 34 a **request** message from the terminal 33 to the service provider's server"), ¶ 35 ("The **player in the client terminal** chooses 21 one of the supported speed rate").

A POSITA would have been motivated to modify the system of Ogdon such that each of the functions performed in Ogdon collectively by the client presentation software and browser are performed by a single program alone, as taught by Ala-Honkola, because both Ogdon and Ala-Honkola are drawn to the same field of adaptive video streaming and in order to simplify the system of Ogdon, reduce the number of programs that are required to run on the client to stream video presentations, and make the program easier to debug. EX1003, ¶¶ 125-126. A POSITA would have had a reasonable expectation of success with such a combination because both Ogdon and Ala-Honkola are drawn to similar systems of client-server based streaming, where the client adaptively receives video segments based on client requests based on playout capabilities including network conditions.

Implementing a media player as a single computer program as opposed to the combination of presentation software and a browser would have been a straightforward modification for a POSITA—a simple matter of programming one computer program to perform all functionality that the client presentation software and the browser are disclosed to perform collectively. EX1003, ¶ 126.

b. 1[B][1], 13[A][2], 13[A][6]

HTTP GET Requests

While Ogdon alone teaches these limitations (*see* Section IX.A: 1[B][1], 13[A][2], 13[A][6]), Ala-Honkola also teaches client requests to a server being HTTP GET requests including identifying the particular file or separately identifiable portion of file being requested. EX1017, ¶ 14 ("selection of the new data source" transmitted "**using a GET method of an HTTP protocol**"), ¶ 22 ("GET method of an HTTP protocol"), ¶¶ 33-34 ("using a **GET method**, which is **one of the methods defined in the HTTP 1.1 protocol**"), ¶ 38.

A POSITA would have been motivated to use HTTP GET requests, as taught by Ala-Honkola, for requesting specific streamlets (segments) in Ogdon because HTTP GET requests were a well-known and reliable means of requesting and obtaining files from a server and thus ensure Ogdon's client properly receives each quality file for continuous playing. EX1003, ¶¶ 127-128. Further, GET requests are one of a finite number of possible request solutions available in the HTTP protocol,

and thus one of a finite number of identified predictable solutions for requesting files from a server with a reasonable expectation of success. EX1003, ¶ 128. A POSITA would have had a reasonable expectation of success with such a combination because both Ogdon and Ala-Honkola are directed to similar systems for adaptive streaming and such a modification would simply entail using known HTTP GET requests from the HTTP Protocol to request files from the server and reliably receive the requested files. *Id*.

Requesting "according to" / "based on" the playback times

Additionally, to the extent it is argued that Ogdon does not teach requesting based on or according to "the playback times" of the streamlets, Ala-Honkola teaches this limitation as well. For example, Ala-Honkola teaches using "timing marks" indicating the "byte" corresponding to playback times of the file such that the client can request the "byte" (corresponding to the timing marks) to begin streaming at when switching streams during playback. EX1017, ¶ 31 ("Stream 1 . . . contains **timing marks** 6, 7, 8, 9 . . . embedded in stream 1 at a various locations, and **correlate the information in the two separate resolution streams**. Thus the **timing marks** of stream 1 in the example of FIG. 1 indicate the byte of the file where the stream is running at the time and the corresponding byte 6A, 7A, 8A, 9A, in stream 2 . . . the mark 7 indicating time 1000ms, it tells the corresponding byte

805000 in stream 2 to where the source of the transmission of the video transfers 11."), ¶ 32 ("stream 2 contains **timing marks 10, 11, 12, 13,** which point to the location of corresponding information in stream 1, as shown by the **corresponding byte 10A, 11A, 12A, 13A**, in stream 1"), ¶ 38. In other words, Ala-Honkola teaches a client requesting according to the playback time (by requesting the byte corresponding to desired timing mark). Additionally, a GET Request, as taught by Ala-Honkola, incudes a "Uniform Resource Identifier (URI) [], as a location (URL) [] or name (URN) [], for indicating the resource to which a method is to be applied." EX1019, 6-7; EX1017, ¶¶ 34, 38; EX1003, ¶ 129.

A POSITA would have been motivated to make client streamlet requests according to the playback times, as taught by Ala-Honkola, in the streamlet requests of Ogdon (*e.g.*, make specific requests for streamlets based on timing marks) because requesting according to specific playback times would allow a client requesting streamlets to avoid missing portions of a video being streamed, especially when making a change in quality, and would provide the viewer with a seamless viewing experience with a reasonable expectation of success. EX1003, ¶ 130. A POSITA would have had a reasonable expectation of success with such a combination because both Ogdon and Ala-Honkola are directed to similar systems for adaptive streaming and such a modification would simply entail requesting files

according to their playback time (*e.g.*, based on timing indicators and/or corresponding bytes). EX1003, ¶ 130.

C. Ground 3: Claims 4, and 7 Would Have Been Obvious in view of Ogdon in view of Shteyn or, alternatively Ogdon in view of Ala-Honkola and Shteyn

The sections of Grounds 1 and 2 (Sections IX.A-IX.B) are incorporated into this section by reference.

1. Claims 4 and 7

As explained above in Sections IX.A-IX.B, Ogdon or Ogdon in view of Ala-Honkola teaches all limitations of claims 4 and 7. To the extent it is argued that Ogdon or Ogdon in view of Ala-Honkola lacks each of the streamlets in each of the plurality of different copies being a separate file stored by the video server and that the client requests identify said separate files stored by the video server corresponding to the requested streamlets, Shteyn teaches these limitations. Shteyn teaches a file is "**partitioned** into a sequence of segments at the **server** side." EX1016, Abstract. Each segment ("file") is stored in the server as different encoded bitrate (bandwidth) and size (bytes), such as "part1" and "part1 alt." *Id.*, 3:44-56, 1:65-2:7 ("the content file is **split into multiple parts**"), claims 1, 9 ("**storing** on one or more **server** computers **multiple alternative files** corresponding to a given segment"), 2:57-3:2, 2:20-24, 4:20-21, FIG. 2; EX1003, ¶ 132.

A POSITA would have understood that these alternative segment files stored with different byte lengths (sizes) and different bandwidth requirements would mean that each alternative segment is encoded at different bit rates because both are determinative of the encoded rate. EX1003, ¶ 134. For instance, the "Preferred format" with a length of 1024 and minimum bandwidth of 10,000 shows it is a higher quality encoded rate (larger size and requires more bandwidth) than the lower quality encoded rate or "Alternative format" with a length of 512 and minimum bandwidth of 8,000 (smaller size and thus requires less bandwidth). *Id.* Shteyn also describes that the different encoded parts for each segment can be the same format or different formats. EX1016, claims 8, 14, FIG. 2, 1:42-50; EX1003, ¶ 133.

A POSITA would have been motivated to modify the apparatus of Ogdon such that each segment of Ogdon is stored at the server(s) as a separate file to simplify streaming requests by simply requesting individual files using a simple GET request rather than requiring the GET requests to also include a RANGE request. EX1003, ¶ 134. A POSITA would have had a reasonable expectation of success with such a combination because both Ogdon and Shteyn are drawn to similar systems of client-server based streaming where video segments yield different portions of the video while across different copies corresponding alternative quality level segments yield the same portions of the video at a different bitrate. EX1016, 1:65, claims 1, 8, 12, 14, FIG. 2, 2:35-39, 3:31-36, 3:57-4:14, 4:20-

31, 3:44-53, Abstract, FIG. 1; EX1003, ¶ 134. Implementing multiple sets of files would have been a straightforward modification for a POSITA, as requesting video segments by having multiple files for the segments or by requesting ranges of the video were two alternative design choices well known to a POSITA. EX1003, ¶ 134.

D. Ground 4: Claims 10 and 12 Would Have Been Obvious in view of Ogdon in view of Chou or, alternatively Ogdon in view of Ala-Honkola and Chou

The sections of Grounds 1 and 2 (Sections IX.A-IX.B) are incorporated into this section by reference.

1. Claim 10

As explained above in Sections IX.A-IX.B, Ogdon or Ogdon in view of Ala-Honkola teaches all limitations of claim 10. To the extent it is argued that Ogdon or Ogdon in view of Ala-Honkola lacks teaching initially requesting low quality streamlets to enable instant playback, Chou teaches this limitation.

Chou explains that start-up delay is the latency experienced after starting transmission from the beginning of the content which is undesirable for a viewer. EX1013, 2:59-64. Chou teaches providing at least two different data streams, one at a low resolution and lower bit rate, and another at a normal resolution and larger bitrate than the first, where "[t]he server **initially transmits the low resolution** stream" so that "the delay due to buffering is reduced to nearly zero," and with the normal resolution stream being transmitted "[w]hen the client buffer has grown

sufficiently large to guard against future underflow by the normal resolution stream." *Id.*, 3:29-54; EX1003, ¶¶ 136-137.

A POSITA would have been motivated to modify the apparatus of Ogdon to initially request lower quality streamlets, such as taught by Chou, in order to have a quicker start-up time for the stream to minimize the wait for the user wishing to view the stream, which Chou observes can be "particularly annoying." EX1013, 2:59-3:12; EX1003, ¶ 138. In addition, a POSITA would have understood that the client could beneficially use the initial low-quality slice to determine network requirements for subsequent requests. EX1003, ¶ 138. A POSITA would have had a reasonable expectation of success with such a combination because it would have been a straightforward modification of Ogdon to specify that a lower quality of collections of segments be retrieved initially, and whereby Ogdon and Chou are drawn to similar systems of adaptive client-server based streaming of content having multiple qualities. *Id.*

2. Claim 12

As explained above in Sections IX.A-IX.B, Ogdon or Ogdon in view of Ala-Honkola teaches all limitations of claim 12. To the extent it is argued that Ogdon or Ogdon in view of Ala-Honkola lacks teaching that the apparatus is a mobile computing device comprising a processor and a non-transitory data storage, Chou teaches these limitations.

Chou teaches that clients that stream video from a server include "a personal computer (PC)" and "may be practiced with other computer-system configurations, including hand-held devices." EX1013, 5:4-15. Further, Chou teaches that such computing environments include a processor (processing unit) and non-transitory data storage (system memory, ROM, RAM). EX1013, 5:24-34 (computing device includes "processing unit 21, system memory 22 . . . read-only memory (ROM) 24 and random-access memory (RAM) 25").

A POSITA would have been motivated to implement the system of Ogdon in a mobile hand-held computing device including a processor and non-transitory data storage, as taught by Chou, in order to allow a user more flexibility by streaming to a portable mobile device and to perform the required functions for streaming a video presentation and displaying the video to the user who is travelling. EX1003, ¶¶ 139-141. A POSITA would have had a reasonable expectation of success with such a modification because hand-held computing devices were well-known personal computing devices with well-known components including processors and non-transitory data storage. EX1003, ¶ 141.

E. Ground 5: Claims 8 and 14 Would Have Been Obvious in view of Ogdon in view of SMIL 2.0 or, alternatively Ogdon in view of Ala-Honkola and SMIL 2.0

The sections of Grounds 1 and 2 (Sections IX.A-IX.B) are incorporated into this section by reference.

1. Claims 8 and 14

As explained above in Sections IX.A-IX.B, Ogdon or Ogdon in view of Ala-Honkola teaches all limitations of claims 8 and 14. To the extent it is argued that Ogdon or Ogdon in view of Ala-Honkola lacks teaching that the media player upshifts to a higher quality one of the different copies when the factor is greater than a first threshold and downshifts to a lower quality one of the different copies when the factor is less than a second threshold, SMIL 2.0 teaches these limitations.

For example, SMIL 2.0 teaches an element called "<switch>" that "allows an author to specify a set of **alternative** elements **encoded at different quality levels** from which only the first acceptable element is chosen"; these include: "[i]f the system bitrate is **5600 or higher**, the object dutch**HQ**.aiff is selected," if the "system bitrate is at least **28800** but less than 56000," then "dutchMQ.aiff is selected," and **otherwise** "dutch**LQ**.aiff is selected." EX1006, 61.

```
<switch>
  <audio src="dutchHQ.aiff" systemBitrate="56000" ... />
  <audio src="dutchMQ.aiff" systemBitrate="28800" ... />
  <audio src="dutchLQ.aiff" ... />
</switch>
```

Id., annotated Figure showing selection of high quality (green; 56000 minimum bitrate), medium quality (blue; 28800 minimum bitrate), or low quality below 28800 bitrate (red)); *see also id.*, 62 ("SMIL 2.0 player to determine the

setting for system test attribute" and it "may be determined (and reevaluated) dynamically").

A POSITA would have understood the above disclosures from SMIL 2.0 to teach a client application selecting a next segment at a different quality to "adapt to changing circumstances" to be repeatedly generating, by the media player, a factor (*e.g.*, current bandwidth indicated by "systemBitrate") relating to the performance of the network and upshifting to a higher quality one of the different copies (*e.g.*, dutch**HQ**) when the factor (client bitrate (systemBitrate)) is **greater** than a **first threshold** (56000), and downshifting to a lowest quality one of the different copies (*e.g.*, dutch**LQ**) when the factor is **less** than a **second threshold** (28800). EX1003, ¶¶ 143-145. A POSITA would have been motivated to upshift to a higher quality when current bandwidth exceeds a first threshold and downshift to a lower quality when a bandwidth drops below a second threshold, as taught by SMIL 2.0, in the system of Ogdon in order to ensure that the requested segments can be timely cached for playback such that a viewer can view the video stream uninterrupted. EX1004, 6:18-23 ("Thus, when the data required for a segment is not timely cached prior to its intended performance at a client's node, alternate segment data is automatically requested from the communications network by the client node."), 21:62-63 ("attempt to assure a timely caching of this next collection of segments for timely performance"); EX1003, ¶ 145. A POSITA would have had a reasonable expectation

of success with such a modification because both Ogdon and SMIL are similarly directed to a client adaptively selecting appropriate quality levels of streamed content and because simply setting a first and second bandwidth threshold for when to upshift and downshift quality levels for the next segment would have been a simple and straightforward modification of Ogdon and would have been consistent with the goals of Ogdon. EX1003, ¶ 145.

X. GRAHAM FACTORS (NO SECONDARY CONSIDERATIONS)

The first three *Graham* factors were discussed for each ground, i.e., the scope of the prior art, the prior art as compared to the claims, and the level of ordinary skill in the pertinent art. *See* Sections V-IX.

For the last factor, secondary considerations, Petitioner acknowledges that the ALJ in the ITC Investigation accepted Patent Owner's argument that there was a presumption of a nexus between the claims and the Move Media Player (which was acquired by DISH) and ultimately found certain secondary considerations. EX1009, 212-213. DISH argued that respondents conceded that the Move Media Player embodied the claimed invention because respondents argued that a public use of Move Media Player in 2005 was an invalidating use meeting each and every element of the asserted claims. *Id.*, 212. The ALJ accepted this argument and also found that DISH's expert demonstrated that Move's success is tied to the unique characteristics of the claimed invention including "offering 'a smooth end user experience as the

Move Media Player up-shifts and down-shifts in response to network and client CPU availability" and streaming using "simple HTTP protocol transfer of media files from standard Web servers rather than deployment of expensive media servers," which reduce cost and complexity. *Id.*, 213.

Petitioner submits that these findings are incorrect. First, Petitioner has not made any claims that prior use of the Move Media Player was an invalidating public use and thus the ALJ's findings regarding the concession that Move Media Player meets the claims does not apply to Petitioners.

Second, Petitioner disagrees that the Move Media Player has a nexus to the '156 Patent because any of Move's success is not tied to unique characteristics of the claimed invention. As the prior art discussed in the Grounds above shows, the purportedly unique and successful aspects of the Move system that the ALJ relied on to find a nexus were already in existence in the prior art and thus cannot form the basis of any nexus to the claimed invention. *See Yita LLC v. MacNeil IP LLC*, 69 F.4th 1356, 1364 (Fed. Cir. 2023) ("[O]ur case law makes clear that objective evidence of nonobviousness lacks a nexus if it exclusively relates to a feature that was *known* in the prior art—not necessarily well-known") (emphasis in original) (internal citations and quotations omitted).

For example, the purported "unique" claimed feature of "a smooth end user experience" that "up-shifts and down-shifts in response to network and client CPU

availability," was already present in the prior art. For example, Ogdon discloses upshifting and downshifting quality of the stream in response to, for example, network congestion to ensure a smooth and uninterrupted stream. *See* Section IX.A.1 Ground 1, claims 1[B][2]-1[D].

Additionally, the alleged "unique" claimed feature of "use of simple HTTP protocol transfer of media files from standard Web servers rather than deployment of expensive media servers" cannot be a basis for finding a nexus explained in the Grounds above, at least Ogdon and Ala-Honkola disclose using simple HTTP protocol for clients to request transfer of files from standard web servers, rather than specialized media servers. *See* Grounds 1 and 2, claim 1[B][1].

Thus, Patent Owner has not shown any nexus to the claim language.

XI. NO BASIS FOR DISCRETIONARY DENIAL

A. § 314(a): *Fintiv* and *General Plastic* Factors Favor Institution

The six *Fintiv* factors weigh against discretionary denial. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11, at 6 (PTAB Mar. 20, 2020).

First Factor. This is neutral because Petitioner has not yet moved to stay the District Court Litigation pending IPR, and the PTAB will not speculate on how a district court may rule when a stay is requested. *See Hulu LLC v. SITO Mobile R&D IP, LLC*, IPR2021-00298, Paper 11 at 10-11 (PTAB May 19, 2021).

Second Factor. This favors institution as a Final Written Decision is quite likely before a trial occurs given no trial date is yet scheduled for the District Court Litigation.

Third Factor. This factor favors institution given the District Court Litigation in its earliest stages because the case management conference has not yet occurred, and thus no claim construction nor any other significant milestones have occurred.

Fourth Factor. This factor favors institution. Petitioner stipulates that if this'156 Patent IPR is instituted, Petitioner will not pursue invalidity grounds in the District Court Litigation of the Challenged Claims on any ground raised, or that could have been reasonably raised in this IPR for the Challenged Claims. *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12, at 18-19 (PTAB Dec. 1, 2020).

Fifth Factor. This factor should be accorded little weight or is neutral given the Petitioner and Patent Owner are parties in the District Court Litigation.

Sixth Factor. Petitioner's merits are strong, as shown in the above grounds and described in the supporting Houh declaration.

Additionally, *Gen. Plastic Indus. Co. v. Canon Kabushiki Kaisha* factors weigh against discretionary denial because there is no prior petition filed on the challenged claims of the '156 Patent. *Id*., IPR2016-01357, Paper 19, at 16-18 (PTAB Sept. 6, 2017).

B. § 325(d): *Advanced Bionics* Favors Institution

Denial under § 325(d) is not warranted under *Advanced Bionics'* two-factor test. *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6, at 8 (PTAB Feb. 13, 2020).

The first factor of whether the "same or substantially the same prior art or arguments previously were presented to the Office" (*id*.) is not met because the specific grounds here were not considered during prosecution of the '156 Patent. Further, neither Ogdon, Shteyn, SMIL 2.0, nor Chou are cited on the face of the '156 Patent. Because the first factor is not met, there is no need to analyze the second factor. *Sony Group Corp. v. MZ Audio Sciences, LLC*, IPR2022-01544, Paper No. 12, at 7 (PTAB Apr. 21, 2023).

XII. CONCLUSION

Petitioner requests *inter partes* review and cancellation of claims 1-17.

DATED: November 7, 2023

Respectfully submitted,

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CERTIFICATION OF COMPLIANCE UNDER 37 CFR § 42.24(d)

Pursuant to 37 C.F.R. §42.24(d), Petitioner certifies that this Petition for *Inter Partes* Review has total 13,973 words as counted by Microsoft Word, exclusive of the table of contents, table of authorities, mandatory notices under § 42.8, certificate of service, word count, and appendix of exhibits or claim listing (37 C.F.R. § 42.24(a)). This is within the 14,000 word limit allowed under § 42.24(a)(1)(i).

DATED: November 7, 2023

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CERTIFICATE OF SERVICE

I hereby certify that on November 7, 2023 I caused a true and correct copy of the foregoing materials:

- Petition for *Inter Partes* Review of U.S. Patent 10,757,156
- Exhibits
- Petitioner's Power of Attorney

to be served via overnight delivery on the USPTO Patent Center (PAIR) Correspondence Address for U.S. Patent 10,757,156 as follows:

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I also caused a courtesy copy of the foregoing materials to be served via email on DISH's counsel of record in the district court litigation:

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