Filed on behalf of: fuboTV Media Inc. and Yanka Industries, Inc.

Entered: June 9, 2025

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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fuboTV MEDIA INC. and Yanka Industries, Inc.,
Petitioners,

v.

DISH Technologies L.L.C.,
Patent Owner.

IPR2024-00917, -00918, -00919
Patent Nos. 10,757,156, 9,407,564, 8,868,772

SUPPLEMENTAL DECLARATION OF HENRY HOUH IN SUPPORT OF PETITIONERS' REPLY

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I. Introduction and Qualifications

1. I, Henry Houh, submit this declaration on behalf of fuboTV Media Inc. and Yanka Industries, Inc. ("Petitioners") to provide my opinion concerning the validity of claims 1-21 of U.S. Patent No. 8,868,772 ("'772 patent"), in support of Petitioners' Reply for IPR2024-00919; the validity of claims 1-16 of U.S. Patent No. 9,407,564 ("'564 patent"), in support of Petitioners' Reply for IPR2024-00918; and the validity of claims 1-18 of U.S. Patent No. 10,757,156 ("'156 patent') in support of Petitioners' Reply for IPR2024-00917. Each patent is Exhibit 1001 in the corresponding proceeding.

2. Because all three patents are related and share a specification, and because Dr. Jeffay addresses all three in a single declaration, I likewise address all three patents in this declaration. Citations to Exhibit 1001 throughout refer to the '772 patent, which is the parent patent, but apply equally to the '156 and '564 patents.

3. On January 29, 2024, I signed a declaration in relation to the petition in another proceeding, IPR2024-00519, on behalf of Aylo Freesites Ltd. concerning the validity of claims 1-21 of the '772 patent. I understand that my original January 29, 2024 declaration was submitted alongside the petition in that proceeding as Exhibit 1003. I also understand that on May 17, 2024, the same declaration was submitted in relation to the petition in IPR2024-00919 involving

the same patent as Exhibit 1003. That original declaration contains an overview of the '772 patent and the prosecution history thereof and my opinions regarding: claim construction, the level of skill of ordinary artisans, the state of the art described in the '772 patent at the time of the '772 patent's earliest claimed priority date of April 20, 2004, and the disclosures contained in the prior art relative to claims 1-21 of the '772 patent.

4. Similarly, in relation to the '564 patent, I signed a declaration dated January 29, 2024. That declaration was submitted alongside the petition in IPR2024-00518, again on behalf of Aylo, and, subsequently, the petition in IPR2024-00918 on behalf of fuboTV. Further, in relation to the '156 patent I signed a declaration dated January 29, 2024. That declaration was then submitted alongside the petition in IPR2024-00513 on behalf of Aylo, and, subsequently, the petition in IPR2024-00917 on behalf of fuboTV. Those original declarations likewise contain an overview of the respective patents, the prosecution history thereof and my opinions regarding: claim construction, the level of skill of ordinary artisans, the state of the art described in the those patents at the time of the patent's earliest claimed priority date of April 20, 2004, and the disclosures contained in the prior art relative to challenged claims.

5. My experience and qualifications are set forth in Exhibit 1003, my *curriculum vitae* attached thereto as Exhibit A, and my updated *curriculum vitae* filed concurrently herewith as Exhibit 1064.

6. I have been asked to provide additional opinions in response to certain arguments in the Patent Owner's Responses and the opinions of Patent Owner's witness, Dr. Kevin Jeffay, submitted in support thereof and whose declaration is as Exhibit 2141 in each of the proceedings.

II. Summary Of Materials Reviewed And Considered

7. All of the opinions contained in this declaration are based on the documents I reviewed and my knowledge and professional judgment. In forming the opinions expressed in this declaration, while drawing on my experience in web sites, communications systems, networking, distributed systems, protocols, and streaming audio/video communication. Further, in addition to the Institution Decisions (IPR2024-00919, Paper 14; IPR2024-00918, Paper 14; and IPR2024-00917, Paper 14), Patent Owner's Responses (IPR2024-00919, Paper 30; IPR2024-00918, Paper 27; IPR2024-00917, Paper 27), and Dr. Jeffay's Declaration (Exhibit 2141), I reviewed the documents cited in this declaration, including the following, listed by exhibit number:

In Relation to IPR2024-00919 ('772 Patent)

1001	U.S. Pat. 8,868,772
1002	File History of U.S. Pat. 8,868,772
1004	International P.C.T. Publication WO 2002049343
1007	U.S. Patent No. 6,848,004
1008	WO1997044942
1009	337-TA-1265 ITC Investigation Initial Determination
1010	337-TA-1265 ITC September 11, 2023 Enforcement Complaint
1013	U.S. Patent No. 6,637,031 to Chou ("Chou")
1020	U.S. Patent Publication No. US 2004/0093420
1021	Transcript of Conference Call Before the Patent Trial and Appeal Board, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. Sept. 18, 2024)
1022	Decision on Appeal, *Ex Parte Major*, No. 2011-008734 (PTAB July 23, 2014) (Application No. 11/116,783)
1023	U.S. Patent No. 11,991,234 File History
1024	Order Granting Request for Ex Parte Reexamination, Reexam Control No. 90/019,670 (U.S.P.T.O. Dec. 6, 2024)
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1027	Transcript of the Deposition of Kevin Jeffay, Ph.D., *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 8, 2025)
1028	T. Berners-Lee et al., *Hypertext Transfer Protocol – HTTP/1.0*, Network Working Grp. Request for Comments: 1945 (May 1996) (Exhibit 1 to the Deposition of Kevin Jeffay, Ph.D., *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 8, 2025)

1029	U.S. Patent No. 11,991,234 B2 (Brueck) (Exhibit 2 to the Deposition of Kevin Jeffay, Ph.D., *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 8, 2025)
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1031	Tom Risen, *Dish Network Joins Web-TV Trend With Sling: The New Service Will Include ESPN and Offers Another Alternative to Cable*, U.S. NEWS & WORLD REP. (Jan. 5, 2015) (Exhibit 4 to the Deposition of David Ericson, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 8, 2025)
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1033	Transcript of the Deposition of Robert Drew Major, *Aylo Freesites, Ltd. v. DISH Techs., L.L.C.*, Nos. IPR2024-00431, -00044, -00045, -00046, -00146 (P.T.A.B. Sept. 17, 2024) ("Major-Aylo") (Exhibit 1 to the Deposition of R. Drew Major, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 14, 2025)
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1037	*Declaration of Peter Ratcliffe Esq.*, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, No. IPR2024-00917 (P.T.A.B. Mar. 18, 2025) (Exhibit 2 to the Deposition of Peter Ratcliffe, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 15, 2025)

1038	World International Property Organization, International Publication No. WO 02/49343 A1 (Leaning) (Exhibit 3 to the Deposition of Peter Ratcliffe, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 15, 2025)
1039	European Patent Office, European Patent Specification, EP 1 342 363 B1 (Leaning) (Exhibit 4 to the Deposition of Peter Ratcliffe, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 15, 2025)
1040	U.S. Patent No. 7,447,791 B2 (Leaning) (Exhibit 5 to the Deposition of Peter Ratcliffe, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 15, 2025)
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1042	Hiroyuki Kasai et al., *The Development of a Multimedia Transcoding System for Mobile Access to Video Conferencing*, E85-B IEICE TRANSACTIONS COMMC'NS 2171 (Oct. 2002) (Exhibit 7 to the Deposition of Peter Ratcliffe, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 15, 2025)
1045	U.S. Patent Application Publication No. 2003/0135631 A1
1046	Frédéric Dufaux & Touradj Ebrahimi, *Motion JPEG2000 for Wireless Applications*, IEEE Proc. 1st Int'l JPEG 2000 Workshop (2003), https://infoscience.epfl.ch/server/api/core/bitstreams/6bf509c6-9aa9-49aa-b41a-4016ec3fbd21/content (last visited June 5, 2025)
1047	R. Fielding et al., *Hypertext Transfer Protocol – HTTP/1.1*, Network Working Grp. Request for Comments: 2616; Obsoletes: 2068 (June 1999)
1049	U.S. Patent No. 6,304,297 B1
1050	Supavadee Aramvith & Ming-Ting Sun, *MPEG-1 and MPEG-2 Video Standards* (1999), https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=f499594b35c573dd2296aa567ff16688bb972e3b (last visited June 5, 2025)

1051	T. Berners-Lee et al., *Hypertext Transfer Protocol – HTTP/1.0*, Network Working Grp. Request for Comments: 1945 (May 1996), https://datatracker.ietf.org/doc/html/rfc1945 (last visited June 4, 2025, 7:33 P.M.)
1052	Ramesh Yerraballi, *Multimedia Systems Concepts Standards & Practice* ch. 5.3 (Univ. of Tex., Austin), https://users.ece.utexas.edu/-ryerraballi/MSB/Contents.html (last visited June 6, 2025, 10:02 A.M.) (excerpt)
1053	Andrew Davis, *An Overview of Video Compression Algorithms*, EE|TIMES (Feb. 3, 1998), https://www.eetimes.com/an-overview-of-video-compression-algorithms/ (last visited June 4, 2025, 7:37 P.M.)
1054	Elise A. Couper et al., *Boom and Bust in Telecommunications*, 89/4 Fed. Rsrv. Bank Richmond Econ. Q. 1–24 (2003), https://www.richmondfed.org/~/media/richmondfedorg/publications/research/economic_quarterly/2003/fall/pdf/wolman.pdf (last visited June 6, 2025)
1055	EBU•UER, *EBU Subjective Listening Tests on Low-Bitrate Audio Codecs* (June 2003), https://tech.ebu.ch/docs/tech/tech3296.pdf (last visited June 5, 2025)
1056	Dapeng Wu et al., *Streaming Video Over the Internet: Approaches and Directions*, 11 IEEE Transactions Cirs. Sys. Video Tech. 1–20 (Feb. 2001)
1057	Hun-Cheol Lee & Seong-Dae Kim, *Iterative Key Frame Selection in the Rate-Constraint Environment*, 18 SIGNAL PROCESSING: IMAGE COMMC'N 1–15 (2003)
1058	Yu Yuan, David Feng & Yuzhuo Zhong, *A Novel Method of Keyframe Setting in Video Coding: Fast Adaptive Dynamic KeyFrame Selecting*, IEEE Proc. 2003 Int'l Conf. Comput. Networks Mobile Computing 428, Shanghai, China (Oct. 20–23, 2003)
1060	Info. Scis. Inst., Univ. of S. Cal., *Transmission Control Protocol: DARPA Internet Program Protocol Specification*, RFC: 793 (Sept. 1981), https://www.ietf.org/rfc/rfc793.txt (last visited June 7, 2025)

In Relation to IPR2024-00918 ('564 Patent)

1001	U.S. Pat. 9,407,564
1002	File History of U.S. Pat. 9,407,564
1004	International P.C.T. Publication WO 2002049343
1007	U.S. Patent No. 6,848,004
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1049	U.S. Patent No. 6,304,297 B1
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1054	Elise A. Couper et al., *Boom and Bust in Telecommunications*, 89/4 Fed. Rsrv. Bank Richmond Econ. Q. 1–24 (2003), https://www.richmondfed.org/~/media/richmondfedorg/publications/research/economic_quarterly/2003/fall/pdf/wolman.pdf (last visited June 6, 2025)
1055	EBU•UER, *EBU Subjective Listening Tests on Low-Bitrate Audio Codecs* (June 2003), https://tech.ebu.ch/docs/tech/tech3296.pdf (last visited June 5, 2025)
1056	Dapeng Wu et al., *Streaming Video Over the Internet: Approaches and Directions*, 11 IEEE Transactions Cirs. Sys. Video Tech. 1–20 (Feb. 2001)
1057	Hun-Cheol Lee & Seong-Dae Kim, *Iterative Key Frame Selection in the Rate-Constraint Environment*, 18 SIGNAL PROCESSING: IMAGE COMMC'N 1–15 (2003)

1058	Yu Yuan, David Feng & Yuzhuo Zhong, *A Novel Method of Keyframe Setting in Video Coding: Fast Adaptive Dynamic KeyFrame Selecting*, IEEE Proc. 2003 Int'l Conf. Comput. Networks Mobile Computing 428, Shanghai, China (Oct. 20–23, 2003)
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<u>In Relation to IPR2024-00917 ('156 Patent)</u>

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1002	File History of U.S. Pat. 10,757,156
1004	International P.C.T. Publication WO 2002049343
1007	U.S. Patent No. 6,848,004
1008	WO1997044942
1009	337-TA-1265 ITC Investigation Initial Determination
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1017	U.S. Patent Publication No. 2003/0055995
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)
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1023	U.S. Patent No. 11,991,234 File History
1024	Order Granting Request for Ex Parte Reexamination, Reexam Control No. 90/019,672 (U.S.P.T.O. Dec. 9, 2024)

1025	Transcript of Conference Call Before the Patent Trial and Appeal Board, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 29, 2025)
1027	Transcript of the Deposition of Kevin Jeffay, Ph.D., *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 8, 2025)
1028	T. Berners-Lee et al., *Hypertext Transfer Protocol – HTTP/1.0*, Network Working Grp. Request for Comments: 1945 (May 1996) (Exhibit 1 to the Deposition of Kevin Jeffay, Ph.D., *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 8, 2025)
1029	U.S. Patent No. 11,991,234 B2 (Brueck) (Exhibit 2 to the Deposition of Kevin Jeffay, Ph.D., *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 8, 2025)
1030	Transcript of the Deposition of David Ericson, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 9, 2025)
1031	Tom Risen, *Dish Network Joins Web-TV Trend With Sling: The New Service Will Include ESPN and Offers Another Alternative to Cable*, U.S. NEWS & WORLD REP. (Jan. 5, 2015) (Exhibit 4 to the Deposition of David Ericson, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 8, 2025)
1032	Transcript of the Deposition of R. Drew Major, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 14, 2025)
1033	Transcript of the Deposition of Robert Drew Major, *Aylo Freesites, Ltd. v. DISH Techs., L.L.C.*, Nos. IPR2024-00431, -00044, -00045, -00046, -00146 (P.T.A.B. Sept. 17, 2024) ("Major-Aylo") (Exhibit 1 to the Deposition of R. Drew Major, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 14, 2025)
1034	Transcript of the Deposition of Mark Mitchell, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 30, 2025)

1035	Transcript of the Deposition of Peter Ratcliffe, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 15, 2025)
1036	*Instant Video Streaming: Video Without the Waiting*, 1.7 BT Innovative Research: BT Research & Venturing: IPR Overview (Feb. 23, 2007) (Exhibit 1 to the Deposition of Peter Ratcliffe, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 15, 2025)
1037	*Declaration of Peter Ratcliffe Esq.*, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, No. IPR2024-00917 (P.T.A.B. Mar. 18, 2025) (Exhibit 2 to the Deposition of Peter Ratcliffe, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 15, 2025)
1038	World International Property Organization, International Publication No. WO 02/49343 A1 (Leaning) (Exhibit 3 to the Deposition of Peter Ratcliffe, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 15, 2025)
1039	European Patent Office, European Patent Specification, EP 1 342 363 B1 (Leaning) (Exhibit 4 to the Deposition of Peter Ratcliffe, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 15, 2025)
1040	U.S. Patent No. 7,447,791 B2 (Leaning) (Exhibit 5 to the Deposition of Peter Ratcliffe, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 15, 2025)
1041	M.D. Walker et al., *Mobile Video-Streaming*, 21 BT TECH J. 192 (July 2003) (Exhibit 6 to the Deposition of Peter Ratcliffe, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 15, 2025)
1042	Hiroyuki Kasai et al., *The Development of a Multimedia Transcoding System for Mobile Access to Video Conferencing*, E85-B IEICE TRANSACTIONS COMMC'NS 2171 (Oct. 2002) (Exhibit 7 to the Deposition of Peter Ratcliffe, *fuboTV Media Inc. v. DISH Techs., L.L.C.*, Nos. IPR2024-00917, -00918, -00919 (P.T.A.B. May 15, 2025)
1045	U.S. Patent Application Publication No. 2003/0135631 A1

1046	Frédéric Dufaux & Touradj Ebrahimi, *Motion JPEG2000 for Wireless Applications*, IEEE Proc. 1st Int'l JPEG 2000 Workshop (2003), https://infoscience.epfl.ch/server/api/core/bitstreams/6bf509c6-9aa9-49aa-b41a-4016ec3fbd21/content (last visited June 5, 2025)
1047	R. Fielding et al., *Hypertext Transfer Protocol – HTTP/1.1*, Network Working Grp. Request for Comments: 2616; Obsoletes: 2068 (June 1999)
1049	U.S. Patent No. 6,304,297 B1
1050	Supavadee Aramvith & Ming-Ting Sun, *MPEG-1 and MPEG-2 Video Standards* (1999), https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=f499594b35c573dd2296aa567ff16688bb972e3b (last visited June 5, 2025)
1051	T. Berners-Lee et al., *Hypertext Transfer Protocol – HTTP/1.0*, Network Working Grp. Request for Comments: 1945 (May 1996), https://datatracker.ietf.org/doc/html/rfc1945 (last visited June 4, 2025, 7:33 P.M.)
1052	Ramesh Yerraballi, *Multimedia Systems Concepts Standards & Practice* ch. 5.3 (Univ. of Tex., Austin), https://users.ece.utexas.edu/-ryerraballi/MSB/Contents.html (last visited June 6, 2025, 10:02 A.M.) (excerpt)
1053	Andrew Davis, *An Overview of Video Compression Algorithms*, EE|TIMES (Feb. 3, 1998), https://www.eetimes.com/an-overview-of-video-compression-algorithms/ (last visited June 4, 2025, 7:37 P.M.)
1054	Elise A. Couper et al., *Boom and Bust in Telecommunications*, 89/4 Fed. Rsrv. Bank Richmond Econ. Q. 1–24 (2003), https://www.richmondfed.org/~/media/richmondfedorg/publications/research/economic_quarterly/2003/fall/pdf/wolman.pdf (last visited June 6, 2025)
1055	EBU•UER, *EBU Subjective Listening Tests on Low-Bitrate Audio Codecs* (June 2003), https://tech.ebu.ch/docs/tech/tech3296.pdf (last visited June 5, 2025)
1056	Dapeng Wu et al., *Streaming Video Over the Internet: Approaches and Directions*, 11 IEEE Transactions Cirs. Sys. Video Tech. 1–20 (Feb. 2001)

1057	Hun-Cheol Lee & Seong-Dae Kim, *Iterative Key Frame Selection in the Rate-Constraint Environment*, 18 SIGNAL PROCESSING: IMAGE COMMC'N 1–15 (2003)
1058	Yu Yuan, David Feng & Yuzhuo Zhong, *A Novel Method of Keyframe Setting in Video Coding: Fast Adaptive Dynamic KeyFrame Selecting*, IEEE Proc. 2003 Int'l Conf. Comput. Networks Mobile Computing 428, Shanghai, China (Oct. 20–23, 2003)
1059	U.S. Patent No. 8,868,772
1060	Info. Scis. Inst., Univ. of S. Cal., *Transmission Control Protocol: DARPA Internet Program Protocol Specification*, RFC: 793 (Sept. 1981), https://www.ietf.org/rfc/rfc793.txt (last visited June 7, 2025)

8. My opinions are additionally guided by my appreciation of how a person of ordinary skill in the art would have understood the claims of the '772 patent, '564 patent, and '156 patent at the time of the alleged invention, which I have been asked to assume is April 30, 2004.

III. Legal Understanding

9. I am not an attorney. However, as noted in my original declaration, I have been informed by counsel of certain legal standards and have applied those standards, described in Exhibit 1003, in formulating my opinions. Ex. 1003 §IV.

10. In addition to the legal standards set forth in my original declarations, I further understand that there are "secondary considerations" (also sometimes referred to as "objective indicia") that can weigh in favor of finding that a claim is not invalid as obvious under 35 U.S.C. § 103. I understand that potentially relevant secondary considerations include, but are not limited to: (1) unexpected results, (2)

commercial success, (3) long-felt but unsolved needs, (4) teaching away, (5) industry praise, (6) failure of others, (7) skepticism of experts, and (8) copying by competitors. I also understand that, for any secondary considerations to be relevant to an analysis of obviousness, there must be a nexus between that secondary consideration and the patented features. I further understand that the patent owner has the burden of demonstrating that any such consideration weighs in favor of nonobviousness.

11. I also understand that, if the patent owner demonstrates that a particular product is coextensive with the invention disclosed and claimed in the patent in question, the patent owner is entitled to a rebuttable presumption that there is a nexus between any secondary consideration tied to the product and the patented features. I further understand that this presumption does not apply when the product in question has components or features beyond those of the patented invention.

IV. Level of Ordinary Skill in the Art

12. As I stated in my original declarations, in my opinion a person having ordinary skill in the art as of April 30, 2004, 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). A higher level of education or specific skill might make up for less experience and vice versa.

13. Dr. Jeffay states that a person of ordinary skill in the art at the time of the invention "would have been someone with a least a bachelor's degree in electrical engineering or computer science, or an equivalent degree or experience in a related field, with at least two years of practical coursework in the design or development of distributed multimedia delivery systems." Ex. 2141 ¶56.

14. Under either definition, as of April 30, 2004, I am more than qualified as a person of ordinary skill in the art and am familiar with the knowledge and capabilities of someone that meets the definition. And under either definition, my opinions remain the same.

V. The Challenged Patents

15. In his declaration, Dr. Jeffay includes an analysis of three patents, each challenged in a separate proceeding. Ex. 2141 ¶¶3-4. In this declaration, I do the same.

16. While I provide an overview of the patents and the prosecution histories in my earlier declarations, I discuss them further below.

A. Related Art

17. Dr. Jeffay describes what he refers to as three "conventional" approaches set forth in the background section of the shared specification: downloading, streaming, and progressive download. Ex. 2141 ¶¶37-44.

18. The shared specification describes these three approaches as "Related Art" in the "Background of the Invention" section. Ex. 1001 at 1:22-2:5.

19. When the specification describes downloading in the Background section, it refers to "[d]ownloading complete media files." Ex. 1001 at 1:44-51. This downloading of a complete file "can take large amounts of time depending on the network connection" but allows downloaded content to "be viewed repeatedly anytime or anywhere." Ex. 1001 at 1:46-49. This approach enables "higher quality audio/video than can be delivered in real time" but "[u]sers generally dislike this option, as they tend to want to see or hear the media file instantaneously." Ex. 1001 at 1:47-51.

20. The specification describes streaming as offering "the advantage of immediate access to content" and "provid[ing] the opportunity for the user to select different content for viewing on an ad hoc basis" but "sacrific[ing] quality compared with downloading a file of the same content." Ex. 1001 at 1:52-58. The specification also compares downloading to streaming in that "[d]ownloading also supports rewind, fast forward, and direct seek operations, while streaming is unable

to fully support these functions" and "is vulnerable to network failures or congestion." Ex. 1001 at 1:58-61.

21. The third form of related art is progressive downloads wherein "the media file download begins, and the media player waits to begin playback until there is enough of the file downloaded that playback can begin with the hope that the remainder of the file will be completely downloaded before playback 'catches up.'" Ex. 1001 at 1:62-2:1. The specification identifies that the "waiting period can be substantial depending on network conditions." Ex. 1001 at 2:2-5.

22. Importantly, as of the priority date of the challenged patents, progressive downloads relate to downloading ***the entire file*** and starting playback partway through that full-file download. Wu *et al.*, Streaming Video Over the Internet: Approaches and Directions, IEEE Transactions on Circuits & Systems for Video Technology, Vol. 11, No. 1 (February 2001) (Ex. 1056).[1]

23. As explained further below, I disagree with Dr. Jeffay's characterization of certain prior art as disclosing these methods. For example, as explained further below, I disagree with Dr. Jeffay that Leaning (Ex. 1004) describes a "progressive download" approach at least because Leaning does not require the media player to "wait" to begin playback.

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[1] Unless otherwise indicated, all emphases are added.

24. I also disagree with Dr. Jeffay's assertion that the challenged patents "teach[] solutions that overcome the drawbacks of each to achieve continuous playback while streaming." Ex. 2141 ¶36. The specification itself notes only that the purported invention "has been developed in response to the present state of the art" and "in response to the problems and needs in the art that ***have not been fully solved*** by currently available content streaming systems" to "overcome ***many*** or all of the above-described shortcomings in the art." Ex. 1001 at 2:52-59 (emphasis added).

25. For example, the specification acknowledges that existing approaches, such as "pipelining," can already "eliminate[] all but the first request latency" by leveraging "a single TCP connection" and serially requesting streamlets over that single connection. Ex. 1001 at 10:1-14.

26. Dr. Jeffay also states that the patents addresses network failure vulnerability and congestion "by creating different copies of its streamlets at different bit rates and inserting a step into the process … that responds to changes in network conditions," referring to step 610 in Figure 6. Ex. 2141 ¶40. While I agree that the patents describe upshifting and downshifting quality, (1) the determination does not depend directly on the user's network connection and (2) step 610 in Figure 6 is unrelated.

27. First, to be more specific, the shared specification describes that upshifting and downshifting is determined based on a "performance factor" where the determination of whether the "higher quality playback can be sustained" is based on a "combination of factors," including "amount of contiguously available streamlets stored in the staging module, a minimum safety margin, and current read ahead margin"—not directly in response to network conditions. Ex. 1001 at 3:11-29, 3:57-4:6, 12:15-13:11 ("The policy determination about whether or not to upshift 710 playback quality begins by comparing $\phi_{current}$ with a trigger threshold Θ_{up} …. In one embodiment, the trigger threshold Θ_{up} is determined by a combination of factors relating to the current read ahead margin (i.e. the amount of contiguously available streamlets that have been sequentially arranged by the staging module 409 for presentation at the current playback time index), and a minimum safety margin."). The specification explains that this performance factor can be calculated as a geometric mean (or some other averaging) based on a performance ratio, which in turn accounts for "network behavioral characteristics" derived from a number of samples. Ex. 1001 at 12:15-40.

28. Second, step 610 in Figure 6 is labeled as "Retrieve Streamlet From Cache." Ex. 1001 at Fig. 6. As the label indicates, this step in the process of "viewing a plurality of streamlets" is to "retrieve[] 610 the streamlet" from the

cache. Ex. 1001 at 11:35-51. Dr. Jeffay does not offer an explanation regarding how the addition of this retrieval step relates to responding to network conditions.

B. Continuous Playback

29. Dr. Jeffay focuses heavily on the "continuous playback" limitation in the challenged claims, stating that the patents achieve a "combination of improvements over the prior art" that "avoid disruptions and achieves continuous playback." Ex. 2141 ¶45. Dr. Jeffay then later contrasts this with what he refers to as approaches that "disrupt playback" or cause playback to be "interrupted" both in time and in content. Ex. 2141 ¶¶65, 73. I will discuss where, how, and why the prior art discloses the "continuous playback" limitations in additional detail below, but, at the outset, it is worth discussing Dr. Jeffay's opinions regarding the use of the phrase "continuous playback" in the patents themselves.

30. As an initial matter, other than in the claims themselves, the shared specification of the '772, '564, and '156 patents does not use the phrase "continuous playback." Ex. 1001. Nor do the patents indicate, in either the specification or the claims, that the purported invention achieves uninterrupted playback when there is a rate shift. Ex. 1001.

31. Rather, the shared specification states that "the present invention has been developed to provide an apparatus, system, and method for adaptive-rate content streaming that overcome many or all of the above-discussed shortcomings

in the art." Ex. 1001 at 2:56-59. I agree with Dr. Jeffay that the referenced "above-discussed shortcomings in the art" refers to "reliability," "efficiency," and "latency." Ex. 1001 at 1:17-2:48.

32. I disagree, however, with any implication that addressing issues with reliability, efficiency, or latency relate to playback being completely uninterrupted. Rather, as the specification itself makes clear: (1) reliability refers to "slowdown" due to, for example "[a] break in the continuity of a TCP connection," (2) "[e]fficiency refers to how well the user's available bandwidth is used for delivery of the content stream," and (3) "[l]atency is the time measure form [*sic*] the client's point-of-view, of the interval between when a request is issued and the response data begins to arrive." Ex. 1001 at 2:6-39. Attempting to minimize (or even "alleviate," Ex. 1001 at 2:36-38) these effects does not demand or imply completely uninterrupted playback.

33. The specification then goes on to describe, at most, ensuring that any video plays in sequential order. For example, arranging streamlets chronologically or in accordance with numbered identities for playback. Ex. 1001 at Abstract ("A staging module is configured to stage the streamlets and ***arrange the streamlets for playback*** on a content player."), 3:46-56 ("In one embodiment, the method include simultaneously requesting a plurality of streamlets, continuously monitoring streamlet requests and subsequent responses, and accordingly

requesting higher or lower quality streamlets, and staging the streamlets and arranging the streamlets for playback on a content player."), 6:67-7:7 ("For example, 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."), 8:41-44 ("The staging module 409 may be configured to arrange the streamlets 212 ***in the order of ascending playback time***.").

34. While the claims use the phrase "continuous playback," the shared specification does not. The file history of the '772 patent (the parent patent) does, however, use the term "continuous" in relation to "playback." In Applicant Remarks dated April 10, 2009, Applicant responded to a rejection based the combination of two references referred to as Hughes and Li. IPR2024-00919, Ex. 1002 at 486; IPR2024-00917, Ex. 1018 at 486; IPR2024-00918, Ex. 1018 at 486. To argue that the two references did not disclose a limitation reciting "achieve continuous playback of the video using portions," Applicant argues that the "media player" in the claims:

> "can achieve continuous playback of the requested video without the problem described in the background of Hughes and Li because the shifts between the playback quality occur during playback at portion boundaries. The 'requests' are for 'portions,' so the 'shifts' occur at the 'portion' level; and the 'portions' of the different 'copies' are the 'same portion of the video;' so ***shifts happen on portion boundaries and the portion boundaries of the copies at the same time index in the video—meaning playback is continuous***."

The Applicant had made this same argument previously in Remarks dated March 14, 2009. Ex. IPR2024-00919, Ex. 1002 at 456; IPR2024-009017, Ex. 1018 at 456; IPR2024-00918, Ex. 1018 at 456.

35. A person of ordinary skill in the art would understand this discussion as describing continuous playback as shifting between video qualities at the same time index. It is through this that the claims aim "to achieve" continuous playback. This goal of the purported invention is an aspirational one—as described throughout this declaration, the nature of network connections and streaming inherently involves imperfect connections and, therefore, imperfect playback.

36. The portions of the file history that Dr. Jeffay describes are not inconsistent with what I describe in the preceding paragraphs. As Dr. Jeffay notes, during the prosecution of the application that would issue as the '772 patent (which is also the parent application for the applications that would issue as the '564 and '156 patents), the Applicant added the limitation "to achieve continuous playback of the video using portions[2] of the highest quality one of the copies determined sustainable at that time." Ex. IPR2024-00919, Ex. 1002 at 456; IPR2024-00917, Ex. 1018 at 456; IPR2024-00918, Ex. 1018 at 456. Specifically,

[2] Dr. Jeffay alters the text to read "the files" instead of "portions" without explanation. Ex. 2141 ¶44.

this language was added as part of an Applicant Amendment dated December 2, 2008, in which Applicant rewrote the claims nearly in their entirety. Ex. IPR2024-00919, Ex. 1002 at 386-388; IPR2024-00917, Ex. 1018 at 386-388; IPR2024-0918, Ex. 1018 at 386-388. In the Applicant Remarks discussing Hughes and Li described above, that language was already present in the claims.

37. I agree with Dr. Jeffay that this limitation reciting "to achieve continuous playback of the video using portions of the highest quality one of the copies determined sustainable at that time" appears in all of the independent claims of the '772, '546, and '156 patents.

38. Dr. Jeffay then argues that the "combination of improvements over the prior art discussed above avoids disruptions and achieves continuous playback." Ex. 2141 ¶45. It is unclear what improvements Dr. Jeffay is referring to, or how such purported improvements avoid disruption and/or achieve continuous playback and offers no explanation or supporting evidence. Further, the reference to "avoids disruptions" is confusing in the context of the patents. The shared specification uses the term "disruption" (or any variation thereof) exactly once, in referring to "network disruptions," for example, Internet outages. Ex. 1001 at 12:51-54. The supposed invention does not relate to network issues, much less solving them. At most, the specification explains some approaches to help "withstand" such disruptions. Ex. 1001 at 12:51-54.

39. The testimony of Dr. Jeffay and other individuals who provided declarations in support of the Patent Owner Responses confirm that "continuous playback" does not mean completely uninterrupted. The Patent Owner Responses contend that the "MOVE" product meets the continuous playback limitations. But the "MOVE" product experienced, for example, delays, freezing, and buffering. May 8, 2025 Deposition Transcript of Dr. Jeffay 208:15-219:12; May 14, 2025 Deposition Transcript of Named Inventor R. Drew Major 127:6-128:8; May 9, 2025 Deposition Transcript of Former MOVE Vice President of Operations David Ericson 211:18-213:21; May 30, 2025 Deposition Transcript of the Manager of Business Intelligence at Brigham Young University Mark Mitchell 54:23-56:12.[3] All of these are types of interruptions in video transmissions.

40. Dr. Jeffay also states that "[t]he invention of the Challenged Patents also avoids disruptions and achieves continuous playback by playing all the streamlets already arranged in its 'staging module' (depicted [in Figure 4]), even after a decision to rate shift is made." Ex. 2141 ¶45. This statement is not supported by the specification and Dr. Jeffay offers no supporting citations.

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[3] I later use short-hands to cite to these same deposition transcripts with the individual's name, followed by "Tr."

41. In the specification, the referenced "staging module 409 may be configured to arrange the streamlets 212 in order of ascending playback time." Ex. 1001 at 8:41-42; Ex. 1001 at 11:52-55, 12:44-50 (referring to "contiguously available streamlets that have been arranged by the staging module 409 for presentation at the current playback time index"). Nothing requires (or indicates) that the arranged streamlets are played in full.

VI. Overview of Prior Art

A. Leaning

42. I provide an overview of International Patent Publication WO 2002/049343 to Leaning ("Leaning," Ex. 1004) in my original declarations. As discussed in further detail below, Dr. Jeffay omits key disclosures in Leaning throughout his analysis. In particular, and contrary to Dr. Jeffay's characterizations (Ex. 2141 ¶¶47-51), Leaning: (1) does not describe "using the 'progressive download' technique" described in the Background section of the specification, (2) does not require that the "Clear Buffer" always be implemented or that any "Clear Buffer" step discard sub-files, and (3) permits playback as soon as one sub-file is received and downloaded.

B. Gamble

43. I provide an overview of U.S. Patent Application Publication No. 2004/0093240 to Gamble ("Gamble," Ex. 1020) in my original declarations. As

discussed further below, Gamble teaches one networked component requesting files (of any type, including video) and another networked component transmitting those files in response to such requests. Ex. 1020 [0039]. To do so, Gamble leverages multiple, parallel TCP connections. Ex. 1020 [0025]-[0027], [0034], [0038]-[0039].

C. Ala-Honkola – 156 Patent

44. I provide an overview of U.S. Patent Application Publication No. 2003/0055995 to Ala-Honkola ("Ala-Honkola," Ex. 1017) in my original declaration in IPR2024-00917. As discussed further below, Ala-Honkola teaches establishing multiple TCP connections for streaming media files, including portions of media files stored at different bitrates. Ex. 1017 [0010], [0022]-[0025], [0030]-[0032], [0045]-[0046].

VII. "Continuous Playback" Would Have Been Obvious in View of Leaning

A. Leaning Does Not Describe Progressive Playback

45. I disagree with Dr. Jeffay that Leaning discloses using "progressive download" and not achieving continuous playback. Ex. 2141 ¶63. As I explain above, progressive download is when the download begins and the media player waits to begin playback until enough of the file is downloaded that the playback is unlikely to catch up to the point where the file is being downloaded before the file is completely downloaded . Ex. 1001 at 1:62-2:1.

46. In fact, Leaning discloses that a "sub-file size" can be "between 30% and 130% of playout time." Ex. 1004 at 12:26-34. The playout time (or "T_p") "determines the degree of buffering that the terminal performs." Ex. 1004 at 5:20-22. The "buffer," as the term is used in Leaning as well as in the field, is where the decoded data that is waiting to be played is stored. Ex. 1004 at 4:16-18, p. 10.

47. Pages 9-10 of Leaning explain how this works in additional detail, starting with the very first sub-file of a media file, represented by 000000.bin. Ex. 1004 at 3:10-18 (explaining a naming convention where a sub-file is named according to "their sequence in the original file, for example: 000000.bin, 000001.bin …"), 17:11-19 (providing an example of a naming convention where the earliest in time sub-file for each bitrate is 000000.bin), 19:25-29 ("start again at 000000.bin"), 21:22-24 (referring to 000000.bin as the "starting sub-file name").

48. The flowchart on page 10 of Leaning explains how the first-in-time sub-file is processed. First, Leaning sets the current sub-file to 000000.bin. Ex. 1004 at p. 10. Second, Leaning requests the corresponding URL, and, if 000000.bin (the requested sub-file) exists, the requested sub-file is sent. Ex. 1004 at p. 10. Third, the file is decoded and written to the buffer. Ex. 1004 at p. 10.

49. Importantly for comparing Leaning to progressive download, Leaning then checks to see if the buffer fullness from that single file is greater than the

playout time (T_p). Ex. 1004 at p. 10. If it is, then Leaning proceeds to step J3 "Begin/continuing playing." Ex. 1004 at p. 10. In other words, if the very first sub-file provides more media than the playout time, the file will play. As noted above, Leaning also expressly discloses that sub-files, including a first sub-file, can be 130% the size of the playout time. Ex. 1004 at 12:26-34. As a result, upon receipt and decoding of 000000.bin (the first sub-file), the buffer fullness is greater than T_p at step J1A and the device goes to step J3 and begins playing. Ex. 1004 at p. 10. This is effectively instantaneous playback, within the constraints of computer networking.

50. Dr. Jeffay also cites to a portion of Leaning that refers to "ceas[ing] playing until further data arrives" as indicating that Leaning is a progressive download approach. Ex. 2141 ¶50. This statement, however, refers to ***if*** the buffer becomes empty and does not indicate that Leaning is describing progressive download. Ex. 1004 at 6:3-4.

51. This process does not describe either a download (which, as described above, refers to obtaining an entire file locally) or waiting to begin playback until enough of a file is downloaded. All Leaning needs is buffered data having a duration of more than the playout time in order to begin playback, which may occur when just a single sub-file is received and decoded.

B. My Original Declarations Address the "Continuous Playback" and "Continuous Presentation" Limitations

52. Dr. Jeffay states that my original declaration "ignore[s]" the continuous playback limitation, seemingly because I allegedly did not use the word "continuous" and because I referred back to other limitations where I outlined the process disclosed in Leaning, such as in relation to the "upshift" limitation. Ex. 2141 ¶¶68-72.[4] But Dr. Jeffay is wrong—I did expressly say that Leaning discloses continuous playback of the video. Ex. 1003 ¶92. And just because Leaning does not use the phrase "continuous playback" does not mean that it does not teach continuous playback. When the various steps of Leaning are read together (as my original declaration outlines), it is clear that the processes disclosed in Leaning likewise accomplishes continuous playback in the context of adaptive bitrate streaming.

53. I'll use my original declaration in IPR2024-00919 regarding the '772 patent as an example, but the reasoning and arguments are the same for the '156 and '534 patents in relation to the continuous playback and continuous presentation limitations.

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[4] Dr. Jeffay includes a discussion of the '234 patent, which is part of a separate proceeding and which I do not discuss here. Ex. 2141 ¶71.

54. In my original declaration (IPR2024-00919, Ex. 1003), I explain that Leaning discloses storing two or more versions of a recording (including a video recording) at different compression rates. IPR2024-00919, Ex. 1003 at ¶67. Each of these versions are then divided into sub-files (e.g., 135 smaller files, each representing 4 seconds of play time) that are labeled with the serial numbers that are "indicative of their sequence in the original file, e.g., 000000.bin, 000001.bin, and so on. IPR2024-00919, Ex. 1003 at ¶68. As my color-coded diagram indicates, each version is divided the same way, containing the same set of sub-files in the same order:

Directory	Subdirectory	Filename
mp3_bwv565	none	link.htm index.htm
mp3_bwv565	008k_11_m	000000.bin 000001.bin 000002.bin 000003.bin . . 000134.bin
mp3_bwv565	016k_11_m	000000.bin 000001.bin 000002.bin 000003.bin . . 000134.bin
mp3_bwv565	018k_11_s	000000.bin 000001.bin 000002.bin 000003.bin . . 000134.bin
mp3_bwv565	024k_11_s	000000.bin 000001.bin 000002.bin 000003.bin . . 000134.bin
mp3_bwv565	032k_11_s	000000.bin 000001.bin 000002.bin 000003.bin . . 000134.bin

IPR2024-00919, Ex. 1003 at ¶¶68, 71, 73 (explaining that the sequential numbering discloses the "time index" limitation), 79 (explaining again that "Leaning discloses that the subfiles of each of the copies are in the same sequential order").

55. I then go on to explain that this approach results in the full media file being stored as a set of files representing successive temporal portions of the

original media file. IPR2024-00919, Ex. 1003 at ¶69. And that Leaning further explains that it is "highly desirable that the sub-file boundaries are the same for each rate so that the first sub-file received for a new rate continues from the same point in the recording that the last subfile at the old rate ended." IPR2024-00919, Ex. 1003 at ¶71.

56. The media player can then increment the file name to request the files in the sequential order, including based on time indexes. IPR2024-00919, Ex. 1003 at ¶¶79, 84, 86-87.

57. I then continue to explain that Leaning compares a "measured rate" to a "current rate" to determine whether the current rate is sustainable, including teaching that "interruption … can be avoided" by anticipating underflow. IPR2024-00919, Ex. 1003 at ¶91.

58. As I note in my original declarations this, all together, discloses making the successive determinations to shift the playback quality based on the performance factor to achieve continuous playback of the video using the files (sub-files) of the highest quality copy of the video that is determined to be sustainable at that time. IPR2024-00919, Ex. 1003 at ¶92. I then go on to explain upshifting (including the "Stepup" process in the flowchart) in greater detail in view of the language in the same limitation reciting "the highest quality copy of the video that is determined to be sustainable." IPR2024-00919, Ex. 1003 at ¶92.

59. Substantively, Dr. Jeffay focuses on the inclusion of the "Clear Buffer" step in the flowchart on page 10 of Leaning to opine that "Leaning is not continuous." Ex. 2141 ¶¶72-73. As I discuss further below, this misunderstands Leaning and ignores Leaning express disclosures that, while helpful in some instances, the "Clear Buffer" is not a required step and playback is ***not*** "interrupted every time a rate shift is performed," as Dr. Jeffay contends. Ex. 2141 ¶73.

60. For these reasons, and the additional reasons discussed below, Leaning ***does*** disclose continuous playback.

C. Leaning Discloses Uninterrupted Playback

61. As described above, I disagree with Dr. Jeffay that "continuous playback" is equivalent to uninterrupted or undisrupted playback. Ex. 2141 ¶¶63-65. Rather, as described above, the claim language, the shared patent specification, and the patent owner's own arguments that the "MOVE" product accomplishes continuous playback, all show that "continuous playback" does not require completely uninterrupted playback.

62. Regardless, as I explained in my original declarations, Leaning also discloses that "interruption can be avoided." Ex. 1004 at 15:3-8, 8:11-16. Specifically, Leaning first describes that existing interruptions to audio output when rates are switched resulted from "conventional sound cards" having to "re-set[] in order to change sampling rate." Ex. 1004 at 14:25-20. This need arose

in the context of conventional sound cards because those early sound cards had fixed internal clocks tied to the actual circuitry of the device. Changing the rate of processing required actually reconfiguring the circuitry during the reset.

63. To avoid the need to reset, which would create an interruption, Leaning explains that the "sound card could be run continuously at the highest sampling rate envisaged." Ex. 1004 at 14:28-30. Leaning next describes that when there is "buffer underflow," i.e., interruptions in output, Leaning will rate switch downwards to avoid that interruption "in the majority of cases" by leveraging "automatic data rate switching downwards." Ex. 1004 at 15:3-8. The result is that the system disclosed in Leaning can rate shift without clearing the buffer and without interruption.

64. Further, when considering Leaning's applications to video files (which, as explained above, is disclosed), a person of ordinary skill in the art would have understood that changing the video bitrate does not require a hardware reset or clearing the buffer. Rather the refresh rate of a display device (like a computer monitor) is decoupled from the bitrate and framerate at which the video player is operating. Ex. 2129 at 99:12-104:22; United States Patent No. 6,304,297 (Ex. 1049) at 1:10-2:53. For example, a computer monitor's refresh rate can remain static while a video player (such as one in a web browser) changes bitrates or while different applications open with an operating system's windowing interface update

their application window at different rates. The video player application does not concern itself with the refresh rate of the display device hardware. This approach, which is how video has worked since well before the challenged patents, permitted rate adjustments to an application's display window without requiring any hardware resets.

65. This is consistent with Leaning's teachings that the "player program incorporates a video decoder," which would be implemented separately and independently from the display hardware. Ex. 1004 at 16:6-10.

66. Additionally, even if video cards needed to be reset like audio cards (which they do not), a person of ordinary skill in the art would readily implement the solution expressly taught in Leaning to run the video card (like Leaning teaches running the audio card) continuously at the highest sampling rate. Ex. 1004 at 14:25-15:8, 16:6-7.

67. Leaning also does not separately require (as Dr. Jeffay states) "clearing and re-filling a playback buffer as part of every shift." Ex. 2141 ¶¶63-65. Dr. Jeffay omits the second half of the only sentence he relies on, which reads: "clear[ing] the buffer … ***is not actually essential***." This statement is also made in the context of a jump (i.e., when the user indicates which part of the recording her or she wishes to jump to by, for example, moving a cursor), not a rate change. Ex. 1004 at 11:12-20.

68. In his declaration, Dr. Jeffay walks through the example on page 10 of Leaning, arguing that Leaning "intentionally interrupts playback at each and every rate shift." Ex. 2141 § VII.A.2. I have already addressed many of the disclosures Dr. Jeffay ignores in order to reach these conclusions above, but will address them again here in the context of Dr. Jeffay's example.

69. Dr. Jeffay starts by stating that the "rate change" process in Leaning is limited to audio. Ex. 2141 ¶74. Not so. As described further below, Leaning is clear that it applies to both audio and video. Ex. 1004 at 2:5-9 ("the system may be used to convey video signals instead of, or in addition to, audio signals"). And, Leaning explains that, in the context of video delivery, a person of ordinary skill in the art can swap a sound card for a video card, or add a video card alongside a sound card. Ex. 1004 at 4:7-10. The reference to a "sound card" in step J3 as emphasized by Dr. Jeffay does not, therefore, indicate that the overall disclosures only apply to audio.

70. Dr. Jeffay next opines that step J1A reciting "If Buffer Fullness > T_p seconds go to Step J3." I do not disagree that this indicates that, in this flowchart, Leaning explains that the buffer must exceed a certain playout time T_p before going to Step J3, which is the step that initiates playback. Ex. 2141 ¶74.

71. But, I do disagree with Dr. Jeffay's next statement that "Leaning's only example" has a playout time (T_p) of 10 seconds and a sub-file length of 4

seconds, thereby requiring at least three sub-files before beginning or resuming playback. Ex. 2141 ¶75. While these are examples Leaning provides (Ex. 1004 at 3:6-7, 5:20-21), Leaning more generally explains that the file is "divided into smaller files … corresponding to a fixed playing time." Ex. 1004 at 3:5-7. And, the playout time is a "parameter" that "could be made user-selectable if desired." Ex. 1004 at 5:20-21. This hardly indicates to a person of ordinary skill in the art that Leaning is limited to a playout time of 10 seconds and a sub-file length of 4 seconds; rather, both of these are highly configurable and Leaning discloses being able to process a range, including where the sub-file length is greater than the playout time T_p as discussed below. Further, a person of ordinary skill in the art would readily understand that Leaning's examples could be scaled to other increments through the application of simple mathematics. For example, as Leaning itself outlines. Ex. 1004 at 13:26-30.

72. Additionally, as I explain above, a sub-file length of up to 130% T_p is satisfactory. Ex. 1004 at 12:31-34. For example, a sub-file could be about 4 seconds long and T_p could be 3 seconds. In other words, a single sub-file will exceed the playout time and playback will begin or resume upon that single sub-file being decoded into the buffer. Furthermore, if the sub-file length was 2 seconds with a playout time of 3 seconds, two sub-files would be initially requested and decoded before playout begins, with up to 4 seconds of video buffered.

73. Dr. Jeffay then argues that Leaning requires interruptions in the output at both the start and when a rate shift occurs. Ex. 2141 ¶76.

74. First, to opine that Leaning "necessarily results in interruptions in the output," Ex. 2141 ¶76, Dr. Jeffay cites to a passage that actually states the opposite. In that passage, Leaning first notes that "automatic data rate switching downwards" would occur "only in cases of buffer underflow," which will avoid interruptions in the output. Ex. 1004 at 15:3-6. In other words, Leaning will only downgrade the rate when necessary, that is, when there would otherwise be interruptions in output if the rate did not change. Leaning then expressly states that "with this modification," disclosed in Leaning, "***such interruptions can be avoided***," referring to the same exact "interruptions" Dr. Jeffay cites to. Ex. 1004 at 15:3-6.

75. Second, Dr. Jeffay cites to a passage referring to "extra delay when starting play." Ex. 2141 ¶76. That portion of Leaning explains why "excessively large sub-files" (in terms of the length of those sub-files in time) "are disadvantageous." Ex. 1004 at 12:31-32. In particular, "in requiring a larger buffer and in causing extra delay when starting play and/or when jumps or rate changes are involved." Ex. 1004 at 12:31-32. Leaning then goes on to explain that "[a] sub-file size of between 30% and 130% of the playout time" is "satisfactory," and, therefore, not excessively large. Ex. 1004 at 12:33-34. As explained above, this

includes sub-file sizes that permit playback upon receipt of the first sub-file by having a size equal to or larger than the playout time (100-130%).

76. Third, Dr. Jeffay again refers to the inclusion of a "Clear Buffer" step in the flow chart on page 10 of Leaning to conclude that Leaning requires clearing the buffer every time a rate shift occurs, and, therefore, interrupting playback every time a rate shift occurs. Ex. 2141 ¶¶76-77. As noted above and in further detail below, I disagree that the "Clear Buffer" step is required every time a rate shift occurs.

77. Dr. Jeffay's next arguments relating to why clearing a buffer results in interrupted playback are, therefore, irrelevant in the context of Leaning, which presents the "Clear Buffer" step as an option. Regardless, I address each of these arguments as well.

78. Specifically, Dr. Jeffay opines that clearing the buffer results in both a "temporal discontinuity" (because the buffer must refill) and a "content-based discontinuity" (because sub-files are incremented sequentially). Ex. 2141 ¶¶78-79.

79. These arguments of Dr. Jeffay's are based on the assumption that "the next sub-file requested after a rate shift will be the sub-file ***after*** the last sub-file previously stored in the buffer, which may not have been played yet." Ex. 2141 ¶¶78-83 (emphasis in original). That assumption is incorrect.

80. A person of ordinary skill in the art would understand from Leaning that clearing the buffer refers to actually playing out the sub-files in the buffer, not discarding them. Leaning highlights that the "first sub-file received for a new rate" actually "continues from the same point in the recording that the last sub-file at the old rate ended," indicating that there are not any sub-files in between that are being discarded. Ex. 1004 at 12:16-18. Further, the sub-files in the buffer have already been received and decoded. It would be inefficient and undesirable to re-do that process, which would add roundtrip time for data transmission and occupy bandwidth.

81. Throughout his declaration, Dr. Jeffay cites to a portion of Leaning that states that "in the case of the jump" there is a preference "to suspend decoding and clear the buffer so that the new request is sent immediately." Ex. 1004 at 11:19-20. That portion goes on to clarify "this is not actually essential" and that this is in the context of a "jump" (that is, when a user mov[es] a cursor to a desired point on a displayed bar representing the total duration of the recording"), not a change in bitrate. Ex. 1004 at 11:19-20.

82. The portions of Leaning cited by Dr. Jeffay in paragraph 91 of his declaration do not indicate otherwise. Those portions of Leaning (Ex. 1004 at 8:27-9:2) provide examples of when Leaning will step down in bitrate. Because

(as is the case in the challenged patents) the preference is for higher quality bitrates, Leaning will only step down in certain conditions.

83. To that end, this specific portion of Leaning explains one condition for stepping down in bitrate is when "the measured Buffer Low Percentage exceeds a Step Down Threshold." Ex. 1004 at 8:15-27. The "Buffer Low Percentage" is "the percentage of time that the buffer contents represent less than 25% of the playout time" and the "Step Down Threshold" is a set value to which that percentage is compared in order to determine whether a step down should occur. For example, "[i]f the Step Down Threshold is set to 0% then when the buffer empties the system always steps down when the other conditions are satisfied," where the other conditions refer to "if the buffer ever empties AND the measured rate is less than the current rate." Ex. 1004 at 8:17-30. If, however, the Step Down Threshold is set to 5%, then even if the other conditions are satisfied, that is, the buffer empties and the measured rate is less than the current rate, the step down to a lower rate will still not occur if "the measured Buffer Low Percentage is greater than 5%." Ex. 1004 at 8:28-32. As a result, a downshift will occur only when the rate cannot be sustained as indicated by the Buffer Low Percentage for a certain amount of time. Ex. 1004 at 8:32-9:2.

84. Finally, to address the title Dr. Jeffay uses for this section ("A POSITA Would Not Discard Leaning's 'Clear Buffer' Instruction"), a person of

ordinary skill in the art would not need to "discard" the "Clear Buffer"-related teachings, including because Leaning itself makes clear that the inclusion thereof is optional (as discussed above) and because a person of ordinary skill in the art would understand that, in the context of changing bitrates, any clearing of the buffer could (and should) be implemented by playing out the sub-files already in the buffer, including because Leaning teaches that "the first sub-file received for a new rate continues from the same point in the recording that the last sub-file at the old rate ended." Ex. 1004 at 12:16-18.

VIII. Leaning's Techniques Can Be Used For Video

A. Leaning Discloses Video Applications

85. Dr. Jeffay also opines that Leaning is limited to audio. Ex. 2141 ¶¶66, 84-88. But Leaning itself says otherwise. Leaning consistently explains that it relates to delivery of "recorded audio or video material," including in the very title. Ex. 1004 at Cover; Ex. 1004 at 1:12-14 ("a terminal for playing audio or video material"), 1:02-21. In fact, Leaning prefaces its discussion of audio by clearly identifying it as an example:

> "The system shown in Figure 1 has as its object the delivery, to a user, of digitally coded audio signals (for example, of recorded music or speech) via a telecommunications network to a user terminal where the corresponding sounds are to be played to the user. However, as will be discussed in more detail below***, the system may be used to convey video signals instead of, or in addition to, audio signals***."

Ex. 1004 at 2:5-9. Likewise, for Figure 2, Leaning explains that "[f]or video delivery, a video card would be fitted in place of, or in addition to, the [sound] card 36." Ex. 1004 at 4:7-10.

86. There are numerous instances throughout Leaning making clear that the concepts apply to both, including, in particular, that the "manner of partitioning the file into sub-files" remains "unchanged" when using Leaning for a video file. Ex. 1004 at 16:6-10. That passage, in full, makes this aspect of Leaning very clear:

> "The ***same principle may be applied to the delivery of video recordings***, or, of course, video recordings with an accompanying sound track. In the simpler version, where there is only one recording, ***the system differs from the audio version only in that the file is a video file*** (e.g. in H.261 or MPEG format) ***and that the player program incorporates a video decoder.*** The manner of partitioning the file into sub-files is unchanged."

This does not, as the Responses state, relate at all to subtitles. It refers expressly to video recordings generally.

87. At a minimum, an individual having ordinary skill in the art would readily understand what changes would need to be made to any audio examples in Leaning to apply the same concepts to video, including the changes Leaning supplies.

88. Leaning also works through the video-specific aspects of encoded media, such as the inclusion of independent frames (I-frames or intra-frames)

and/or dependent frames (P-frames) in video files, that do not apply to audio files. For example, Ex. 1004 at 16:17-31.

89. Dr. Jeffay points to an excerpted statement from that passage to assert that there are "further implications" when partitioning video files into sub-files and draws the conclusion that Leaning does not show that the discussions of audio can apply equally to video. Ex. 2141 ¶67. As described above, Leaning, first of all, explains that its methodologies can apply equally to video.

90. Further, Dr. Jeffay disregards the overall context in which "further implications" of video files are referenced. Leaning explains that there are "further implications for file partitioning if switching or jumps are to be permitted." Ex. 1004 at 16:17-18. Leaning then goes on to explain how to handle those further implications.

91. Dr. Jeffay improperly excerpts this passage to argue that "Leaning's rate shifting interrupts playback" and/or does not apply to video (though it is not clear which or how these two opinions are consistent with one another). Ex. 2141 ¶67. But what that same passage actually explains is how to accommodate features and functionalities, including when the media player enables jumping, fast forward and/or rewind features for video files.

92. Specifically, "if switching or jumps are to be permitted," Leaning acknowledges that there are "further implications ***for file partitioning***." Ex. 1004

at 16:17-23. "In the case of recordings where each frame is coded independently," using I-frames, "it is sufficient that a sub-file contains a whole number of frames of a picture," Ex. 1004 at 16:18-20, and there are no additional complexities to accommodate. One simply splits up the file into sub-files that align with whole numbers of frames. Dufaux and Ebrahimi, Motion JPEG2000 for Wireless Applications (Ex. 1046) (describing Motion JPEG2000, an intra-frame video standard).

93. "***If compression involving inter-frame techniques***" (that is, using techniques referred to as predictively coded frames, dependent frames, P-frames, or B-frames) "***is in use***, however, the situation is more complex." Ex. 1004 at 20-21. Even then, Leaning discloses solutions. If such techniques (including MPEG) still include intra-frames (independent frames), the file can still be partitioned into sub-files in the same manner, but "each sub-file should preferably begin with an intra-frame." Ex. 1004 at 16:21-23. A person of ordinary skill in the art would readily understand that one could and would insert an I-frame at regular intervals to accomplish this. And a person of ordinary skill in the art would have begun each sub-file with an intra-frame (I-frame) to avoid mistracking, just as taught by Leaning. Ex. 1004 at 16:21-23.

94. In encoding standards like MPEG, frames are grouped together into what is referred to as a group of pictures. A person of ordinary skill in the art

would understand that one could hold the group of pictures constant across bitrates—the same frame at the start and the same frame at the end. The result would be that if, at one bitrate, a sub-file begins at an I-frame (intra-frame), the same would be true at different bitrates. Changing the bitrate would not affect where the I-frame is located.

95. Even when there are not frequent and regular I-frames and there is a risk of mistracking, (which I discuss further below), "the problem can be solved using the principle described in [Leaning's] international patent application No. WO98/26604 (issued in USA as patent 6,002,440)," included as Exhibit 2014, which "involves the encoding of an intermediate sequence of frames which bridges the gap between the last frame of the preceding sequence and the first frame of the new sequence." Ex. 1004 at 17:7-10; Ex. 1004 at 18:18-27. The referenced patent, titled "Video Coding," Ex. 2014 at Cover, "relates to the encoding of video signals," Ex. 2014 at 1:3-5. In particular, to reduce a "mismatch" error in encoding systems that use intra-frames by encoding the intra-frame from a reconstructed frame of the P-stream rather the original video. Ex. 2014 at 2:22-28 (providing a brief overview). The disclosures of the '440 patent (Ex. 2014) focus on video applications.

96. Leaning expressly explains that using bridging files can be applied to both instances such as fast forward when the rate of play is changed, as well as

"rate-switching." Ex. 1004 at 17:24-18:27 ("Exactly the same process could be used for rate-switching[.]"). By rate-switching, Leaning is clearly referring to changing bitrates, providing the following exemplary series of files to construct a bridge, where all of the files are "x1," indicating that they playing at regular speed, not fast forward; and the change from "96k" to "128k" indicates a change from 96 kbit/s to 128 kbit/s, a change in bitrate:

mpg_ name/096k_x1/000099.bin
mpg_ name/096/128_x1/000100.bin
mpg_ name/128k_x1/000101.bin

Ex. 1004 at 18:3-6, 18:18-27; Ex. 1004 at 6:21-26 (explaining that a "directory name" with, for example "008k" or "0024k" "indicates a rate of 8 kbit/s or 24 kbit/s"), p. 7.

97. In view of all the foregoing I therefore do often refer to audio examples within Leaning, but the principles are the same and can be equally applied to video as Leaning expressly teaches, and as would be readily understood by a person of ordinary skill in the art in view of Leaning.

98. I note, also, that Dr. Jeffay himself seeks to apply audio-based reasoning to video, in particular, to argue that the "Clear Buffer" step would apply equally to video. Ex. 2141 ¶¶89-91. In particular, Dr. Jeffay states that "[a]lthough Leaning primarily addresses these benefits" (of clearing the buffer) "in the context of a sound card, a POSITA would have understood that those teachings applied

equally to hardware video cards at the time of Leaning." Ex. 2141 ¶89. Dr. Jeffay then states "Leaning does not make any special accommodation for video cards." Ex. 2141 ¶90. As I explain above, Dr. Jeffay is incorrect that the "Clear Buffer" step must apply at all.

99. Further, Dr. Jeffay cites to U.S. Patent No. 6,678,332 (Ex. 2139) to argue that video cards would need to be "cleared and reset" to decode a new bitstream. Ex. 2141 ¶89. But the '332 patent merely notes that "[o]ne attempt" to address discontinuity when switching between MPEG transport systems includes resetting the decoder. Ex. 2139 10:25-28. It then goes on to explain that doing so "will slow down the maximum rate at which the viewer can scan through the channels looking for an interesting program to watch" and proposes a different "preferred solution" that implements "seamless splicing" to permit decoding "in the conventional fashion without significant audio/visual discontinuities and without a significant delay." Ex. 2139 10:28-44. Further, as I explain above, a person of ordinary skill in the art would not understand that a video card would need to be cleared and reset to decode at a new bitrate. Rather, the video player is decoupled from the display hardware, permitting a video player to use a range of bitrates and framerates without changing the refresh rate of the display monitor (or even permitting multiple different video players to run at different bitrates and framerates on the same display monitor). Ex. 1049 at 1:10-2:53.

100. Regardless, Dr. Jeffay cannot have it both ways—arguing that Leaning does not apply to video for certain limitations and arguing that Leaning must apply to video for others. As I explain above, Leaning expressly states that it applies equally to audio and video and a person of ordinary skill in the art would understand Leaning to apply equally to audio and video.

B. Leaning's "Encode Then Segment" or "Segment Then Encode" Approaches Can Achieve Continuous Playback of Video

101. Dr. Jeffay represents that encoding video files then partitioning those files into sub-files results in "mistracking." Ex. 2141 ¶¶93-99.

102. In an attempt to show that, Dr. Jeffay downloads the "akiyo" video and then encodes it in H.261, which has frames that are both independent (I-frames) and dependent (P-frames). An online course package from the University of Texas at Austin has an overview of H.261 that explains this at a high level. Ex. 1052 at 4, 8. Dr. Jeffay then partitioned the file into four sub-files, then eventually decoding and playing each sub-file. Ex. 2141 ¶¶93-97. The result, Dr. Jeffay finds, is "mistracking." Ex. 2141 ¶98. This is unsurprising in view of the fact that Leaning itself specifically teaches that such mistracking can occur in the context of the H.261 standard. Ex. 1004 at 16:24-31.

103. As an initial matter, this further confirms that Leaning's disclosures apply equally to video—a point which Dr. Jeffay elsewhere disputes and that I

address further above. Ex. 1004 at 16:6-10 (explaining that "the system differs from the audio version only in that the file is a video file (e.g., in H.261 or MPEG format) and the player program incorporates a video decoder" but that "[t]he manner of partitioning the file into sub-files remains unchanged").

104. In this experiment, however, Dr. Jeffay ignores two things expressly taught in Leaning: (1) that the mistracking problem relates to video standards that do not regularly include intra-frames, not all video standards and (2) that Leaning discloses a solution for video standards prone to mistracking.

105. On the first point, Leaning discloses "recordings where each frame of a picture that is coded independently," in which case a file can be divided into sub-files with "a whole number of frames of a picture." Ex. 1004 at 16:18-20. There would be no mistracking as there are no dependent frames present in the file to potentially create that result.

106. Leaning also explains that "[i]n the case of inter-frame coding systems such as the ITU H.261 standard, which does not provide for the frequent, regular inclusion of intra-frames" the otherwise-suggested solution for video files "is not possible." Ex. 1004 at 16:24-31. For ***other*** video encoding standards that ***do*** provide for the regular inclusion of intra-frames, one can simply begin each sub-file with an intra-frame, as taught by Leaning. Ex. 1004 at 16:17-23 ("Some such systems (for example the MPEG standards) generate a mixture of

independently code frames ('intra-frames') and predictively coded frames; in this case each sub-file should preferably begin with an intra-frame.").

107. For example, in MPEG-1 and MPEG-2 encoded video, an independently coded frame exists in regular intervals as depicted below. Specifically, in MPEG standards, frames are divided into groups of pictures ("GOPs"), one frame of which is independently coded. The spacing between the independently-coded frames is a known constant (e.g., identified as "N"). Aramvith and Sun, MPEG-1 and MPEG-2 Video Standards (Ex. 1050) at 5.

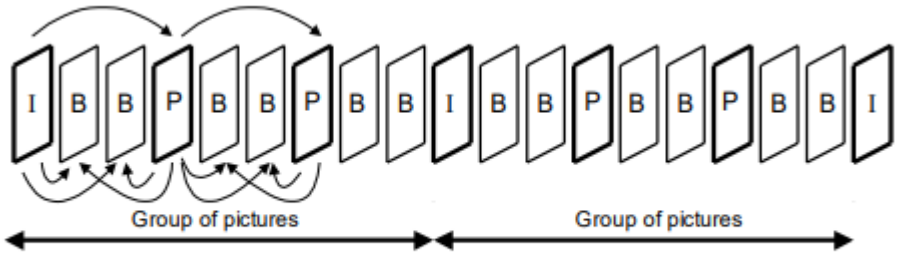


Figure 4: MPEG Group Of Pictures.

108. By 2004, it was well-known to a person of ordinary skill in the art that the regular interspersing of independently coded frames in an MPEG-encoded file in part to provide access points in compressed video data. Ex. 1050 at 5. In the case of H.261, as Leaning acknowledges, I-frames are not interspersed at regular intervals. Ex. 1004 at 16:24-31; Ex. 1050 at 3 ("In H.261, only the previous video frame is used as the reference frame for the motion compensated prediction …"), 8-9 (comparing MPEG-1 and H.261 and noting that only MPEG-1 are the frames

organized as a group of pictures). If a user does not account for that fact when encoding or segmenting the video file, mistracking can result. This is consistent with what Leaning describes and what I explained in my deposition: that mistracking occurs "when a terminal gets a predictively coded frame for which is does not have the preceding frame." Ex. 2141 ¶100 (quoting Ex. 2129, Dep. Tr. at 115:18-21).

109. Mistracking, however, does not need to occur. What Dr. Jeffay does not do in his experiment is implement Leaning's solution for encoding standards like H.261 that do not have independently-coded frames at regular intervals. Ex. 1004 at 16:32-17:10. As noted above, Leaning refers to another patent, U.S. Patent No. 6,002,440 (Ex. 2014) that "involves the encoding of an intermediate sequence of frames which bridges the gap between the last frame of the preceding sequence and the first frame of the new sequence" to solve the mistracking problem that arises in the context of such standards. Ex. 1004 at 16:32-17:10, 18:18-27.

110. Leaning then goes on to provide an example of how the implementation described in U.S. Patent No. 6,002,440 (Ex. 2014) will work in the context of the H.261 standard to accommodate switching between fast forward and normal play: creating a sequence of three or four frames to construct bridging sub-files. Ex. 1004 at 17:11-18:17.

111. Leaning then explains that "[e]xactly the same process could be used for rate-switching (albeit that now bridging sub-files are required in both directions)" or, as an "alternative … construct[ing] a four-second bridging sequence." Ex. 1004 at 18:18-27.

112. Leaning, therefore, not only provides solutions for implementing rate-shifts in the context of video, but works through the implications of various video encoding standards.

113. In fact, Leaning also discloses far more detail regarding ***how*** rate-shifts can be implemented for video than the challenged patents. The specification of the challenged patents provide no information regarding, and sets forth no adjustments to address, various video encoding standards and the presence or absence of any independent frames. Rather, the specification simply lists "DivX, Windows Media Video 9, Quicktime 6.5 Sorenson 3, [and] Quicktime 6.5/MPEG-4" as encoding schemes that may be used. Ex. 1001 at 6:42-45, 7:35-39. The specification does not mention, much less address any technical challenges relating to, for example, the H.261 standard, at all. And yet, Dr. Jeffay still asserts that the patents disclose encoding and then segmenting MPEG-4 encoded files. Jeffay 243:11-247:12 (discussing Ex. 1004 at 6:42-45, Fig. 2A-2C). If Dr. Jeffay is right, this indicates that the patent applicant, even more so than Leaning, seemingly recognized that a person of ordinary skill in the art would

understand that encoding and then segmenting was feasible using known techniques.

114. Dr. Jeffay does not leverage any of these solutions, and, accordingly, experiences the mistracking Leaning warns of when experimenting with the "akiyo" video. Instead, Dr. Jeffay seems to make every effort to make sure there ***will be*** mistracking rather than to avoid it, as a person of ordinary skill in the art would have done.

115. In fact, based on my review of Dr. Jeffay's materials in relation to encoding, segmenting, and decoding the "akiyo" video, Dr. Jeffay used a command to encode the file such that there is only an I-frame about every 99,999 frames—all but ensuring that there would be no I-frames in a given segment and that mistracking would occur.

116. I reproduced Dr. Jeffay's analysis and also performed my own analysis. For example, when I repeated Dr. Jeffay's command to encode the uncompressed akiyo video, I found the following line in the output: "[h261 @ 0xa0004b840] keyframe interval too large!, reducing it from 99999 to 600" (highlighted below) :

```
Input #0, yuv4mpegpipe, from 'akiyo_cif.y4m':
  Duration: 00:00:10.01, start: 0.000000, bitrate: 36460 kb/s
  Stream #0:0: Video: rawvideo (I420 / 0x30323449), yuv420p(progressive), 352x288, SAR 128:117 DAR 1408:1053, 29.97 fps, 29.97 tbr, 29.97 tbn
Stream mapping:
  Stream #0:0 -> #0:0 (rawvideo (native) -> h261 (native))
Press [q] to stop, [?] for help
[h261 @ 0xa0004b840] keyframe interval too large!, reducing it from 99999 to 600
Output #0, h261, to 'akiyo_cif-99999.h261':
  Metadata:
    encoder         : Lavf61.7.100
  Stream #0:0: Video: h261, yuv420p(tv, progressive), 352x288 [SAR 128:117 DAR 1408:1053], q=2-31, 128 kb/s, 29.97 fps, 29.97 tbn
      Metadata:
        encoder         : Lavc61.19.101 h261
      Side data:
        cpb: bitrate max/min/avg: 0/0/128000 buffer size: 0 vbv_delay: N/A
[out#0/h261 @ 0xa0004a080] video:193KiB audio:0KiB subtitle:0KiB other streams:0KiB global headers:0KiB muxing overhead: 0.000000%
frame=  300 fps=0.0 q=8.0 Lsize=     193KiB time=00:00:10.01 bitrate= 158.2kbits/s speed= 304x
```

In other words, Dr. Jeffay requested that the encoding of the original uncompressed "akiyo_cif.y4m" video ("akiyo" video) be encoded with one I-frame every 99,999 frames. Since the "akiyo" video only had 300 frames to start, Dr. Jeffay is requesting that an encoding produce a file with only a single I-frame, thereby ***guaranteeing*** in his analysis that any sub-files after the first sub-file that were generated ***would never begin*** with an I-frame. That is the opposite of what Leaning teaches. Furthermore, Dr. Jeffay's request of a keyframe interval was even too many for the ffmpeg encode, as it changed the parameter to a maximum it could handle to an interval of 600 frames. And, at 30 frames per second, 600 frames represents 20 seconds of video, which is also longer than the "akiyo" video.

117. When I used a keyframe interval parameter of 30 frames to perform the initial encoding, the resulting segmentation using Dr. Jeffay's identical segmentation command resulted in sub-files that each began with an I-frame and did not have the mistracking problems present in Dr. Jeffay's contrived example. I repeated my own analysis using keyframe intervals of 60 and 120 frames, and Dr.

Jeffay's segmentation command also resulted in no mistracking problems for the generated segments.

Specifically, I looked at the "Properly Decoded Frame" image from Dr. Jeffay's declaration ('772 case, Exhibit 2141, p. 61) compared to the first frame for segment 001 of "akiyo" when I encoded to H.261 with I-frame intervals of 30, 60, and 120 seconds:

"Properly Decoded Frame" from Jeffay's Declaration, Ex. 2141 at p. 61	**First frame of second segment (segment 001), encoding with I-frames every 30 frames**
First frame of second segment (segment 001) encoding with I-frames every 60 frames	**First frame of second segment (segment 001) encoding with I-frames every 120 frames**

118. I used the following commands to generate the H.261 files; the only difference between the command I used and Dr. Jeffay's command is that I changed the "-g" parameter for how often to create I-frames from "99999" to either

"30," "60," or "120," though I created a more detailed name for the output file (the highlights show the differences from Dr. Jeffay's command):

- [Jeffay] ffmpeg -i akiyo_cif.y4m -b:v 128k -g 99999 -c:v h261 akiyo_cif.h261
- [Houh 30] ffmpeg -i akiyo_cif.y4m -b:v 128k -g 30 -c:v h261 akiyo_cif-30.h261
- [Houh 60] ffmpeg -i akiyo_cif.y4m -b:v 128k -g 60 -c:v h261 akiyo_cif-60.h261
- [Houh 120] ffmpeg -i akiyo_cif.y4m -b:v 128k -g 120 -c:v h261 akiyo_cif-120.h261

119. I segmented the output files from these H.261 encoded video files using the identical command Dr. Jeffay used to create his segments (though I changed filenames accordingly):

- [Jeffay] ffmpeg -i akiyo_cif.h261 -c copy -f segment -segment_time 4 segment_cif_%03d.h261
- [Houh 30] ffmpeg -i akiyo_cif-30.h261 -c copy -f segment -segment_time 4 akiyo_segment_cif-30_%03d.h261
- [Houh 60] ffmpeg -i akiyo_cif-60.h261 -c copy -f segment -segment_time 4 akiyo_segment_cif-60_%03d.h261

- [Houh 120] ffmpeg -i akiyo_cif-120.h261 -c copy -f segment -segment_time 4 akiyo_segment_cif-120_%03d.h261

120. Following this approach, there were no "mistracking" issues for the segmented files when using appropriate parameters to encode the video as a person of ordinary skill in the art would understand to do so that the encoded video would be segmented such that each sub-file started with an I-frame. I have submitted the second subfiles (segment 001) of each of these videos as exhibits, although I transcoded the H.261 files into MPEG4 to comport with the PTAB's filing requirements. Exhibit 1061 is the video encoded with an I-frame every 30 frames, and I confirm that the MPEG4 displays in the same way as the H.261 version. Exhibit 1062 is the video encoded with an I-frame every 60 frames, and I confirm that the MPEG4 displays in the same way as the H.261 version. Exhibit 1063 is the video encoded with an I-frame every 120 frames, and I confirm that the MPEG4 displays in the same way as the H.261 version.

121. On a more conceptual level, I also disagree with Dr. Jeffay's assertions that segmenting inter-frame encoded video "will almost certainly result in sub-files comprising only P-frames" without the corresponding I-frames needed for decoding and that "different bit rates would require differing GOP structures and hence produce video segments with differing I-frame location in the corresponding segments." Ex. 2141 ¶¶99-102.

122. Rather, it would be well within the understanding of a person of ordinary skill in the art to have I-frames in the same place in time across bitrates. By 2004, the concept of an I-frame interval (also referred to as a keyframe interval) was well-known. A user can set a constant I-frame interval, which is the number of frames between I-frames. That would be true regardless of the bitrate. Lee and Kim, Iterative Key Frame Selection in the Rate-Constraint Environment, Signal Processing: Image Communication 19 (2003) 1-15 (Ex. 1057); Yuan *et al.*, A Novel Method of Keyframe Setting in Video Coding: Fast Adaptive Dynamic Keyframe Selecting, Proceedings of the 2003 International Conference on Computer Networks and Mobile Computing (Ex. 1058).

123. While encoding a full video at different bitrates may not always result in I-frames in the same frame location within each video, a person of ordinary skill in the art would know to leverage constant groups of pictures to ensure that I-frames are in the same location across bitrates. Or, as Leaning phrases it, keeping the sub-file boundaries the same across different bitrates. Ex. 1004 at 12:16-18.

124. As Leaning teaches (and as a person of ordinary skill in the art would understand), the encoded video would not be "segmented at arbitrary boundaries" or create "sub-files that begin with B- or P-frames" as Dr. Jeffay contends. Ex. 2141 ¶100. Rather, they could be segmented at regular time intervals in relation to a known the predictable I-frame location and "preferably begin with an

intra-frame," another term for I-frame. Ex. 1004 at 12:16-18 ("In the case of rate switching, it is, if not actually essential, highly desirable that the sub-file boundaries are the same for each rate, so that the first sub-file received for a new rate continues from the same point in the recording that the last sub-file at the old rate ended."), 12:18-20 ("every sub-file should represent the same fixed time period (e.g., the 4 seconds mentioned above)"), 13:23-15:3 (describing encoding audio creating sub-files containing whole numbers of frames and a specified time duration).

125. Leaning also separately contemplates segmenting a video file into sub-files ***and then*** encoding. Ex. 1004 at 13:26-14:13. And a person of ordinary skill in the art would have understood that segmenting before encoding would be effective to implement Leaning's teachings. Leaning's disclosure of sub-files beginning with I-frames is consistent with video being segmented first and then encoded or encoded first and then segmented. While I've explained previously that persons of ordinary skill in the art would have understood that generating multiple full videos at different bitrates may not ***always*** produce full videos where the I-frames are at the same location, as I explain above, a person of ordinary skill in the art would have known how to accomplish this: by keeping the GOPs constant across different bitrates.

126. For the reasons set forth in this section and others Leaning, therefore, does disclose continuous playback, including in the context of video. Dr. Jeffay's opinions do not affect my conclusions.

IX. Leaning Discloses The "Multiple TCP Connections" and "Plurality of Different TCP Connections" Limitations

127. As I explain in my original declarations, Leaning expressly discloses using HTTP 1.0, referring to "the Hypertext Transfer Procotol (see RFCs 1945/2068 for details)." Ex. 1004 at 2:9-11. Those of ordinary skill in the art would have known that RFC 1945 refers to HTTP 1.0. Hypertext Transfer Protocol – HTTP/1.0, Network Working Group (Ex. 1051) at 1 ("This specification reflects common usage of the protocol referred too [*sic*] as HTTP/1.0."). Contrary to Dr. Jeffay's assertion that a person of ordinary skill in the art would understand Leaning to disclose only HTTP 1.1 (and teach away from HTTP 1.0), Leaning in fact expressly references HTTP 1.0.

128. It is well-known (and was well-known at the time) that in HTTP 1.0, each new HTTP request establishes a new TCP connection, resulting in the claimed multiple or plurality of TCP connections. Dr. Jeffay does not dispute that. In fact, this is consistent with the portion of the specification Dr. Jeffay cites: "[w]hen a TCP connection fails completely, a new request may be sent on a different

connection for the same streamlet." Ex. 2141 ¶ 106 (citing Ex. 1001 at 9:59-63). That is how HTTP 1.0 would work.

129. Further, the introduction of HTTP 1.1 does not un-do the know-how of a person of ordinary skill in the art that the predecessor HTTP 1.0 leveraged multiple TCP connections. In addition, HTTP 1.1 discloses the use of multiple TCP connections between a single client and server even with persistent connections. It states "Clients … SHOULD limit the number of simultaneous connections" to not "more than 2." Ex. 1047 at 47.

130. Dr. Jeffay's three other arguments misunderstand Leaning. First, Dr. Jeffay states that Leaning's reference to a "web server" would "use TCP to deliver content" and result in "the exact pathologies" the patents "concern themselves with and overcome." Ex. 2141 ¶107. As an initial matter, the ***claims of the patents*** recite generic servers and using TCP to deliver content. Further, Leaning refers to using an ordinary web server in contrast to a "streamer"—a server dedicated entirely to streaming. Ex. 1004 at 2:27-32. Because Leaning operates on an ordinary web server (like the patents purport to) there is no need for the additional provisions required for leveraging a streamer, e.g., "masking of errors due to packet loss." Ex. 1004 at 2:27-32. In fact, because Leaning operates on an ordinary web server, leveraging HTTP over TCP, there are no packet loss errors because TCP provides an error-free connection at the transport level. Transmission

Control Protocol, DARPA Internet Program Protocol Specification (Ex. 1060) at 7-8[5] ("The TCP must recover from data that is damaged, lost, duplicated, or delivered out of order by the internet communication system …. Damage is handled by adding a checksum to each segment transmitted, checking it at the received and discarding damaged segments. … As long as the TCPs continue to function properly and the internet system does not become completely partitioned, no transmission errors will affect the correct delivery of data. TCP recovers from internet communication system error."). The statements made by Leaning regarding streamers (that Leaning does not leverage) does not affect the fact that Leaning discloses the claim limitations.

131. Second, Dr. Jeffay cites to Leaning's reference to an "error message" to argue that transmission errors in Leaning are unavoidable and that Leaning actually creates packet loss. Ex. 2141 ¶¶109-110. But nothing in Leaning teaches that Leaning seeks to create packet loss. And the "error message" in Leaning serves only the straightforward purpose of informing the system that the transmission of the complete audio or video file is complete and there are no additional sub-files remaining. Leaning is very clear, explaining:

> "Whilst playing the sounds as in (8) above, the player program continually monitors the state of the buffer fullness and whenever this falls below T_p it

[5] Page numbers refer to the exhibit pagination, not the original pagination.

> ***increments the file name again and obtains a further sub-file from the server. This process is repeated until a 'file not found error' is returned."***

And the flowchart on page 10 confirms, showing that the terminal will "Request this URL" corresponding to a sub-file and, on the server side, in response to that request, "[i]f the requested subfile exists, Send requested subfile; otherwise send error message." If, back on the terminal side an "error message [is] received, Stop." Ex. 1004 at p. 10. This is not some "unique use of standard 'error message[s]'" as Dr. Jeffay states, Ex. 2141 ¶109, but rather a straightforward, standard indicator from a server to a terminal to indicate that there are no additional sub-files to request and process.

132. This has nothing to do with whether Leaning discloses multiple TCP connections or addresses transmission errors as HTTP and TCP operate at different layers of data transmission. Leaning relates to the application layer, which is the topmost most directly end user-facing layer. The application layer leverages application layer protocols, like HTTP. Any "error" Leaning discloses generating would therefore relate to the application layer. In contrast, TCP operates at the separate transport layer, which sits deeper within the data transmission structure and governs, e.g., data transfer and delivery. The transport layer leverages transport-layer protocols like TCP. Ex. 1060 at 4-7.

133. Third, Dr. Jeffay takes a partial sentence from Leaning out of context to state that, in Leaning, "there is no expectation that a sub-file will be followed by a sub-file other than that which immediately follows it in the original sequence." Ex. 2141 ¶111. But the complete passage in Leaning does not say that. Rather, Leaning states that "***if*** there is no expectation that a sub-file will be followed by a sub-file other than that which immediately follows it in the original sequence, ***then*** it matters little where the boundaries between the sub-files are located" and "the only real decision is how big the sub-files should be." Ex. 1004 at 12:9-13 (parenthetical omitted). Leaning then goes on to separately explain different situations where there are "jumps … between different data rates." Ex. 1004 at 12:13-16. In those instances the "if" statement does not apply because "there are other considerations," "[w]here … the signal is coded in frames, a sub-file should contain a whole number of frames," and "[i]n the case of rate switching, it is … highly desirable that the sub-file boundaries are the same for each rate." Ex. 1004 at 12:13-16. This, again, has nothing to do with TCP connections and whether there are multiple such connections.

134. Finally, Dr. Jeffay's statement that Leaning relates to "telecom circuits" has no basis. Ex. 2141 ¶108. Leaning refers to implementations on telecommunications networks—a broad term that refers to any transmission of information over a distance using electronic means. Ex. 1004 at 2:5-7.

Telecommunications networks include everything from microwave to cellular transmissions, as well as television and the internet. Couper *et al.*, Boom and Bust in Telecommunications, Federal Reserve Bank of Richmond Economic Quarterly Volume 89/4 (Ex. 1054) at 3. Leaning itself discloses implementations in such a broad set of use cases. Ex. 1004 at 2:7-11 ("the network is the internet or other packet network … though in principle other digital links or networks can be used"), 4:4-7 (listing desktop computers, handheld computers, and mobile phones as possible terminals), 4:11-15 (referring to using a web browser, such as Netscape Navigator or Microsoft Explorer).

X. Leaning Discloses The "Initially Request Low Quality Streamlets" Limitations ('564 Patent, Claim 7; '156 Patent, Claim 10; '772 Patent, Claim 6)

135. Dr. Jeffay states that Leaning does not disclose the limitations reciting "initially request low quality streamlets" because (1) Leaning does not disclose instant playback and (2) one of the examples in Leaning begins with a 24 kbit/s bitrate file. Ex. 2141 ¶¶ 115-116. Regarding Dr. Jeffay's first argument, I describe Leaning's disclosures of instant playback above, including because Leaning expressly discloses that sub-files can be 130% of the playout time, such that, upon receipt and decoding, the buffer fullness is greater that T_p and playback begins. Ex. 1004 at p. 10, 12:26-34. This plainly achieves instant playback as recited in the

clams, including in claim 7 of the '564 patent, claim 10 of the '156 patent, and claim 6 of the '772 patent.

136. Dr. Jeffay's second argument is also incorrect. Dr. Jeffay contends that because Leaning provides an example where the system starts with a 24 kbit/s bitrate, which is in the middle of the range of exemplary bitrates (8 kbit/s, 16 kbit/s, 24 kbit/s, and 32 kbit/s), Leaning discloses beginning with a high quality rather than a low quality file. Ex. 2141 ¶116. As an initial matter, 24 kbit/s is not considered to be "high quality" in the context of audio, which is the type of file to which this example relates. Rather, a 2003 subjective listening test found that 32 kbit/s is "the lowest bitrate limit for obtaining a quality level that is better than 'bad.'" EBU Subjective Listening Tests on Low-Bitrate Audio Codecs (Ex. 1055). And, in reference to a "content file" that may comprise "audio" that "may be compressed," the shared specification refers to 100kb/s as "low quality." Ex. 1001 at 6:39-42 ("The content file 200 may comprise uncompressed video and audio, or alternatively, video or audio. Additionally, the content file 200 may be compressed."), 6:46-57 ("the low quality stream 204 may be encoded and compressed to a bit rate of 100 kilobits per second (kbps),"). Leaning, in the example Dr. Jeffay selects, starts at an even lower bitrate than the 100kb/s example the shared specification calls a "low quality stream." Ex. 1001 at 6:39-57.

137. Dr. Jeffay also argues that Leaning teaches requesting higher quality files with "extra delay." Ex. 2141 ¶116. But that portion of Leaning refers to the size of the sub-file with respect to length of time, not whether the bitrate is high or low quality. Ex. 1004 at 12:27-35.

138. Further, using claim 7 of the '564 patent as an example, the relevant claim limitations recite variations of the phrase "initially request low quality file to enable instant playback of the video, and to subsequently upshift to a better quality copy." The claim language does not require starting with the lowest possible quality copy, just low quality from which it is possible to upshift to higher quality. This is exactly what Leaning describes: "if the measured rate exceeds not only the current rate but also the next higher rate for a given period of time … increase the current rate." Ex. 1004 at 8:24-25, 9:3-5 ("[I]ncrease the data rate from 8 to 24 kbit/s …. As a result, the next request to the server becomes a request for a higher (or lower) rate[.]"), p. 10 ("If MRate > NextRate AND NextRate <> 0 goto Stepup … Set RateU = next higher rate in list or zero if none").

XI. Leaning Discloses The "Arranging" Files or Portions Limitations ('772 Patent, Claim 8)

139. In this declaration, I address only claim 8 of the '772 patent, not claims 1 and 12 of the '234 patent, which Dr. Jeffay also discusses. In relation to at least claim 8 of the '772 patent Leaning discloses "arranging the requested files

from the different copies in the order of ascending playback with the media player on the end user station."

140. Dr. Jeffay argues that Leaning does not disclose this limitation because the '772 patent describes processing and requesting multiple streamlets "simultaneously," requiring a staging module to then arrange them "in order of ascending playback time." Ex. 2141 ¶119. But this is not the limitation. Nothing in claim 8 of the '772 patent requires "simultaneously" requesting streamlets, or simultaneously doing anything for that matter. And nothing in claim 8 of the '772 patent requires using a staging module. All the claim recites is arranging the files in ascending order. Leaning teaches exactly that.

141. Leaning discloses that it "increments the filename" to obtain further sub-files. Ex. 1004 at 5:23-6:2. For example, starting with 000000.bin, incrementing to 000001.bin, incrementing to 000002.bin, and so on, until the complete audio or video file has been obtained. Ex. 1004 at 5:23-6:2, p. 7; Ex. 1004 at 3:10-18 (showing "file names which include a serial number indicative of their sequence in the original file"). And, Leaning also explains that when a sub-file is received and decoded, the player will "mak[e] a note of the play time of this sub-file," which would further allow arranging the sub-files in ascending order. Ex. 1004 at 5:15-17.

142. This approach also parallels the one described in the '772 patent where, when describing "arrang[ing] the streamlets 212 in the order of ascending playback time … the streamlets 212 are numbered 0, 1, 2, 3, 4" or "identified with a unique filename." Ex. 1001 at 8:42-45.

143. Dr. Jeffay also contends that Leaning does not disclose this limitation because Leaning is describing "requesting sub-files individually, one-at-a-time in a predefined sequence." Ex. 2141 ¶120. This is irrelevant to whether Leaning discloses the claim limitation which recites "arranging the requested files from the different copies in order of ascending playback" without any requirement that the files are not requested individually or that the files are not requested in a predefined sequence.

144. Dr. Jeffay also again cites to the same passage in Leaning I discuss above that states "***if*** there is no expectation that a sub-file will be followed by a sub-file other than that which immediately follows it in the original sequence, ***then*** it matters little where the boundaries between the subfile are located." Ex. 1004 at 12:9-11 (parenthetical omitted). As I explain above, this passage in no way indicates that, in Leaning, a sub-file is always followed by that which immediately follows it in the original sequence. To the contrary, if anything, this statement acknowledges that Leaning can apply to situations where a sub-file is followed by

a sub-file that immediately follows it in the original sequence, or when the sub-file is not followed by a sub-file that immediately follows it in the original sequence.

XII. Leaning Discloses "Determin[ing] That The Higher Quality Playback Can Be Sustained According To An Amount Of Contiguously Available Files" ('564 Patent, Claim 5)

145. Claim 5 of the'564 patent includes a limitation "that the media player determines that the higher quality playback can be sustained according to an amount of contiguously available files stored by the media player." When the specification refers to "contiguously available streamlets," it refers to those "stored in the staging module." IPR2024-00918, Ex. 1001 ('564 patent) at 3:16-19.

146. As explained in my original declaration in support of the petition in IPR2024-00918 regarding the '564 patent, Leaning discloses this limitation because Leaning only permits an upshift if "Buffer Fullness > T_p seconds." Ex. 1004 at 8:17-9:2, p. 10. Specifically, Leaning moves through the flowchart on page 10 as follows: "J1A: If Buffer Fullness > T_p seconds go to step J3," "J3: Begin/continue playing of buffer contents," then "If MRate > NextRate AND NextRate <>0 go to Stepup." Ex. 1004 at p. 10. And, Leaning will only upshift "if the measured rate exceeds not only the current rate but also the next higher rate for a given period of time." Ex. 1004 at 8:24-26; Ex. 1004 at p. 10 ("If MRate > NextRate AND NextRate <> 0 goto Stepup"). Dr. Jeffay omits the entire flowchart sequence in his analysis. Ex. 2141 ¶124 (referencing only "If MRate > NextRate

AND NextRate <> 0 goto Stepup" and ignoring "If Buffer Fullness > T_p seconds go to step J3"). At step J4, the system will check all of those conditions. Ex. 1004 at p. 10.

147. In his declaration, Dr. Jeffay seeks to confuse the order of this flow. Ex. 2141 ¶¶126-127. Very simply, Leaning first proceeds with Step J1A. If (and only if) the buffer fullness is greater than T_p, then Leaning proceeds to Step J3, which is playback. If the buffer fullness is less than T_p, Leaning proceeds to J2, which increments the current sub-file iteratively until the buffer fullness is greater than T_p. Then, Leaning will proceed to playback (J3). If the buffer fullness is zero, the measured rate (MRate) is less than the current rate, and the buffer low percent is greater than T_d, there is a step down. There would not be a scenario in which Leaning seeks to address the aspects of the flow chart for both "Buffer Fullness > T_p" and "Buffer Fullness = 0" at the same time, which is what Dr. Jeffay's argument would require. Ex. 2141 ¶127. The system would simply be checking buffer fullness to determine which portion of the flow to proceed with.

148. For downshifting, that will only occur after the buffer has played and the Buffer Fullness = 0 (and other conditions are also met). Ex. 1004 at p. 10.

149. A person of ordinary skill in the art would also understand that the flowchart on page 10 of Leaning is pseudo code that outlines some of the conditions for rate switching. A person of ordinary skill in the art would know

how to leverage these conditions in order to accomplish a step up or step down, including a step down when "Buffer Fullness = 0" and/or "Buffer Fullness < T_p."

150. I also note that the reference to "NextRate <> 0" refers to the fact that there is a next higher rate available to upshift to, not that the "next higher bit rate ('NextRate') is not zero" as Dr. Jeffay states in paragraph 124.

151. Dr. Jeffay also states that Leaning "denotes looking at bit rates from the preceding two minutes, not the number of files stored in its buffer." Ex. 2141 ¶124. This portion of Leaning, however, simply refers to looking at the measured rate over any period of time (such as 120 seconds, as just one example) to see if it exceeds the "next higher rate" for that time window. Ex. 1004 at 8:24-26. That is an additional aspect of Leaning.

152. Further, that Leaning looks at the measured rate over a period of time (e.g., 120 seconds) is not different from how the '564 patent describes the claimed performance factor. The performance factor is not something that is determined instantaneously. And neither the word "current" nor the calculations of the performance factor indicates that it would be. The claimed performance factor, like the measured rate in Leaning, is calculated based on "the time intervals Δ between successive receive times for each streamlet response" as well as "a window of n samples." IPR2024-00918, Ex. 1001 ('564 patent) at 12:10-40.

153. Dr. Jeffay also refers back to his argument that Leaning discloses needing to "Clear Buffer" whenever there is a rate shift. Ex. 2141 ¶¶125, 129. As I discuss above, that is not what Leaning teaches, including because Leaning itself specifies that such clearing step is not essential and because the buffer contents would play out rather than be discarded. A person of ordinary skill in the art would understand from Leaning that clearing the buffer includes playing out (not discarding) the sub-files. In particular, Leaning explains that the "first sub-file received for a new rate" "continues from the same point in the recording that the last sub-file at the old rate ended," indicating that there are not any sub-files in between that are being discarded. Ex. 1004 at 12:16-18. It would also be inefficient to discard those files as they have already been received and decoded. In addition, even if Dr. Jeffay were correct that Leaning always clears the buffer—and I strongly disagree with him here—the amount of files in the buffer would still be indicative of the system's performance and would nevertheless be a useful datapoint for determining when the system could and should upshift.

154. Additionally, as I explained in my original declaration, using counters to measure the number of files in a buffer or queue was well known in the art and would have been obvious to implement in lieu of looking at time-based measurements of what is contained in the buffer. And, at a minimum, it would have been obvious to a person of ordinary skill in the art to modify Leaning to

factor in the presence of stored files in determining whether a certain bitrate can be sustained. A skilled artisan would have had a reasonable expectation of success in achieving this because Leaning already teaches looking to the buffer contents in deciding whether to upshift or downshift. Ex. 1004 at 8:17-9:2, p. 10.

XIII. Leaning Discloses "Anticipate File Requests And To Pre-Request Files" ('564 Patent, Claim 6)

155. Claim 6 of the '564 patent includes a limitation that recites "anticipate file requests and to pre-request files to enable fast-forward, skip randomly, and rewind functionality."

156. In stating that Leaning discloses a different process, Dr. Jeffay points to the portion of Leaning that relates to file naming conventions. Ex. 2141 ¶132. Dr. Jeffay does not address the portions of Leaning that disclose anticipating file requests and pre-requesting files, including to enable fast-forward, skip randomly, and rewind functionalities. In particular, Leaning discloses filling a buffer up to T_p and "continually monitors the state of buffer fullness" to anticipate and pre-request additional files to build up to T_p. Ex. 1004 at 5:6-6:2. Dr. Jeffay also does not dispute that Leaning discloses using the processes therein to enable fast-forward, skip, and rewind. Further, when Leaning requests additional files for, for example, fast forward, Leaning does not "provid[e] a completely different set of sub-files encoded at different rates" as Dr. Jeffay contends. Ex. 2141 ¶132.

As the example Dr. Jeffay himself uses shows, the bitrate remains the same, that is, in this example, 96kbit/s. Ex. 2141 ¶132; Ex. 1004 at 16:32-17:24.

157. Dr. Jeffay also again points to the "Clear Buffer" portion of the flow chart on page 10 of Leaning. As already discussed above, Leaning makes clear that clearing the buffer is not required, including in relation to the jump process. Dr. Jeffay omits rest of the sentence in Leaning he quotes in paragraph 133, which confirms, expressly, that suspending decoding and clearing the buffer "is not actually essential." Ex. 1004 at 11:19-20. In addition, a person of ordinary skill in the art would have understood that clearing the buffer in order to accommodate a jump to a portion of the video that was already stored in the buffer would have made no sense.

158. Dr. Jeffay also refers to discussions of bitrate to argue that Leaning does not disclose this limitation. Ex. 2141 ¶135. First, as discussed above, Dr. Jeffay confuses the process set forth in the flowchart on page 10 of Leaning. Second, calculations of the measured rate are unrelated to whether Leaning discloses pre-requesting sub-files. And, third, the claim language does not require anticipating and pre-requesting the exact same files such that anticipating and pre-requesting a different bitrate does not disclose the limitation.

159. Dr. Jeffay also refers to the fact that Leaning discloses that a user can move a cursor to a desired point on a displayed bar to jump to a different portion

of the file. Ex. 2141 ¶136. Of course, any system cannot predict what a user will do when a user is given the ability to jump to any portion of a file. Unless Dr. Jeffay is arguing that this claim requires mind reading (which would pose other issues), this has no bearing on whether Leaning discloses anticipating and pre-requesting files. It would also require Leaning to solve a problem that the '564 patent itself does not disclose or describe its own solution for. Like several other claim limitations addressed above, to the extent the challenged patent does provide a solution, it, at best, assumes that a person of ordinary skill in the art would be able to accomplish the recited limitations based on their knowledge of the art.

160. Finally, I note that Dr. Jeffay does not dispute that, as a I explained in my original declarations, a person of ordinary skill in the art would have been motivated to configure Leaning to both anticipate file requests and pre-request files, including to enable fast-forward, skip randomly, and rewind functionality.

XIV. Leaning Discloses "Each of the Streamlets … is Independently Requestable and Playable" ('156 Patent, Claims 5 and 15)

161. Claims 5 and 15 of the '156 patent contain a limitation that recites "each of the streamlets of each of the different copies is independently requestable and playable." Dr. Jeffay does not dispute that Leaning discloses that each of the streamlets (sub-files) is independently requestable. Dr. Jeffay only argues that the sub-files in Leaning are not independently playable. Ex. 2141 §VII.H.

162. Dr. Jeffay's arguments in relation to these claims consist of two arguments that I have already addressed above: Dr. Jeffay's attempt to limit Leaning to audio (when it clearly discloses video) and Dr Jeffay's argument that the video segments will not contain I-frames (when Leaning clearly teaches approaches to ensure that each sub-file begins with an I-frame for decoding, including in the context of MPEG formats, as well as formats that consist of entirely I-frames). Beyond that, Dr. Jeffay largely provides a lengthier discussion of I-frames, P-frames, B-frames and the H.261 and MPEG formats. I address all of these concepts above.

163. The new argument Dr. Jeffay makes in relation to these claims is that it is the B-frames in MPEG that lead to mistracking and prevent sub-files from being independently playable. Ex. 2141 ¶164-165.

164. As an initial matter, Leaning also discloses using its teachings in the context of H.261 encoded video files, for which Dr. Jeffay's B-frame-based argument is not relevant. Ex. 2141 ¶¶164-165 (referring to MPEG only). In fact, H.261 does not support using B-frames. As a result, even if Dr. Jeffay is correct that the incorporation of B-frames somehow prevents portions of an MPEG encoded file from being independently playable, Leaning still discloses standards to which that argument does not apply. Davis, An Overview of Video

Compression Algorithms, EE Times (Ex. 1053) (providing a high level overview of video compression algorithms, including MPEG and H.261).

165. Further, as discussed above, Leaning discloses that each sub-file can be encoded separately. Ex. 1004 at 13:23-14:15. In that case, each sub-file will have all of the I-, P-, and B-frames necessary to de-code that file independently, rendering the sub-file independently playable.

166. And, a person of ordinary skill in the art would understand that B-frames could be disabled when encoding a video.

167. Dr. Jeffay asserts that Leaning's sub-files are not independently playable because Leaning relies on dependently-coded frames and that B-frames will result in mistracking. Ex 2141 at ¶¶161-166. I disagree with Dr. Jeffay.

168. First, Leaning teaches the use of video standards that use only independently-coded frames. Ex. 1004 at 16:18-20. While Dr. Jeffay asserts that the "only two formats" Leaning considers are H.261 and MPEG, that is incorrect as those are just examples. Ex. 2141 ¶147; Ex. 1004 at 16:17-31. A person of ordinary skill in the art would have understood that Leaning's teachings apply to a variety of formats. Further, as I explained above, a person of ordinary skill in the art would have understood that, for formats that use only independently coded frames (I-frames), every segment would necessarily begin with an I-frame. *Supra* §§VIII.A-B. Accordingly, they would be independently playable. I understand

that Dr. Jeffay does not dispute that. Second, and as discussed above, even for video standards that include both I-frames and dependently-coded frames (P-frames and/or B-frames), such as MPEG, a person of ordinary skill in the art would have understood how to make sure that sub-files were independently playable, including (as Leaning expressly teaches) by starting each sub-file with an I-frame. A person of ordinary skill in the art would have been motivated to do so to aid in decoding. IPR2024-00917, Ex. 1003; Ex. 1004 at 16:17-21.

169. I also note that the '156 patent itself discloses the use of MPEG-encoded content and that Dr. Jeffay argues that the '156 patent teaches segmenting after encoding. IPR2024-00917, Ex. 1001 ('156 patent) at 6:60-63 ("Examples of a compressed content file 200 include … MPEG-4 encoded content."), 7:55-57. But, the '156 patent does not address how to avoid the alleged mistracking issue Dr. Jeffay raises and provides no detail regarding how or why a particular streamlet is "independently requestable and playable" as recited in claim 5 of the '156 patent. Seemingly, the '156 patent assumes that doing so would be well-within the knowledge of a person of ordinary skill in the art. Leaning provides more guidance to a person of ordinary skill in the art than the challenged patents.

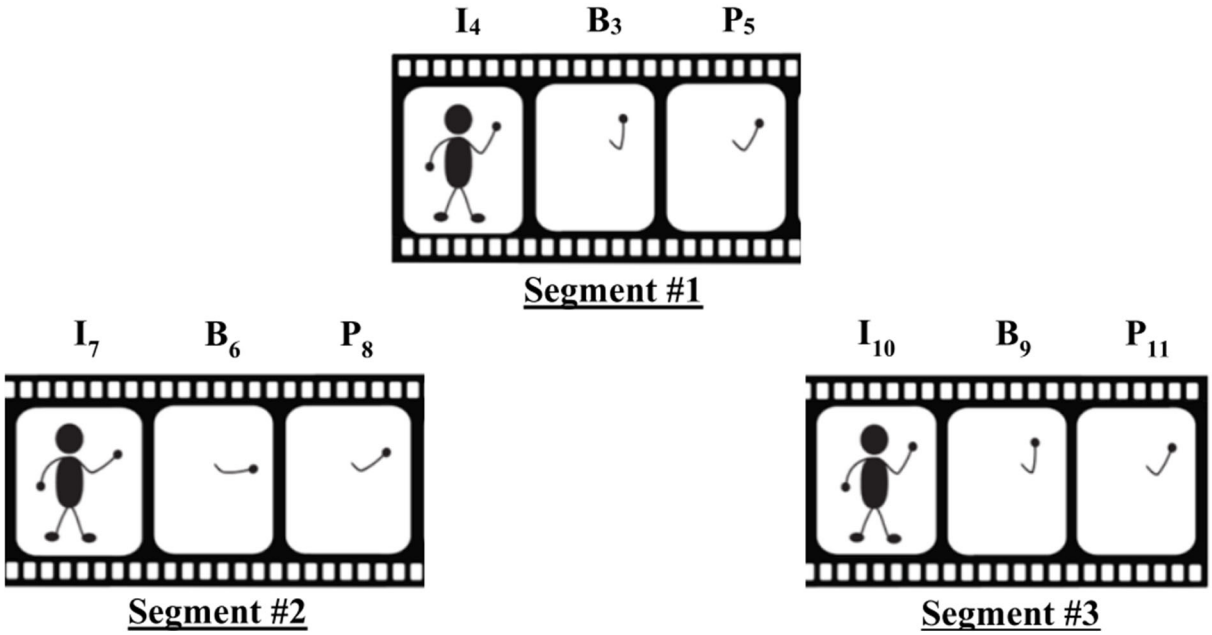
170. With respect to video encoding standards that have dependently-coded frames, a person of ordinary skill in the art would have understood that by beginning each segment with an I-frame and ending each

segment with a P-frame while containing an integer number of groups of pictures, each subfile would be independently playable without mistracking. By doing so, any B-frames would necessarily have the I-frame and P-frame on which they depend within the same segment. There would be no mistracking under these circumstances, even considering the transmission order discussed by Dr. Jeffay.

171. Dr. Jeffay's argument and illustrations purposefully ***create*** a mistracking issue by failing to start segments with an I-frame, even though a person of ordinary skill in the art following Leaning's teachings could and would have known how to avoid that mistracking (e.g., by inserting an I-frame at the start of each sub-file). It is interesting that Dr. Jeffay's argument and illustrations fail to start segments with an I-frame, ***even while he claims that he is.*** Ex. 2141 at ¶169.

172. For instance, in the image below, excerpted from Dr. Jeffay's declaration, Dr. Jeffay identifies segment #1 as including I_4, B_3, P_5. But that segment begins with a B-frame because the frame that appears first in the picture (that is, the order in which the frames are displayed) is B_3 and it is followed by I_4 and then P_5. It is the subscript that indicates the order in which the frames appear in the sub-file (the display order), and the B-frame has the lowest subscript number in Dr. Jeffay's example. The same is true for Dr. Jeffay's Segments #2-3: Segment #2 begins with a B frame because the frame that appears first in the picture is B_6 and is followed by I_7. Similarly, in Segment #3, the frame that appears first in the

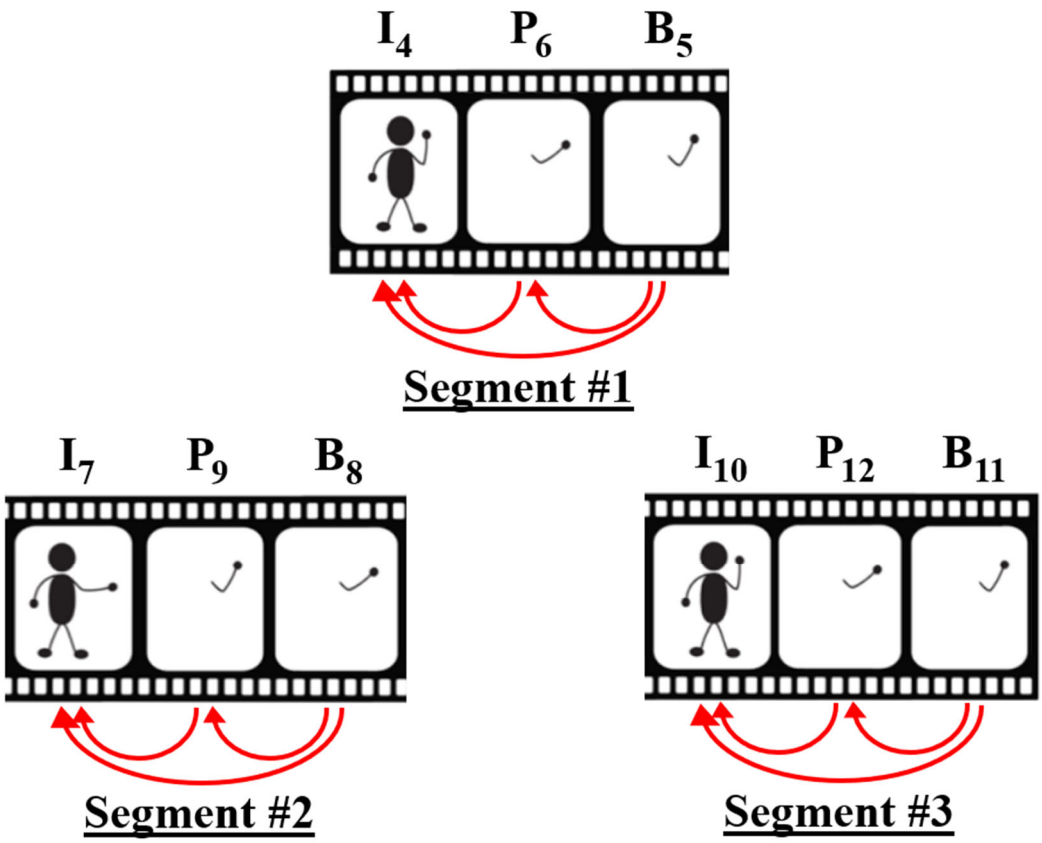
picture is B_9 and is followed by I_{10}. None of these three segments begins with an I-frame, which is what Leaning teaches.



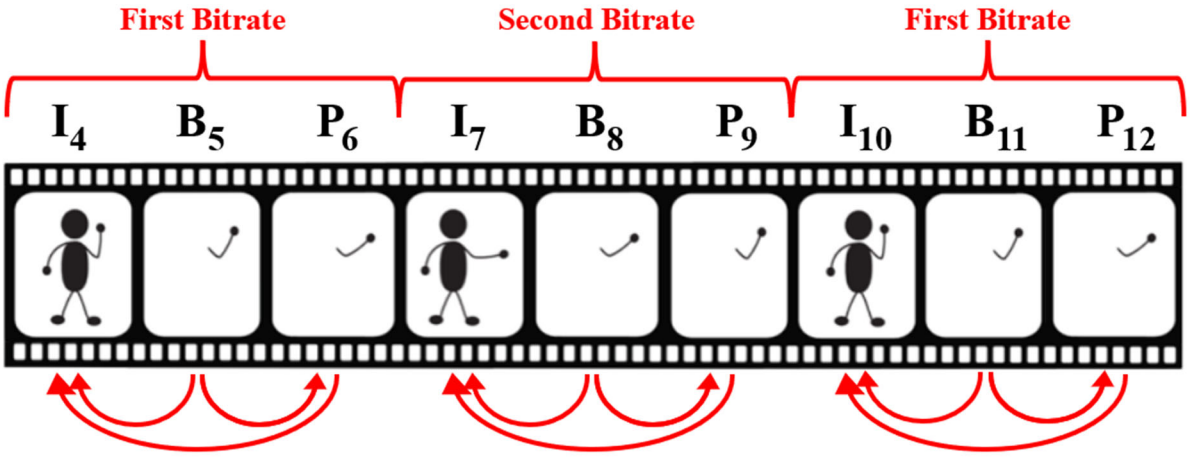
Ex. 2141 at ¶169.

173. A person of ordinary skill in the art would have known how to avoid mistracking for this same file and would have encoded the segments to ensure they were independently playable by following Leaning's teachings and applying his or her own skilled knowledge. For example, a person of ordinary skill in the art would know that Dr. Jeffay's segments could be modified as follows: setting the display order of the frames in Segment #1 as I_4, B_5, P_6, for instance, so the first frame in the segment is an I-frame. In this case, the transmission order of this segment would be I_4, P_6, B_5, and each segment would be independently playable, since B_5 depends on frames within the same segment, as shown below. This order would

be preferred by a person of an ordinary skill in the art when a video is expected to be segmented at (and start with) I-frames. I have included a few example segments below, showing the transmission order of the frames in these segments with red arrows showing the decoding dependencies.



174. Using these segments, each segment is independently playable and no frame depends on a frame from a prior segment. The decoded sequence (display order) appears below.



175. Dr. Jeffay asserts that the segments must be encoded with B-frames following I-frames and P-frames on which they depend. Ex. 2141 at ¶165. But, as I showed above, each segment would be encoded for transmission as, for example, I_4, P_6, B_5. Each segment would include each frame upon which the B-frame depends. And, any B-frames would not depend on any frame in a different segment representing a different bitrate. Instead, as I show above, each segment would include within it every frame upon which the B-frame depends.

176. In summary, Leaning teaches video: (1) with only independently-coded frames (I-frames) and (2) a mixture of I-frames and "predictively coded frames," *e.g.*, MPEG, where "each sub-file should preferably begin with an intra-frame." Ex. 1004 at 16:17-24. Neither of these types of video would create mistracking issues and the video segments would be independently playable because the sub-file beings with an independently coded frame.

177. Dr. Jeffay also states that "[t]his same problem infects the 'bridging sub-files' Leaning describes." Ex. 2141 n.15. It is unclear what Dr. Jeffay means by that. Regardless, as discussed above, Leaning discloses sub-files that are independently playable.

178. All of the foregoing would apply to each sub-file.

XV. Gamble Discloses "Requesting a Plurality of Sequential Files … Over Different Ones of the Plurality of Different TCP Connections" ('564 Patent, Claims 9 and 11; '772 Patent, Claims 2 and 9)

179. In my original declarations for IPR2024-00918 and IPR2024-00919, I explain that Leaning in combination with Gamble, U.S. Patent Application Publication No. 2004/0093420 (Ex. 1020), renders obvious claims 9 and 11 of the '564 patent and claims 2 and 9 of the '772 patent. In particular, I explained that Gamble discloses the limitations reciting "requesting a plurality of sequential ones of the files … over different ones of the plurality of TCP connections."

180. As discussed above, Leaning already discloses these limitations, including through teaching the use of HTTP 1.0 which uses multiple TCP connections. Gamble, in turn, discloses additional features and functionalities of TCP. In particular, Gamble describes using "multiple or parallel" network connections (including, in particular, TCP connections) to transfer data or files. Ex. 1020 [0025]-[0027], [0034], [0038]-[0039], [0042].

181. Dr. Jeffay does not dispute that Gamble discloses a plurality of TCP connections or that Gamble discloses that a plurality of files can be receiving over different ones of those connections. Instead, Dr. Jeffay disputes only whether Gamble discloses "requesting a plurality of sequential files" versus only transmitting a plurality of sequential files. Ex. 2141 ¶¶174-175. But, Gamble does not simply transmit files without a corresponding requests. Gamble expressly states that there is a "file management module 116 operating on server 108" that "can listen for TCP connection requests." Ex. 1020 [0038]. That server "can accept these connection requests and process all N per-connection data transfers independently and concurrently." Ex. 1020 [0039]. Where "N" refers to the number of parallel connections. Ex. 1020 [0039]. Further, Gamble discloses "file transfer techniques over parallel connections between applications such as network applications" wherein "a data file can be sent" from one client to another via a server, where each client can both send and receive data. Ex. 1020 [0042]. Accordingly, Gamble discloses "requesting" a plurality of files over multiple TCP connections.

182. At a minimum, a person of ordinary skill in the art would understand that a request would precede a transmission. TCP uses a request/response approach where a server (or computer system or client) calls to the internet module which then transmits the data to the desired destination. Ex. 1060 at 5-6, 10.

183. Further, as I explain in my original declarations, the basis for invalidity is Gamble in combination with Leaning. To the extent Gamble alone does not disclose requesting a plurality of files, Leaning when read alongside Gamble does to a person of ordinary skill in the art. Dr. Jeffay does not contend that Leaning does not disclose "requesting" a plurality of files or that Leaning does not disclose using HTTP and TCP connections—because it does. Gamble, in turn, provides information regarding how to configure a system to leverage multiple parallel TCP connections.

184. The fact that a "server 108" is involved in processing the requests and transmissions is not unique, not surprising, and not a reason a person of ordinary skill in the art would not combine Gamble and Leaning. Rather, in Gamble, "server 108" refers to any generic computing device. Ex. 1020 [0026] ("Server 108 is a computing device such as, for example, a personal computer, workstation, mini-mainframe, or mainframe computer."). A person of ordinary skill in the art would have understood how to implement Gamble's approaches relating to any generic computer device in the context of Leaning.

185. Finally, Dr. Jeffay states, when providing an overview of Gamble in his declaration that Gamble does not disclose video streaming. Ex. 2141 ¶52. But Gamble applies to a range of file types and expressly contemplates "multimedia files" (a category that includes video files) and files stored in "video memory." Ex.

1020 [0002], [0030]. And, Gamble discloses streaming the file segments. Ex. 1020 [0009], [0048]-[0051], Fig. 5. That Gamble uses the more generic term "file" when describing segmenting and streaming does not exclude video files.

186. Further, the disclosures in Gamble relate to large data files. Ex. 1020 at Cover, Abstract. A person of ordinary skill in the art would consider video to be a large data file.

XVI. Ala-Honkola Discloses "Request[ing] Streamlets" ('156 Patent, Claim 2)

187. In my original declaration for IPR2024-00917, I explain that Leaning in combination with Ala-Honkola, U.S. Patent Application Publication No. 2003/0055995 (Ex. 1017), renders obvious claims 1-18 of the '156 patent. Dr. Jeffay discusses only claim 2 of the '156 patent in his declaration. Claim 2 recites "wherein the apparatus is configured to establish multiple Transmission Control Protocol (TCP) connections with a content server, and request streamlets of varying bitrates." Dr. Jeffay opines that Ala-Honkola does not disclose the "request streamlet" limitation because Ala-Honkola (1) requests entire streams and (2) relates to consecutive streams. Ex. 2141 ¶177-180.

188. Dr. Jeffay improperly focuses on Ala-Honkola individually and ignores the combination of Leaning and Ala-Honkola that I relied upon in my declaration. For instance, Dr. Jeffay asserts that Ala-Honkola does not disclose

"requesting sequential streamlets." Ex. 2141 ¶179. But the combination relies on Leaning, not Ala-Honkola, for that disclosure and Dr. Jeffay does not dispute that a person of ordinary skill in the art would have combined the two references or that Leaning teaches requesting sequential streamlets. Likewise, while he concedes that Ala-Honkola "discloses using multiple TCP connections to transmit HTTP requests," Dr. Jeffay asserts that "Ala-Honkola fails to disclose transmitting individual, sequential streamlet responses over those multiple TCP connections as claimed." Ex. 2141 ¶179. Again, Dr. Jeffay improperly focuses on Ala-Honkola individually and ignores the combination with Leaning that I proposed. The combination of Leaning and Ala-Honkola teaches transmitting individual, sequential streamlet responses over those multiple TCP connections. Ala-Honkola is also separately clear that its disclosures relate to media streams "or a portion thereof." Ex. 1017 [0025]. In particular, disclosing that a given file can be a portion of a media stream. Ex. 1017 [0025]. Ala-Honkola even defines "Stream" as "A continuous transmission of data over for example HTTP transport." Ex. 1017 [0009]. This would include a portion or segment of a video file (e.g., a streamlet).

189. It would have, therefore, at least been obvious to a person of ordinary skill in the art to apply Ala-Honkola's teachings to a portion of a stream, streamlet,

or sub-file, particularly in light of Leaning's disclosures dividing media files into sub-files and likewise leveraging TCP connections.

XVII. Patent Owner's Evidence Of Secondary Considerations Fail To Show Non-Obviousness

190. Patent Owner's evidence of secondary considerations fail to demonstrate non-obviousness of the claims. First, Patent Owner and Dr. Jeffay do not show a nexus or a connection to any of the challenged claims of the '772, '564, or '156 patents. Second, even if such a nexus existed, Patent Owner's alleged secondary considerations do not overcome the strong showing of obviousness based on Leaning, Gamble, and/or Ala-Honkola.

191. As stated in § III, I understand that, for any secondary consideration to be relevant to the obviousness analysis, there must be a nexus between that consideration and the patented features. I also understand that a patent owner may establish a rebuttable presumption that there is a nexus if it demonstrates that a particular product is disclosed and claimed in the patent in question. I further understand that the presumption does not apply when the particular product has components or features beyond those of the patented invention.

A. Patent Owner And Dr. Jeffay Fail To Show Any Nexus

1. Patent Owner's And Dr. Jeffay's Reliance On The ITC's Decision Is Misplaced

192. I understand from Dr. Jeffay's Declaration that he and Patent Owner contend that MOVE's Media Player and Sling TV practice the challenged claims of the '772, '564, and '156 patents. Ex. 2141 ¶¶193, 210, 217, 280. Dr. Jeffay and Patent Owner primarily rely on a decision from the International Trade Commission ("ITC") to argue that MOVE's Media Player (Ex. 2141 ¶¶186-187, 191, 193 (all citing Ex. 1009 at 212, 213-217)) and Sling TV (Ex. 2141 ¶¶210, 217, 280 (all citing Ex. 1009 at 101-112)) practice the challenged claims.

193. I have reviewed the cited pages of the ITC's decision and disagree that it shows that either MOVE's Media Player or Sling TV practice the challenged claims of the '772, '564, and '156 patents. First, the '772 patent was not involved in the ITC proceeding. Ex. 1009 at 1 (identifying only U.S. Patent Nos. 9,407,564; 10,757,156; 10,469,554; and 10,469,555); May 8, 2025 Deposition Transcript of Dr. Jeffay 175:13-177:18. Thus, the ITC could not have determined whether either the MOVE Media Player or Sling TV practice the challenged claims of the '772 patent.

194. Second, the ITC's decision does not explain how the MOVE Media Player meets the limitations of any claims in the '564 or '156 patents, including the claims challenged here. Rather, the ITC's decision states that Patent Owner

argued that the Respondents in the ITC action "have conceded that the MOVE Media Player embodies the claimed invention because those parties argued that public use of the Move Media Player in 2005 was an invalidating use meeting every element of the asserted claims." Ex. 1009 at 212 (citing Ex. 1009 at 217 (§XIV.C.)). The ITC then concluded it "f[ou]nd that the Move Media Player embodies the claimed invention." Ex. 1009 at 212. I did not see any analysis in the ITC's decision of how the MOVE Media Player meets each limitation of the claims of either the '564 or '156 patents in the pages relied upon by Dr. Jeffay. Ex. 2141 ¶¶186-187, 191, 193 (all citing Ex. 1009 at 212, 213-217).

195. Third, the section of the ITC's decision relied on by Dr. Jeffay fails to analyze whether Sling TV embodies each limitation of the challenged claims of the '564 or '156 patent. Ex. 2141 ¶¶210, 217, 280 (all citing Ex. 1009 at 101-112)). As a threshold point, the ITC's decision states that there are three "Sling TV Apps" (Ex. 1009 at 76) and that it found that Patent Owner "ha[d] not established that the Sling Fire App is representative of the Sling TV Apps" (Ex. 1009 at 101). Neither Patent Owner nor Dr. Jeffay identify which Sling TV App they are relying on in these IPR proceedings, let alone recognize that such apps have sufficient differences to prevent the ITC from finding one particular app is representative of them all. *See*, *e.g.,* Ex. 2141 ¶210 (asserting only that "the objective evidence is tied directly to the novel claim elements that were practiced by Move and are

practiced by Sling TV"). Further, the ITC's decision does not address the '156 patent at all. May 8, 2025 Deposition Transcript of Dr. Jeffay 179:19-180:10; Ex. 1009 at 101-112. Rather, it only assesses whether the Sling Fire App meets a single claim (claim 1) of the '564 patent. Ex. 1009 at 101-112; May 8, 2025 Deposition Transcript of Dr. Jeffay at 181:15-182:10. Even then, the ITC's decision does not technically assess whether the Sling Fire App meets all the limitations of claim 1 of the '564 patent. For six of the eleven limitations of this claim identified by the ITC, it simply states that the ITC Respondents "do not contest that . . . the Sling Fire App satisf[ies] this limitation" before finding the limitation met. Ex. 1009 at 102-109 (specifically limitations 1pre, 1a, 1c, 1d, 1g, and 1h out of limitations 1pre–1j); May 8, 2025 Deposition Transcript of Dr. Jeffay 182:11-183:17, 184:6-191:18.

196. Thus, the ITC's decision does not show whether the MOVE Media Player or "Sling TV" or the Sling Fire App practice—let alone are co-extensive with—the challenged claims in the current IPRs.

2. Patent Owner and Dr. Jeffay Do Not Explain How Any Product Embodies All Challenged Claims

197. Patent Owner and Dr. Jeffay do not explain how either the MOVE Media Player or Sling TV practice each limitation of each challenged claim and do not provide claim charts for 52 of the 55 claims challenged in the current IPRs.

Patent Owner and Dr. Jeffay provide three "representative claim chart[s]," one for each challenged patent, that "exemplifies how Move practiced the limitations present in the challenged claims." Ex. 2141 ¶193 (citing Ex. 2071[6]). Each Exhibit 2071 includes only one challenged claim from one patent, for a total of 3 charted claims out of 55 challenged claims. IPR2024-00919, Ex. 2071 (charting only '772 patent claim 1, only as to the MOVE Media player, out of 21 challenged claims for the '772 patent (IPR2024-00919, Paper 3 (Petition) at 6)); IPR2024-00918, Ex. 2071 (charting only '564 patent claim 8, only as to the MOVE Media Player, out of 16 challenged claims (IPR2024-00918, Paper 3 (Petition) at 6)); IPR2024-00917, Ex. 2071 (charting only '156 patent claim 13, only as to the MOVE Media Player, out of 18 challenged claims (IPR2024-00917, Paper 3 (Petition) at 6)); May 8, 2025 Deposition Transcript of Dr. Jeffay 160:8-161:7 & 164:9-165:20 (admitting only charted '156 patent claim 13 as to the MOVE Media Player), 259:22-261:2 (admitting only charted '564 patent claim 8 as to the MOVE Media Player), 261:16-262:17 (admitting only charted '772 patent claim 1 as to the MOVE Media Player).

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[6] In his declaration that he submits for all three proceedings (IPR2024-00919, IPR2024-00918, and IPR2024-00917), Dr. Jeffay identifies Ex. 2071 as "'156 Patent Claim 13 Chart." Ex. 2141 ¶193. This appears to be a typo.

3. Marketing Materials Relied On By Dr. Jeffay In His Exemplary Charts Establish MOVE Media Player Had *Dis*continuous Playback

198. In the current IPRs, Patent Owner and Dr. Jeffay try to tie secondary considerations to the "continuous playback" feature they allege is included in the MOVE Media Player. IPR2024-00918, Paper 27 (Patent Owner Response) at 49-50. As explained in this section, Patent Owner's documents and admissions from multiple of Patent Owner's declarants establish that the MOVE Media Player does ***not*** have continuous playback. Rather, it has ***dis***continuous playback.

199. For each claim in each example chart, Dr. Jeffay cites MOVE Networks' marketing materials, specifically Ex. 2022, to support his assertion that the MOVE Media Player provided "continuous" playback. IPR2024-00919, Ex. 2071 at 17-18; IPR2024-00918, Ex. 2071 at 16-17; IPR2024-00917, Ex. 2071 at 9. But the cited marketing material establishes that the MOVE Media Player had "stalls" and "blips" in playback and collected detailed data regarding those stalls. Ex. 2022 at 29. As explained in Patent Owner's "Technical Overview of Move Networks Implementation," the MOVE Media Player tracked the number ("stallCount"), minimum duration ("mindur"), average duration ("avgdur"), and maximum duration ("maxdur") of stalls users experienced when viewing video, defining a "stall" as "basically when any kind of blip occurs during play." Ex. 2022 at 29. The MOVE Media Player also tracked the time it took for video

"content to resume playing after a stall," including the minimum delay ("mindelay"), average delay ("avgdelay"), and maximum delay ("maxdelay"). Ex. 2022 at 29. The MOVE Media Player also tracked whether a "user exited the browser during a stall" ("enddurstall"), initial delays in playback ("startdelay," defined as "duration (in ms) after player loaded that content started playing"), and the "number of times the player stopped playing" ("hiccups"). Ex. 2022 at 29-30. That the MOVE Media Player "collected and provided" this data "within [its] log files" indicates that discontinuities in playback were known to occur when using the player.

200. Indeed, Dr. Jeffay, named inventor Drew Major (Ex. 2020 ¶3), and one-time MOVE employees David Ericson (Ex. 2100 ¶12) and Mark Mitchell (Mitchell Tr. 38:14-17) all admitted that the MOVE Media Player had discontinuous playback. Jeffay Tr. 208:15-219:12; Major Tr. 127:6-128:8, Ericsson Tr. 211:18-213:21; Mitchell Tr. 54:7-55:14, 71:12-75:8. Dr. Jeffay testified that a "blip" as described in Ex. 2022 "could be something that causes the video to freeze." Jeffay Tr. 213:18-22. Mr. Major explained that his technology did ***not*** ensure that viewers will never experience buffering or stalling and that he had ***not*** eliminated either from his technology because "[t]here's nothing in networking today that is perfect." Major Tr. 127:6-128:8. Mr. Ericson testified that "stalls" in video streaming means the video "was playing and now it's frozen

or it's stalled." Ericson Tr. 211:18-212:2. Mr. Ericson further admitted that, at the time in 2006 (after the priority date of the challenged patents), the MOVE technology was ***not*** so improved that no one using it would experience freezing, explaining "[n]o technology is perfect." Ericson Tr. 113:8-18. Consistently, Mr. Mitchell testified that the MOVE Media Player could sometimes buffer or have delays or freezing in the video and that these interruptions could be discontinuities in playback, including time delays and discontinuities in content. Mitchell Tr. 71:12-75:8.

201. In short, Patent Owner's and Dr. Jeffay's cited marketing material for the MOVE Media Player and the testimony of multiple witnesses confirm that the MOVE Media Player did ***not*** have "continuous playback," such that it did not practice any challenged claim and was not coextensive with them.

4. MOVE's Media Player Has Critical Features Not In The Challenged Claims

202. I understand that where a product relied upon for secondary considerations includes a critical unclaimed feature that is claimed by a different patent, then the product is not coextensive with the challenged claims.

203. Here, the Patent Owner's own evidence ties the alleged secondary considerations, including praise and commercial success, to unclaimed features, including Digital Rights Management ("DRM"), geo-targeting, and in-depth

reporting. Patent Owner quotes its own evidence to argue that "***The key***" to MOVE's success "***is in [MOVE's] plug-in***." IPR2024-00919, Paper 27 (Patent Owner Response) at 50 (quoting Ex. 2048). But it omits that exhibit's explanation for ***why*** the plug-in is key: it "manages delivery, assembles and renders the stream, and ***offers DRM [Digital Rights Management], geo-targeting, and extremely in-depth reporting***." Ex. 2048 at 1 (also recognizing "Everything viewed in a Move Networks player is tracked"). The Technical Overview of Move Networks Implementation similarly recognizes that "***[c]ore to the Move Networks Video Platform*** is the ability to insert advertisements dynamically as pre- and post-roll commercials as well as replacement commercials in linear programming." Ex. 2022 at 27; Jeffay Tr. 202:17-204:14 (ability to insert advertisements an "essential feature"). Yet this ability to insert advertisements is not claimed in any of the challenged claims. This same Technical Overview also recognizes the importance of "Digital Rights Management (DRM) and Related Business Rules (i.e., GEO Filtering)" (Ex. 2022 at 27) and in-depth reporting (Ex. 2022 at 27 (explaining "how the reporting log files from Move Media Player are processed and utilized to improve the viewing experience"), 29-30 (listing thirty "data types collected and provided within the log files and a brief description of each element, **which are available in customized report forms**") (emphasis in original). Indeed, it is this "extremely in-depth reporting" that is better "than tracking provided by most

CDNs and content management systems which make [MOVE's technology] ***extremely valuable to networks and advertisers***." Ex. 2048 at 1. As MOVE's VP of marketing, Jim Ericson, told a blogger, quality video "makes those viewers more valuable to advertisers" because "[f]or anybody watching the content at any time theoretically everyone could be getting a different ad." Ex. 2048 at 1; Ex. 2031 at 1 (reporting "Benefits to the content owner: cheaper, ***detailed reporting***, high-quality video" and reporting MOVE "supports subscription, purchase, and advertising models"); Ex. 2036 at 2 (blog post from AlwaysOn stating "Move's technology also ***lets advertisers target users*** and ***offers excellent analytics and reporting***"); Ex. 2039 at 1 (article from PR Newswire (posted on CNNMoney.com) quotes Move Network's CEO in 2007, John Edwards, touting how "Move Media Services build audiences and ***bind consumers to broadcasters and advertisers like never before***."); Ex. 2113 at 2-3 (Microsoft press release discussing "how Silverlight enables ***next-generation in-stream advertising*** to better monetize the assets of content owners" and its "strategic alliance with Move Networks" to preview "Silverlight-based ***unique branding and navigation elements within, around and on top*** of Move Networks' video technology").

204. The fact that Patent Owner's evidence ties the alleged secondary considerations, including praise and commercial success, to unclaimed features of the MOVE Media Player defeats its claims of nexus to the challenged claims.

5. As In The Ogdon IPRs, Patent Owner's And Dr. Jeffay's Nexus Claims Are The Result Of Adaptive Bitrate Streaming Technology Disclosed In The Prior Art

205. As explained above in §III, I understand that secondary considerations are not relevant where a patent owner fails to show that the consideration was the result of novel features in the claims, as opposed to features found in the prior art. Here, as discussed further below, Patent Owner and Dr. Jeffay explain that the alleged secondary considerations are the result of using Adaptive Bitrate ("ABR") Streaming technology. As explained in my original declaration (Ex. 1003 ¶¶51, 56, 61, 77-78, 81-82, 86-89, 93, 101, 103, 106) and above in §§VII-XVI, ABR technology was disclosed in the prior art, specifically in Leaning. Thus, Patent Owner's and Dr. Jeffay's alleged secondary considerations are not relevant.

206. In both the Ogdon IPRs[7] and the current IPRs involving the '772, '564, and '156 patents, Dr. Jeffay and Patent Owner rely on largely the same evidence of alleged secondary considerations and tie them to general ABR

[7] The "Ogdon IPRs" are, collectively, earlier IPRs that involve Patent Owner's U.S. Patent Nos. 11,677,798; 11,470,138; 10,469,554; 10,951,680; and 10,469,555, and are Nos. IPR2024-00043, IPR2024-00044, IPR2024-00045, IPR2024-00046, and IPR2024-00146, respectively.

streaming technology. This is readily apparent from comparing paragraphs in Dr. Jeffay's Declaration from the Ogdon IPRs and current proceedings, an example of which is below (differences underlined, breaks added to align text):

Dr. Jeffay's Declaration, Ogdon IPRs, Ex. 2006 ¶¶165-166 (partial)	**Dr. Jeffay's Declaration, Current IPRs, Ex. 2141 ¶¶193-194 (partial)**
Move's contemporaneous documents prove the Move product practiced the patented claims. *See* EX2012 (Move Networks Tech Overview); EX2011 (Streaming Media Technology); EX1009 at 212. In addition, my analysis of the Move products shown in the representative claim chart exemplifies how Move practiced the limitations present in the challenged claims. EX2062. Specifically, Move's system included an end user station/apparatus for	Move's contemporaneous documents prove MOVE's Media-Player practiced the patented claims. *See* EX2022 (Move Networks Tech Overview); EX2021 (Streaming Media Technology); EX1009 (ITC Initial Determination) at 212. In addition, my analysis of MOVE's Media-Player shown in the representative claim chart exemplifies how Move practiced the limitations present in the challenged claims. EX2071 ('156 Patent Claim 13 Chart). Specifically, Move's system included an end user station/apparatus for

Dr. Jeffay's Declaration, Ogdon IPRs, Ex. 2006 ¶¶165-166 (partial)	**Dr. Jeffay's Declaration, Current IPRs, Ex. 2141 ¶¶193-194 (partial)**
adaptive rate streaming of live and on-demand digital content from a video server over a network. *See, e.g.,* EX2022; EX2021; EX2071 at 1. For example, "Move Networks provides and operates the premier video distribution platform" that "delivers pre-recorded (VOD) video content or live broadcasts over the Internet." EX2022 at 4; EX2071 at 1-2; EX2077 (CX-1127, Move Adaptive Stream) at 1; EX2069 (CX-1247C, Move Networks Publishing System) at 6. A high-level diagram of the Move platform is shown below.	adaptive rate streaming of live and on-demand digital content from a video server over a network. *See, e.g.,* EX2012; EX2011; EX2062 at 1. For example, "Move Networks provides and operates the premier video distribution platform" that "delivers pre-recorded (VOD) video content or live broadcasts over the Internet." EX2012 at 4; EX2062 at 1-2. A high-level diagram of the Move platform is shown below.

207. Yet, now Dr. Jeffay and Patent Owner assert that the same, general ABR streaming technology has a different "fundamental difference" from the prior art. Again, this is easiest seen by comparing paragraphs in Dr. Jeffay's Declaration

from the Ogdon IPRs and current proceedings, an example of which is below (differences underlined, "fundamental" difference highlighted, breaks added to align text):

Dr. Jeffay's Declaration **Ogdon IPRs, Ex. 2006 ¶178**	**Dr. Jeffay's Declaration** **Current IPRs, Ex. 2141 ¶206**
For example, the Move Networks Simulcoding process described above, which is responsible for preparing the different bitrate/quality streams and streamlets, "produce[s] several benefits for the video customer, including the following: 1. Quality of service benefits for continuous playback—no noticeable buffering; 2. Quality of service optimization, based on hardware profiles and the speed and quality of the connection to the Internet; 3. The ability to modify the video timeline, such as replacing a	For example, the Move Networks Simulcoding process described above, which is responsible for preparing the different bitrate/quality streams and streamlets, "produce[s] several benefits for the video customer, including the following: 1. Quality of service benefits for continuous playback—no noticeable buffering; 2. Quality of service optimization, based on hardware profiles and the speed and quality of the connection to the Internet; 3. The ability to modify the video timeline, such as replacing a

Dr. Jeffay's Declaration **Ogdon IPRs, Ex. 2006 ¶178**	**Dr. Jeffay's Declaration** **Current IPRs, Ex. 2141 ¶206**
program, inserting a commercial, or switching between live and prerecorded programming; and 4. Encoding process enables scalable delivery infrastructure." EX2012 at 11. And, "the small video streamlets" are what "allow for the rich functionality available in delivery and viewing of the video. These streamlets enable the Move Networks system to operate efficiently and effectively." EX2012 at 11. In an elegant solution, by aligning the streamlets, it allowed for seamless retrieval of content while changing bitrates during a session so that the video could continue even though the network	program, inserting a commercial, or switching between live and prerecorded programming; and 4. Encoding process enables scalable delivery infrastructure." EX2022 at 11. And "the small video streamlets" are what "allow for the rich functionality available in delivery and viewing of the video. These streamlets enable the Move Networks system to operate efficiently and effectively." Id. In an elegant solution, by aligning the streamlets, Move's solution allowed for seamless retrieval of content while changing bitrates during a session so that the video could continue even though the network

Dr. Jeffay's Declaration **Ogdon IPRs, Ex. 2006 ¶178**	**Dr. Jeffay's Declaration** **Current IPRs, Ex. 2141 ¶206**
bandwidth was inconsistent and not stable. And, even though the playout of the video may decrease in quality (in ways that may or may not be discernable to the viewer), the delivery and hence the playout was continuous, and viewers accepted this tradeoff. This aspect of the inventions is fundamentally different from the prior art in which the server decided which files to send	bandwidth was inconsistent and not stable. And even though the playout of the video may decrease in quality (in ways that may or may not be discernable to the viewer), the delivery and hence the playout was continuous, and viewers accepted this tradeoff. *See infra* §IX.C; *see also* EX2036, 2 ("more than 50 minutes"); EX2035, 1 ("more than 50 minutes"); *see also* EX2034 ("22 minutes a session, compared with 3 or 4 minutes" previously); EX2048 ("It also means people watch longer."). This aspect of the inventions is fundamentally different from the prior art in which viewers suffered from discontinuous

Dr. Jeffay's Declaration **Ogdon IPRs, Ex. 2006 ¶178**	**Dr. Jeffay's Declaration** **Current IPRs, Ex. 2141 ¶206**
to the client and/or when to send files to the client. Thus, the inventions of the ABR Patents do not suffer from the same server-based limitations to functionality and performance of prior systems.	playback, constant buffering, packet losses, and latency. *Cf.* EX2077. Thus, the inventions of the ABR Patents do not suffer from the same limitations to functionality and performance of prior systems plagued by common streaming solutions at that time.

208. As the Patent Trial and Appeal Board recognized in its Final Written Decisions in the Ogdon IPRs, Patent Owner's alleged "unique characteristics" of the MOVE Media-Player of "actively adjusting . . . video quality to the bandwidth available" and "delivering 'pieces of content progressively' were taught by the prior art, namely, Ogdon and Leaning." IPR2024-00043, Paper 59 (Final Written Decision) at 48 (alteration in original). Patent Owner relies on the same "unique characteristics" in the current IPRs, but it now asserts these characteristics are responsible for providing "continuous playback," among other features. For example, Patent Owner argues in the current IPRs that "MOVE revolutionized how

content is delivered and experienced over the Internet by successfully developing the Emmy-winning ***adaptive-bitrate ('ABR') technology*** of the Challenged Patents" and that this "***concept would support*** fast startup of playback, intelligent shift on-the-fly between different video qualities in response to changing network conditions, and a ***continuous playback of content that would not freeze or buffer***." IPR2024-00918, Paper 27 (Patent Owner Response) at 46. But in the Ogdon IPRs, Patent Owner argued the same thing, tying the same result of less buffering to the (known) ABR technology: MOVE "revolutionized how content is delivered and experienced over the Internet by successfully developing the Emmy-winning adaptive-bitrate ('ABR') technology of the challenged claims" and "***[u]sing the patented ABR technology*** embodied in these claims, a user ***achieves less buffering***, faster starts to video, and a dramatically improved viewing experience with both high-bandwidth and low-bandwidth connections." IPR2024-00043, Paper 21 (Patent Owner Response) at 52-53. Indeed, even now Patent Owner argues that "[t]he industry considered MOVE's Media-Player as superior ***because it could 'stream videos at an adaptive rate***'" to support its nexus claim. IPR2024-00918, Paper 27 (Patent Owner Response) at 52 (quoting Dr. Jeffay's Declaration, Ex. 2141 ¶¶213-217).

209. Similarly, Dr. Jeffay ties the alleged secondary considerations to the same "unique features" that he and Patent Owner relied on in the Ogdon IPRs. For

example, Dr. Jeffay ties alleged "surprising results/superior performance" to "the ability to load quickly (fast start) and breaking the video up into streamlets" and alleged commercial success evidence to "how Move's technology automatically upshifts/downshifts to enable the best streaming experience possible." Ex. 2141 ¶213. As another example, Dr. Jeffay ties alleged praise to MOVE's product's ability to "stream videos at an adaptive rate" and alleged commercial success to "Move Networks' successful implementations of adaptive bitrate streaming for" various entities, to how "Move Networks' plug-in 'could shift between different bitrate streams without pausing or freezing' and produced 'noticeable changes' in the quality of the video in response to the throttle of bandwidth'", and to "multiple investments in Move Networks, ***based on its innovative ABR technology***." Ex. 2141 ¶214. Dr. Jeffay ties alleged copying of MOVE's Media Player to MOVE's "***adaptive bitrate streaming, a technique of detecting a watcher's bandwidth and CPU capabilities in real time*** and then adjusting the quality of a video stream[t]hat requires encoding a single video at multiple bitrates and switching to the most appropriate one on a moment-by-moment basis[with ***t]he result: very little buffering***, fast start time and a good experience for both high-end and low-end connections.'" Ex. 2141 ¶215 (quoting Ex. 2046) (first alteration in original). And, Dr. Jeffay ties alleged "industry praise and peer recognition" to the "claimed

features" of "seamlessly adjusting the video quality to the bandwidth available (e.g., ensuring continuous playback)." Ex. 2141 ¶216.

210. Patent Owner's and Dr. Jeffay's tying of their alleged secondary considerations to general ABR technology is consistent with Patent Owner's own exhibits, which explain that ABR technology results in "continuous playback." Ex. 2022 at 11 (MOVE internal "Technical Overview" manual defining "simulcoding" as the "process of ***breaking the video into smaller streamlets*** for Web transmission and ***encoding multiple bit rates*** for various viewing profiles simultaneously" and stating a benefit of the "Simulcoding Process" is "***continuous playback—no noticeable buffering***"), 23 ("Move Media Player, the Move Networks client software, … decodes and renders the video streamlets to provide a ***continuous, optimal stream*** of video," and noting the "***ability to 'upshift' and 'downshift' to multiple viewing profile bit rates*** on a live ***stream is called Adaptive Streaming***" and "***Move Adaptive Streaming*** starts instantly and ***doesn't buffer-stall***"); Ex. 2077 at 1 ("MOVE ***Adaptive Stream leverages a process called Simulcoding*** that breaks large video files into many small files called streamlets" which "***provides a continuous*** high-quality stream"); Ex. 2036 at 2 ("Move delivers its video as a standard web object that's cached in small bits . . . Move also doesn't use special media serves, and ***adjusts the video quality based on available bandwidth. This means no buffering, no stalling***."); Ex. 2039 at 1 ("Level 3's Move-enabled

streams ***will dynamically adapt*** to changing network and end-user computer conditions. If bandwidth availability is constrained for any reason, or if computing power is limited, the Level 3 stream ***will reduce its bit rate automatically, without buffering***"); Ex. 2046 at 1 (describing "***Adaptive bitrate streaming***, brought to the fore by Move" that "requires encoding a single video at multiple bitrates and switching to the most appropriate one on a moment-by-moment basis" with "[t]he ***result: very little buffering***, fast start time and a good experience for both high-end and low-end connections").

211. That Patent Owner and Dr. Jeffay's nexus arguments are the same as in the Ogdon IPRs is underscored by the fact that some of their proffered evidence does not mention "continuous playback." Ex. 2034 (cited at IPR2024-00918, Paper 27 (Patent Owner Response) at 53 and Ex. 2141 ¶¶ 206, 213, 224, 241, 242, 243, 247, 248). Rather, this exhibit (a blog post) discusses ABR streaming generally and the benefits of using standard servers. It explains that MOVE's technology "***breaks up the video into bits and efficiently reorganizes them*** over the network ***so there's no need for the special computer servers*** and dedicated transmission lines required on streams using Flash." Ex. 2034 at 1. The post does not mention buffering, stalling, or continuous playback. *See also, e.g.,* Ex. 2033 at 1.

B. Patent Owner's Alleged Secondary Considerations Do Not Outweigh The Strong Case Of Obviousness Based On Leaning, Gamble, and Ala-Honkola

1. There Was No Unmet Need Or Failure Of Others

212. I disagree with Dr. Jeffay's claim that the "claimed invention solved a long-felt need for streaming live and on-demand content over the Internet." Ex. 2141 ¶218; Ex. 2141 ¶¶218-229. Dr. Jeffay's analysis relies on general ABR technology, which was disclosed in the prior art and thus renders this secondary consideration irrelevant as explained above in §XVII.A.5.

213. For example, Dr. Jeffay argues that "[p]rior to the introduction of adaptive bitrate streaming technology" there were problems with streaming at high bitrates, "including but not limited to high latency, packet loss, and congestion, which were manifested to the viewer as buffering, delays, stalling, and unresponsiveness." Ex. 2141 ¶219. Dr. Jeffay's argument (and testimony) is the ***same*** one he made in the Ogdon IPRs—using identical quotes from exhibits as can be seen in the chart below (differences <u>underlined</u>, breaks added to align text):

Dr. Jeffay's Declaration, Ogdon IPRs, Ex. 2006 ¶190	Dr. Jeffay's Declaration, Current IPRs, Ex. 2141 ¶219 (partial)
Prior to the introduction of adaptive bitrate streaming technology, "the quality, fluidity and reliability of most	Prior to the introduction of adaptive bitrate streaming technology, "the quality, fluidity and reliability of most

Dr. Jeffay's Declaration, Ogdon IPRs, Ex. 2006 ¶190	**Dr. Jeffay's Declaration, Current IPRs, Ex. 2141 ¶219 (partial)**
broadband streaming [] rarely ever matched that of typical cable, DBS or terrestrial television." EX2040. There were "well-known problems associated with streaming at high bit rates over TCP networks," including but not limited to high latency, packet loss, and congestion, which were manifested to the viewer as buffering, delays, stalling, and unresponsiveness. EX2029; EX2066; EX2059. Additionally, non-streaming video content had delays as content was downloaded, unlike streaming video which enables users to click and start watching immediately without the delay. *See, e.g.,* EX2011 at 2-3. Typical	broadband streaming [] rarely ever matched that of typical cable, DBS or terrestrial television." EX2040 ("The Sport Page ESPN 360"). There were "well-known problems associated with streaming at high bit rates over TCP networks," including but not limited to high latency, packet loss, and congestion, which were manifested to the viewer as buffering, delays, stalling, and unresponsiveness. EX2029; EX2066; EX2059. Additionally, non-streaming video content had delays as content was downloaded, unlike streaming video which enables users to click and start watching immediately without the delay. *See, e.g.,* EX2021 at 2-3. Typical

Dr. Jeffay's Declaration, Ogdon IPRs, Ex. 2006 ¶190	**Dr. Jeffay's Declaration, Current IPRs, Ex. 2141 ¶219 (partial)**
broadband streaming experiences were "hesitant" and had "freeze-up tendencies." EX2040. Dial-up users using contemporary technology would not "typically attempt video streaming, and broadband users often give up after prolonged waits or unresponsiveness due to regular rebuffering." EX2067.	broadband streaming experiences were "hesitant" and had "freeze-up tendencies," <u>meaning they were unable to provide continuous playback</u>. EX2040. Dial-up users using contemporary technology would not "typically attempt video streaming, and broadband users often give up after prolonged waits or unresponsiveness due to regular rebuffering." EX2067.

214. As seen in the comparison above, the only substantive difference from Dr. Jeffay's testimony from the Ogdon IPRs and his current testimony is an addition that his prior testimony about "hesitant" streaming experiences that had "freeze-up tendencies" "mean[t] they were unable to provide continuous playback." Despite recasting the alleged problem with the prior art as one of lacking "continuous playback," Dr. Jeffay testifies—both in the Ogdon IPRs and again here—that it was MOVE Networks' "patented ABR technology" that allegedly solved this problem (differences <u>underlined</u>, breaks added to align text):

Dr. Jeffay's Declaration, Ogdon IPRs, Ex. 2006 ¶194 (partial)	**Dr. Jeffay's Declaration, Current IPRs, Ex. 2141 ¶222 (partial)**
Move Networks was successfully developing its patented ABR technology where others failed. For example, other technologies, such as progressive download, peer-to-peer, and proprietary RTP/RTSP streaming systems requiring specialized servers and dedicated circuits were proposed as alternatives, but could not achieve the same quality of experience as that provided by the patented ABR technology and were ultimately disfavored in comparison to the patented ABR technology. *See* EX2026 at 2. Indeed, several entities developing other means to deliver	Move Networks was successfully developing its patented ABR technology, which provided continuous content playback, while others failed. EX2026, at 2. For example, other technologies, such as progressive download, peer-to-peer, and proprietary RTP/RTSP streaming systems requiring specialized servers and dedicated circuits were proposed as alternatives, but could not achieve the same quality of experience as that provided by the patented ABR technology and were ultimately disfavored in comparison to the patented ABR technology. *See* EX2026 at 2. Indeed, several entities developing other means to deliver

Dr. Jeffay's Declaration, Ogdon IPRs, Ex. 2006 ¶194 (partial)	Dr. Jeffay's Declaration, Current IPRs, Ex. 2141 ¶222 (partial)
high-quality long form content over the Internet ultimately abandoned their proprietary systems after years of development and adopted the patented ABR technology designed and developed by Move Networks.	high-quality long form content over the Internet ultimately abandoned their proprietary systems after years of development and adopted the patented ABR technology designed and developed by Move Networks.

215. Because ABR streaming technology was already known in the prior art (in, for example, Leaning), Patent Owner's evidence of unmet need and success when others failed lacks a nexus to the claimed invention. As such, it is irrelevant to the secondary considerations and obviousness analysis. Patent Owner and Dr. Jeffay cannot avoid this result by relying on a feature ("continuous playback") that flows from using the same, known ABR streaming process.

216. Dr. Jeffay's reliance on British Telecom ("BT") allegedly "never develop[ing] or commercializ[ing] the video teachings of Leaning" also does not show a long-felt, unmet need or failure of others. First, I understand that, legally, whether or not a prior art teaching is commercialized is irrelevant to the obviousness analysis. Second, Peter Ratcliffe, the BT Chief IP Lawyer that Dr. Jeffay relies on, testified in his declaration that Leaning's audio teachings were

commercialized (Ex. 2126 ¶10) and at his deposition that Leaning was both licensed to others as part of portfolio licenses, and asserted against a third party (Ratcliffe Tr. 73:16-74:15, 126:11-127:23, 139:11-140:3, 158:19-159:8). Third, Mr. Ratcliffe was not aware that BT had a "streamed video" product called Fastnets and testified that he did not search for information regarding the Fastnets product when searching to see if Leaning had been commercialized. Ratcliffe Tr. 99:16-100:11; 105:12-16. After being shown a 2007 BT product brochure for Fastnets, Mr. Ratcliffe conceded that he "wouldn't doubt it if Fastnets was a product and others in the company knew what it was and, you know, knew what it did" but that he did not search for Fastnets in connection with preparing his declaration. Ratcliffe Tr. 109:5-110:7. Mr. Ratcliffe further conceded that he "do[es]n't doubt" that "British Telecom commercialized streaming technology where a key feature was the patented use of switching frames between multiple video streams encoded at different data rates." Ratcliffe Tr. 111:6-16.

217. Mr. Ratcliffe's admissions are consistent with a 2007 BT product brochure for Fastnets technology, titled "Instant video streaming; Video without the waiting," that indicates that BT commercialized its "patented 'Fastnets' technology" video streaming system. Ratcliffe Dep., Ex. 1 (Ex. 1036) at 1 (stating "Fastnets has been implemented as a complete system"). This BT brochure explains that Fastnets "is a high-performance, network-agnostic video streaming

architecture that eliminates some of the worst problems of video streaming: slow start, picture freezing on network congestion, and poor video quality." Ratcliffe Dep., Ex. 1 at 1. Fastnets does this by using ABR technology: "[f]aced with congestion that restricts throughput, the picture quality reduces but the video continues – drastically reducing pausing and rebuffering." Ratcliffe Dep., Ex. 1 (Ex. 1036) at 1. BT's brochure provides details on "[h]ow it works," explaining that "[t]he key feature of Fastnets is the patented use of SP (switching) frames to ***switch between multiple video streams encoded at different data rates.***" Ratcliffe Dep., Ex. 1 (Ex. 1036) at 2. BT's brochure continues on to describe how Fastnets encodes the "same video" at three different data rates and the server can switch between rates if it "determines that the player is not receiving data at" the highest rate. Ratcliffe Dep., Ex. 1 (Ex. 1036) at 2. This switching—to higher or lower data rates—"can be done without pause or glitch in the displayed picture" and "without any pause in video playback." Ratcliffe Dep., Ex. 1 (Ex. 1036) at 2. In other words, BT advertised Fastnets as achieving "continuous playback" through the use of ABR technology.

218. It thus appears that, contrary to Dr. Jeffay's and Patent Owner's assertions, BT did, in fact, commercialize a patented, ABR video streaming product that embodied at least some of at least some of the video teachings of Leaning. Such commercialization further shows that the prior art was successful

and met any unmet need for streaming live and on-demand content over the Internet.

219. I disagree with Dr. Jeffay's assertion that "Move's patented ABR technology" was "transformative." Ex. 2141 ¶226. Rather, as explained above §VII-XVI, the general ABR technology that MOVE patented was already disclosed in the prior art, specifically in Leaning. Thus, MOVE's patenting of this already disclosed technology was not "transformative."

220. I also disagree with Dr. Jeffay's assertion that "practically every major online video provider has shifted to deploy an adaptive bitrate architecture that was inspired by the patented ABR technology." Ex. 2141 ¶227. Dr. Jeffay cites only two exhibits for this assertion. The first, Ex. 2024, is a one-page press release that MOVE drafted and issued itself. Ex. 2024; Major Tr. 91:12-92:5. The second, Ex. 2020, is the declaration of named inventor on the challenged patents, Drew Major. While Dr. Jeffay does not cite any particular paragraph of Mr. Major's declaration, Mr. Major asserts in paragraph 25 that a number of companies "all use Adaptive Bitrate Streaming technology that was inspired by MOVE Networks' invention," citing three exhibits: Ex. 2024, Ex. 2062, and Ex. 2096. Exhibit 2024 is the same MOVE press release that Dr. Jeffay relies on. As Mr. Major admitted at his deposition, Exhibit 2096 is the same press release as in Exhibit 2024, only downloaded from the Move Networks newsroom. Major Tr.

94:10-16. The final exhibit Mr. Major relies on, Exhibit 2062, is a blog post dated the same day as the press release in Exhibits 2024 and 2096. Major Tr. 97:17-21, 98:20-8. The Exhibit 2062 blog post quotes a "Move Networks press release" and paraphrases a quote from Mr. Major in that press release stating "Move founder Drew Major even explicitly names multiple video companies that have deployed technology similar to which -- to that which Move Networks received a patent for." Major Tr. 99:22-100:19. Thus, the only basis for Dr. Jeffay's claim that "practically every major online video provider" deployed ABR technology "inspired by the patented ABR technology" is a single statement made by a named (and interested) inventor on patents claiming that ABR technology made in a MOVE press release. Dr. Jeffay does not explain or cite any other evidence showing that any of these companies did, in fact, deploy ABR technology or that they were "inspired by" Patent Owner's ABR technology.

221. I also disagree with Dr. Jeffay's assertion that in 2007, "Microsoft's system, including its Silverlight browser plug-in, did not support dynamically changing audio or video formats mid-stream and, therefore, could not support adaptive bitrate streaming." Ex. 2141 ¶228. Dr. Jeffay only cites one exhibit for this assertion, Ex. 2042, which is an email chain between individuals at MOVE Networks and at Microsoft to set up a time for MOVE to make a presentation to Microsoft. The email does not discuss any technical information regarding

Silverlight's browser plug-in. In fact, the only mention of Silverlight is to note that MOVE Networks will be meeting with the Silverlight team and speculating as to whether that team is aware of various programming opportunities. Ex. 2042 at 2.

222. I also disagree with Dr. Jeffay's assertion that MOVE "frequently faced skepticism that its technology, . . . , could support high-definition video streaming." Ex. 2141 ¶229. Once again, Dr. Jeffay cites only a single email, Ex. 2041, to support his claim. The language Dr. Jeffay quotes on its face does not show skepticism of MOVE's technology. Rather, it accepts that MOVE's technology works and asks about why competitors are having issues. Ex. 2141 ¶299 (quoting Ex. 2041 at 1-2). Moreover, the entire email conversation is in the context of discussing a potential collaboration between MOVE and another company. Ex. 2041 at 1. If the other company was truly skeptical that MOVE's technology worked, then it is unlikely that it would be proposing a potential collaboration.

2. Any Surprising Results Differ Only In Degree And Are Not Probative Of Nonobviousness

223. I disagree with Dr. Jeffay's assertion that the "Move Media Player's ability to provide continuous playback of content that resulted in a high-quality playback experience[] prompt[ed] substantial viewer and industry surprise." Ex. 2141 ¶230. I understand that surprising results are only probative of

nonobviousness if they are different in kind and not merely in degree from the prior art. Here, as named inventor Mr. Major admitted, the MOVE technology did better than others at reducing buffering and stalling delays that resulted in discontinuous playback, but it did not completely eliminate such delays. Major Tr. 127:6-128:8; Ericson Tr. 113:20-114:25 (former MOVE employee admitting MOVE's technology in 2006 did not completely eliminate buffering, and was not "perfect . . . But it was pretty good"); *supra* §XVII.A.3 (explaining that the MOVE Media Player has discontinuous playback). As the Board found in the Ogdon IPRs, the MOVE Media Player's "results were still streaming video, as had already existed, albeit at a better quality or degree according to [Patent Owner's] telling." IPR2024-00043, Paper 59 (Final Written Decision) at 52. Thus, because Patent Owner's and Dr. Jeffay's alleged surprising results are differences only in degree, not in kind, they are not probative of nonobviousness.

3. Any Commercial Success Is Due To Unclaimed Or Already Known Features

224. Patent Owner's and Dr. Jeffay's commercial success evidence lacks nexus to the challenged claims because it ties such success to a critical, unclaimed feature—"extremely in-depth reporting" on and tracking of its users that made MOVE's technology "extremely valuable to networks and advertisers." Ex. 2048 at 1. Moreover, as the Board recognized in its decisions in the Ogdon IPRs, "to

the extent that [Patent Owners's] evidence of commercial success is tied to MOVE Networks as an entity, or to MOVE's 'technology' or 'ABR [adaptive bitrate] technology' generally (…), it is not sufficiently tied to the claimed invention" in the challenged claims "to merit significant weight." IPR2024-0004, Paper 59 (Final Written Decision) at 54. As explained above in §§VII-XVI, XVII.A.5, ABR streaming was known in the prior art so it cannot serve as a nexus to the challenged claims. Patent Owner and Dr. Jeffay cannot overcome the lack of nexus by rebranding the alleged invention as a "continuous playback" feature that flows from using the known ABR streaming process. §XVII.A.5; IPR2024-00918, Paper 27 (Patent Owner Response) at 61.

225. Dr. Jeffay quotes a declaration from Mark Mitchell, a Manager of Business Intelligence for BYU Broadcasting claiming that the MOVE Media Player was "better than our Windows Media stream by leaps and bounds." Ex. 2141 ¶239 (quoting Ex. 2127 ¶5). I disagree that this testimony is relevant to the commercial success analysis. Mr. Mitchell admitted at his deposition that the Windows Media stream he referenced was a ***constant bitrate stream***. Mitchell Tr. 59:16-20. He further admitted that he distinguished that Windows Media constant bitrate stream from the adaptive bitrate stream used in the MOVE Network stream in his comparison. Mitchell Tr. 58:7-59:25. Mr. Mitchell was thus comparing apples (constant bitrate stream) and oranges (adaptive bitrate stream). He was not

comparing the technology in the '772, '564, and '156 patents[8] to other known adaptive bitrate streaming technologies like that disclosed in Leaning. Mr. Mitchell's declaration testimony is also of little value because he admitted that he did not write his declaration and he did not know who did. Mitchell Tr. 20:12-23. Rather, he simply read the declaration he was given and he signed it. Mitchell Tr. 20:12-23.

226. Dr. Jeffay relies heavily on the use of MOVE's ABR technology to broadcast the Church of Jesus Christ of Latter-Day Saints' General Conference in 2005, for his commercial success analysis. Ex. 2141 ¶¶239-240. Dr. Jeffay claims that "the objective evidence shows that Move worked to ensure that tens of thousands of people from all over the world could pull the same files at the same time to watch the same event without freezing, buffering, or extensive latency, which plagued nearly every commercially available solution at that time," citing only the Church's October General Conference Notes at 1 and paragraph 17 of the declaration of former MOVE employee, David Ericson. Ex. 2141 ¶240 (citing Ex. 2064; Ex. 2100 ¶17,).

[8] In fact, Mr. Mitchell admitted that he had not reviewed any ABR patents, including any patents related to the MOVE Media Player. Mitchell Tr. 57:3-25.

227. The underlined language in the quote from Dr. Jeffay's Declaration above can be found verbatim in Mr. Ericson's declaration, but Mr. Ericson's deposition revealed that there is strong reason to doubt the accuracy of multiple facts alleged in that quote. At his deposition, Mr. Ericson admitted that Patent Owner's attorneys at Baker Botts (Zach Shepard, Ali Dhanani, or another attorney) drafted his declaration. Ericson Tr. 31:16-32:5, 4 (identifying attorney names and affiliations). He further admitted he made only minor, non-substantive edits to his declaration and spent "[v]ery little time" reviewing it to see that "it was basically accurate" before signing it. Ericson Tr. 32:6-24. When asked to name an example of any "commercially available solution" in 2005 that he referenced in the quote, Mr. Ericson testified that he was "not aware of any." Ericson Tr. 93:7-94:9.

228. Mr. Ericson further admitted that the Church's October General Conference Notes (Ex. 2064 at 1) that he cited as sole support for his claim that MOVE worked to ensure tens of thousands of people from all over the world could watch the 2005 event does not mention MOVE at all. Ericson Tr. 94:10-96:8. Rather, the cited paragraph of Exhibit 2064 states that the "proceedings were also broadcast live over the internet" as the last entry in a list of five ways that the event was transmitted to the public, including by satellite, on videotapes, and by television and radio networks. Ericson Tr. 95:18-98:13. Mr. Ericson further confirmed that Exhibit 2064 "doesn't identify the number of people who watched

the proceedings via broadcast live over the internet" (Ericson Tr. 98:14-18) and does not say that "tens of thousands of people from all over the world" watched the proceedings via streaming over the internet (Ericson Tr. 99:20-100:2). When asked directly, Mr. Ericson stated he "d[id]n't have th[e] number" of people who watched the event live over the internet. Ericson Tr. 104:5-9. Despite testifying in his declaration that those who watched the 2005 event did so "without freezing, buffering, or extensive latency" (Ex. 2100 ¶17), Mr. Ericson admitted that, in 2006, the MOVE technology did not completely eliminate buffering, and was not "perfect . . . But it was pretty good." Ericson Tr. 113:20-114:25. In short, Mr. Ericson's deposition testimony revealed nearly everything that Dr. Jeffay claimed the objective evidence showed about the 2005 broadcast was based on unsupported claims made by Patent Owner's attorneys, only minimally reviewed by Mr. Ericson.

229. Dr. Jeffay's claims that MOVE Networks' ABR technology was commercially successful because of the number of companies who adopted MOVE's technology (Ex. 2141 ¶¶241-260) is not relevant to obviousness because Dr. Jeffay ties this adoption to use of ABR streaming technology, which was known in the prior art as described above in §XVII.A.5.

230. Patent Owner and Dr. Jeffray's claims that licenses involving the '772, '564, and '156 patents show commercial success (for example, Ex. 2141

¶¶261-262) also are entitled to no weight because neither Patent Owner nor Dr. Jeffray demonstrate there is a nexus between the merits of the invention and the identified licenses.

231. While Dr. Jeffray recognizes that MOVE's business was put up for sale in the late 2000s (Ex. 2141 ¶263), he does not acknowledge that this sale was necessitated because MOVE failed as a company. Ex. 2038 at 1 (Wall Street Journal reporting in 2010 that MOVE "recently laid off about 15 employees amid its transition to its new internet-TV offering, away from its earlier main business of providing video-streaming technology for the Web sites of broadcasters"); Ex. 2121 at 1 (noting in 2010 that Fox.com had "quietly switched from MOVE Networks' player to Flash" and that "a Disney-ABC spokesperson told [the reporter] that ABC.com will also be transitioning from Move to Flash"). MOVE's ultimate failure as a company and its customers' switch back to a "standard player[] like Flash" (Ex. 2033) indicate that the advances in bandwidth available in the 2000s drove any early alleged success of MOVE, not any innovation.

4. Patent Owner and Dr. Jeffay Do Not Show Any Copying

232. Dr. Jeffay's claim that "the objective evidence suggests that competitors copied the patented ABR technology" is unsupported and entitled to no weight in assessing obviousness. Dr. Jeffay never shows how, if at all, any of the companies he identifies in his "Copying" section actually copied the specific

technology recited in the challenged claims. Ex. 2141 ¶¶264-265. Instead, he claims only that "the adaptive bitrate streaming solution 'brought to the fore by Move Networks' was ***influential*** in others' adoption of '***substantially similar***' ABR technology." Ex. 2141 ¶265.

233. Indeed, it is unclear whether any of the evidence Dr. Jeffay cites for copying actually assessed whether the alleged copyists copied the technology in the challenged claims. For example, Dr. Jeffay relies on the declaration of David Ericson, a former MOVE employee, to claim Apple's HLS standard is "very similar to what Move had developed." Ex. 2141 ¶267 (quoting Ex. 2100 ¶¶26-27). But Mr. Ericson admitted that he "compar[ed] HLS to Move's product," not to any claim or any disclosure in the challenged ABR patents. Ericson Tr. 150:8-151:12. Mr. Ericson further testified that his "belief that Apple followed what Move was doing is based on [his] own personal speculation" because "if somebody comes up with something that is similar to something they were exposed to that they hadn't come up with before, that would be an assumption." Ericson Tr. 159:10-19. Such speculation is not reliable evidence of copying and should be accorded no weight in the obviousness analysis.

234. Patent Owner and Dr. Jeffay similarly imply Microsoft copied by creating "its own version of HTTP-based ABR streaming technology," but never explain any link between it and the challenged claims—not even in the paragraph

Patent Owner cites of Dr. Jeffay's testimony. IPR2024-00918, Paper 27 (Patent Owner Response) at 64 (citing Ex. 2141 ¶268). I understand that where, as here, a Patent Owner fails to detail the aspects of a claimed invention are targeted by copyists, evidence of copying should be attributed little weight.

235. At most, Patent Owner and Dr. Jeffay's copying allegations merely argue that Apple and Microsoft both sought to use ABR streaming. IPR2024-00918, Paper 27 (Patent Owner Response) at 63-64; Ex. 2141 ¶¶ 267-268. Because ABR streaming was known in the prior art, Patent Owner and Dr. Jeffay cannot establish a nexus between it and the challenged claims. §XVII.A.5.

5. Any Industry Praise Is For Unclaimed Or Already Known Features

236. I understand that when a patent owner fails to connect evidence of industry praise to the novel elements of challenged claims, such evidence should be given no weight in the obviousness analysis.

237. Patent Owner's and Dr. Jeffray's proffered praise evidence is tied to ABR streaming generally, which was known in the prior art. Ex. 2141 ¶¶270-280; IPR2024-00918, Paper 27 (Patent Owner Response) at 64-67. For example Patent Owner quotes the ***same*** blog post to argue "the industry recognized MOVE's product as superior because it can 'stream videos at an adaptive rate . . .' <u>and provide continuous playback</u>" in the Ogdon IPRs as it does here. IPR2024-00918,

Paper 27 (Patent Owner Response) at 65 & IPR2024-00043, Paper 21 (Patent Owner Response) at 60 (same, without underlined portion). The only difference is that Patent Owner tacks on a reference to "continuous playback," even though the post says nothing about this feature. Ex. 2051. Similarly, Patent Owner argues that the ***same*** awards from AlwaysOn, Red Herring, and TechCrunchies that it relied on in the Ogdon IPRs are due to "using the claimed technology to achieve continuous playback." IPR2024-00918, Paper 27 (Patent Owner Response) at 65; Ex. 2141 ¶¶278-280 (relying on same awards). But in the Ogdon IPRs, Patent Owner argued only that they were due to "the patented ABR technology." IPR2024-00043, Paper 21 (Patent Owner Response) at 63. While Patent Owner now claims these awards are "link[ed] directly to the continuous playback," the single paragraph it cites of Dr. Jeffay's testimony to support this ***says no such thing***. IPR2024-00918, Paper 27 (Patent Owner Response) at 65-66 (citing Ex. 2141 ¶278). Dr. Jeffay actually testifies that these awards are "based on 'innovation, market potential, customer adoption, media buzz and investor value creation'" and "combining scalability with meaningful reporting and analytics" to create the first "business model that focuses on revenue generation for its content providers while distributing their content to millions of viewers simultaneously." Ex. 2141 ¶278 (quoting Ex. 2026).

238. Patent Owner's and Dr. Jeffay's reliance on a 2020 Emmy to Sling TV lacks nexus as explained *supra* §§XVII.A.1, XVII.A.2. It should be accorded no weight. Sling TV's own press release about the Emmy states that the award relates to Sling TV's "over-the-top television service" that was launched February 9, 2015. Ex. 2023; Ericson Tr. 63:4-21 (agreeing that "at the time Sling TV won the Emmy, Sling TV characterized the award as being for 'launching the first over-the-top TV service'"). Consistently, the current curriculum vitae from LinkedIn of former MOVE employee, David Ericson, states that this Emmy was given for "Sling TV's groundbreaking work in launching the first live [Over-The-Top] TV Service." Ex. 2100 at 11; Ericson Tr. 42:25-44:10. While Dr. Jeffay claims that the Emmy was because Sling TV "was recognized as a 'pioneer in adaptive bit rate streaming'" (Ex. 2141 ¶217 (quoting Ex. 2023)), Dr. Jeffay omits that the entity calling Sling TV a "pioneer in adaptive bit rate streaming" was Sling TV itself. Ericson Tr. 241:3-242:10.

239. While Patent Owner claims (without analysis) that the "flawless delivery" quote from Tony Rallo at Televisa in one of MOVE's press releases (Ex. 2052) "has a direct nexus to the 'continuous playback' limitation of the Challenged Claims" (IPR2024-00918, Paper 27 (Patent Owner Response) at 67), the exhibit shows the two are unrelated. The press release provides details on the "large scale setup and operations" that had "flawless delivery," which involved "25 different

Move players, with fully redundant network operation centers in 3 Move locations, multiple satellite link downloads at Move's Satellite Operations Center, multi-tier performance monitoring, and load balancing across multiple CDNs." Ex. 2052. This operational infrastructure is completely separate from the ABR streaming that allegedly results in "continuous playback" in the challenged claims. While Dr. Jeffay repeats the quote from Mr. Rallo, he merely asserts this is praise for Move Networks. Ex. 2141 ¶277. He does not explain or analyze how this quote relates to the technology recited in the challenged claims.

240. Finally, Patent Owner's reliance on alleged praise based on various blog posts (IPR2024-00918, Paper 27 (Patent Owner Response) at 66-67 (citing Ex. 2054, Ex. 2055, Ex. 2070, Ex. 2036)) should not be given any weight in the obvious analysis. Any alleged praise from these blog posts relates to ABR streaming generally, which was known in the prior art. §§VII-XVI, XVII.A.5.

241. In sum, none of Patent Owner's or Dr. Jeffay's alleged secondary considerations have a nexus to the challenged claims. They thus should be granted no weight in the obviousness analysis. In addition, even assuming nexus had been shown, Patent Owner's or Dr. Jeffay's alleged secondary considerations evidence is weak and cannot outweigh the strong showing of obviousness based on Leaning, Gamble, and Ala-Honkola.

CONCLUSION

All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true. Further, I am aware that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001. I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 9, 2025, in Lovell, ME.

Henry H. Houh.

Henry Houh