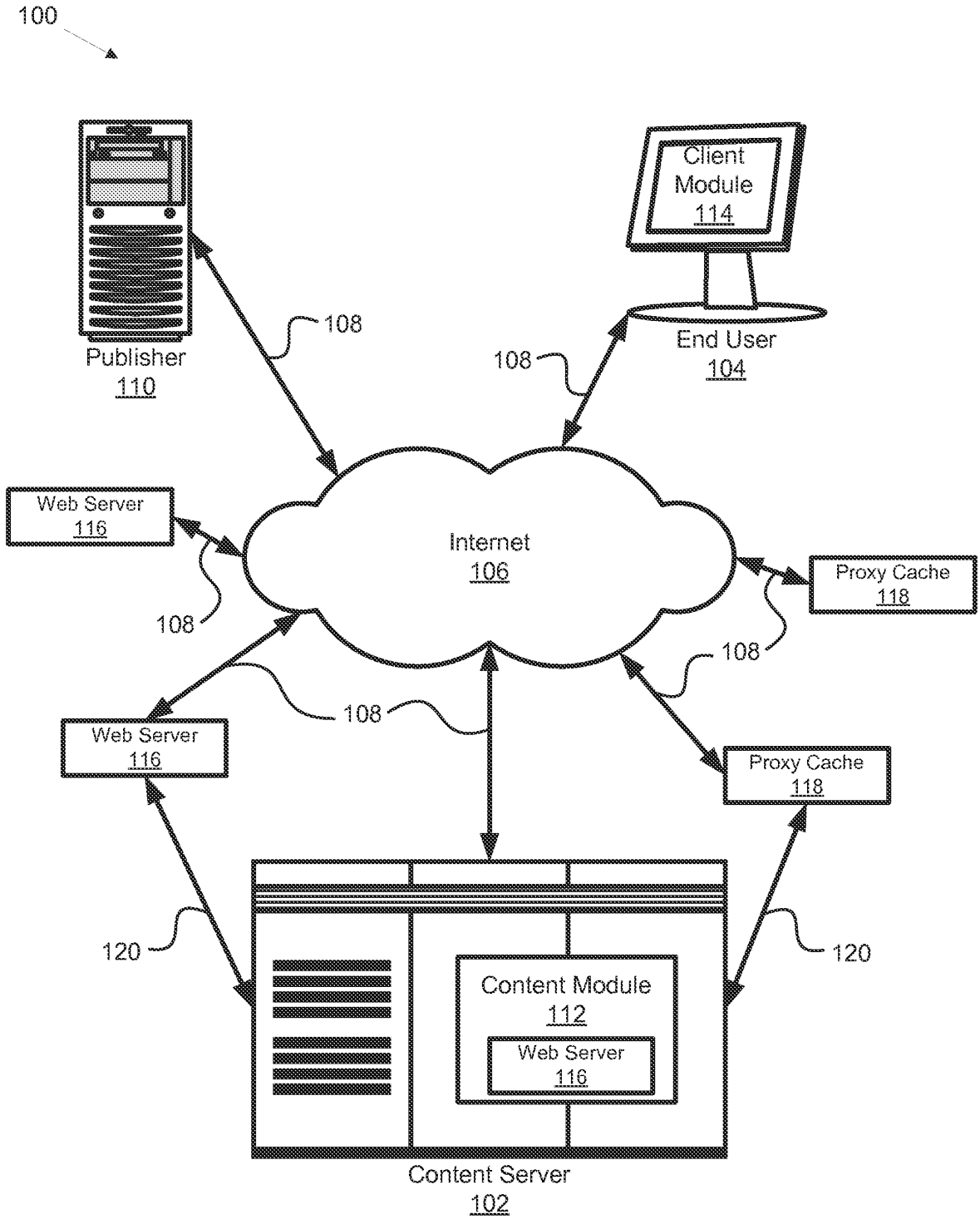

100
Publisher
110
108
Client
Module
114
End User
104
108
Web Server
116
Internet
106
Proxy Cache
118
108
108
108
Web Server
116
Proxy Cache
118
120
120
Content Module
112
Web Server
116
Content Server
102

FIG. 1

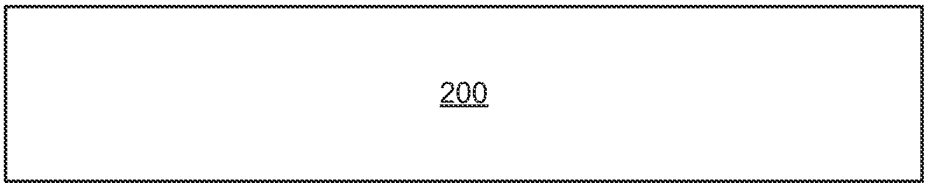


FIG. 2a

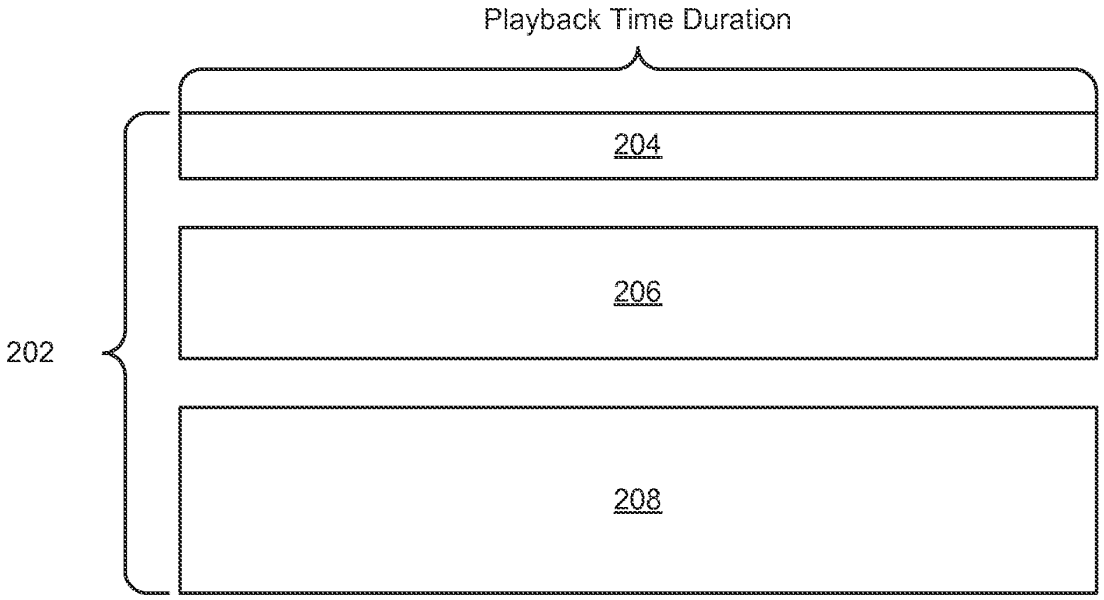


FIG. 2b

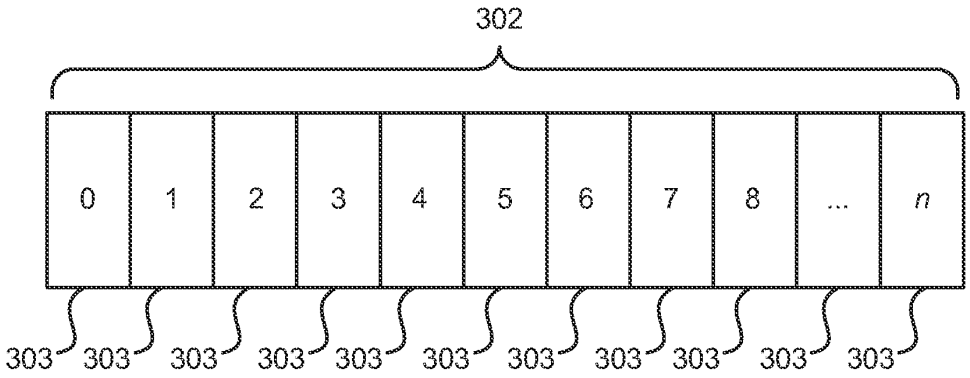

302
0
1
2
3
4
5
6
7
8
...
n
303
303
303
303
303
303
303
303
303
303
303

FIG. 3a

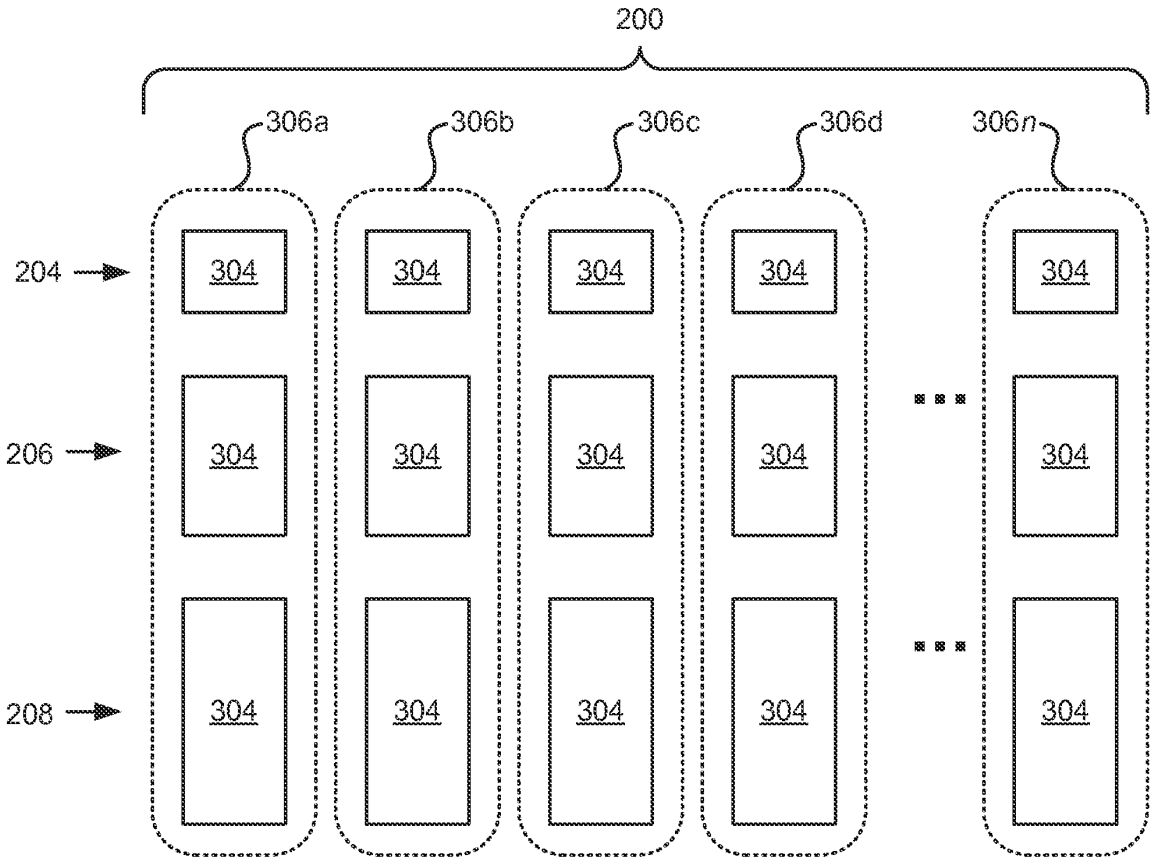

200
306a
306b
306c
306d
306n
204
206
208
304

FIG. 3b

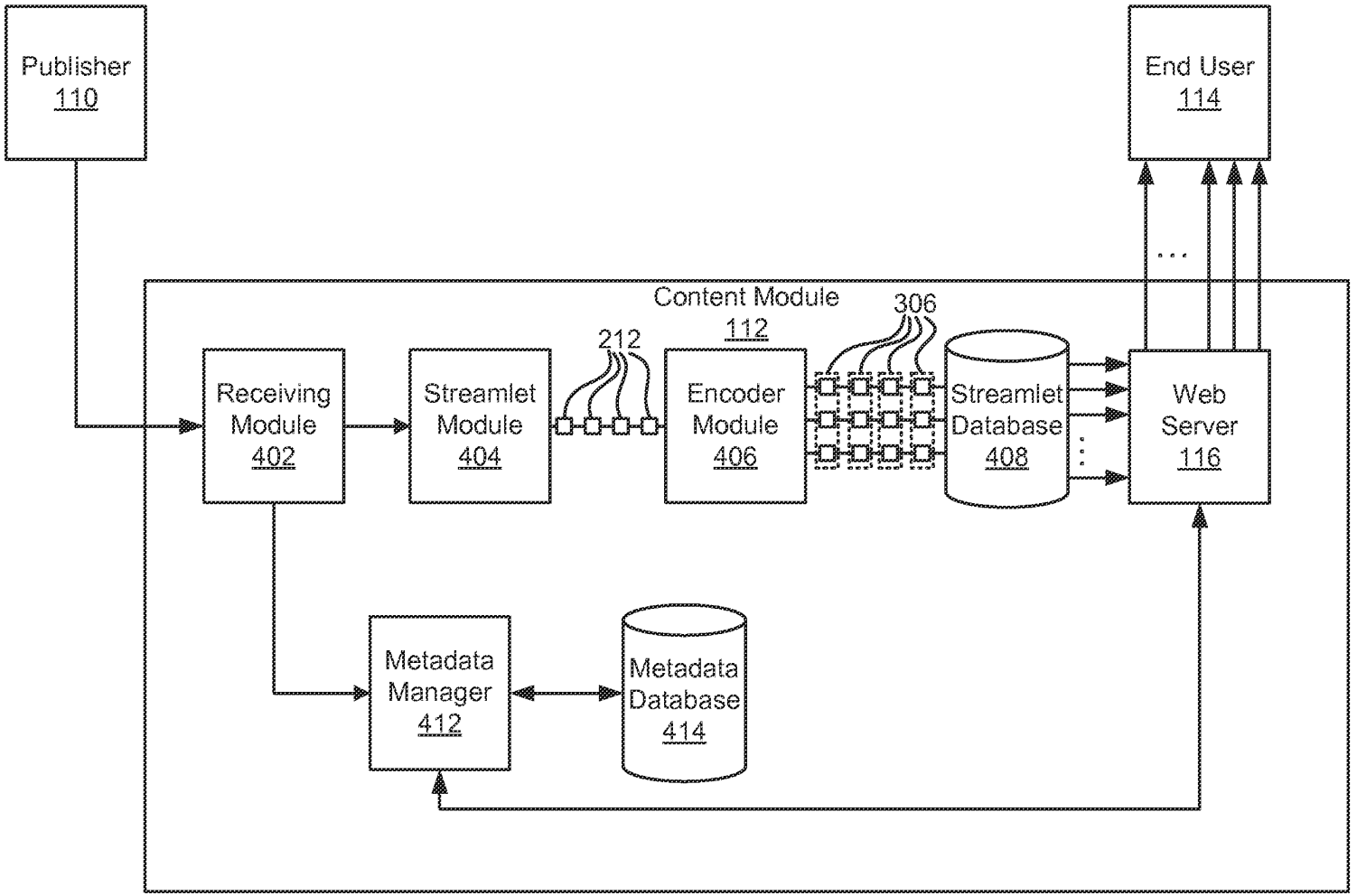


FIG. 4

fuboTV Media Inc.
Exhibit 1002
Page 004

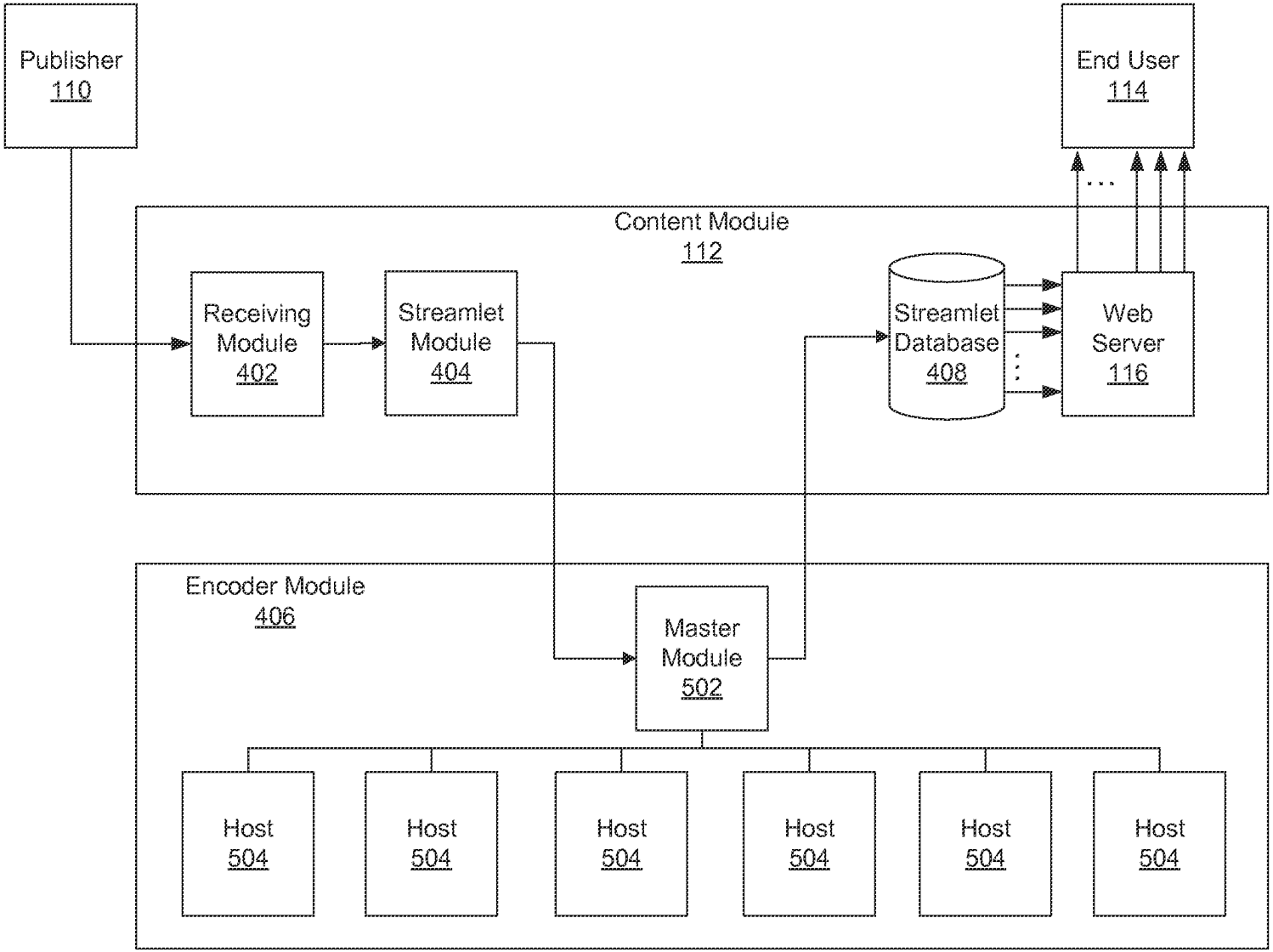


FIG. 5a

fuboTV Media Inc.
Exhibit 1002
Page 005

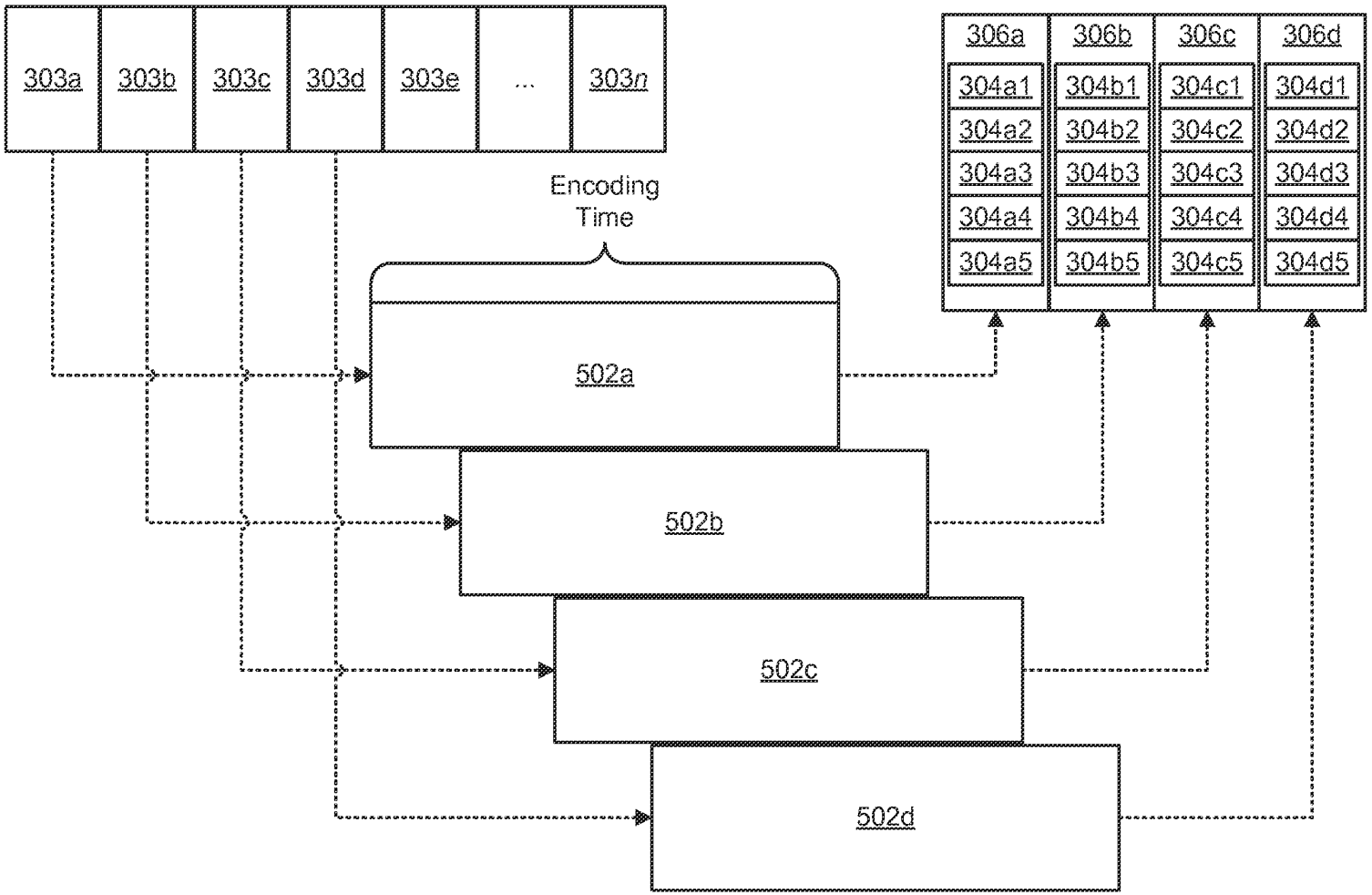


FIG. 5b

fuboTV Media Inc.
Exhibit 1002
Page 006

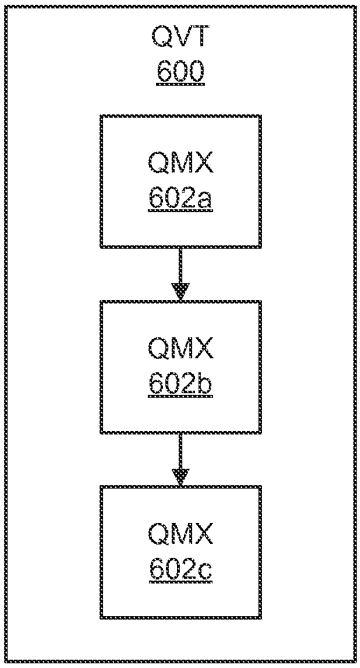


FIG. 6a

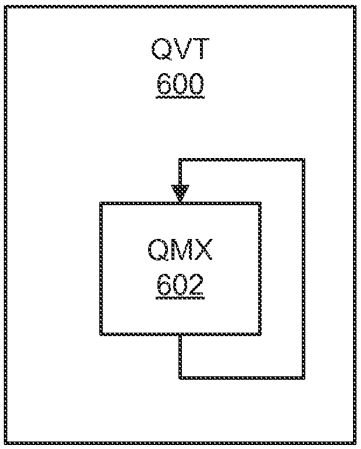


FIG. 6b

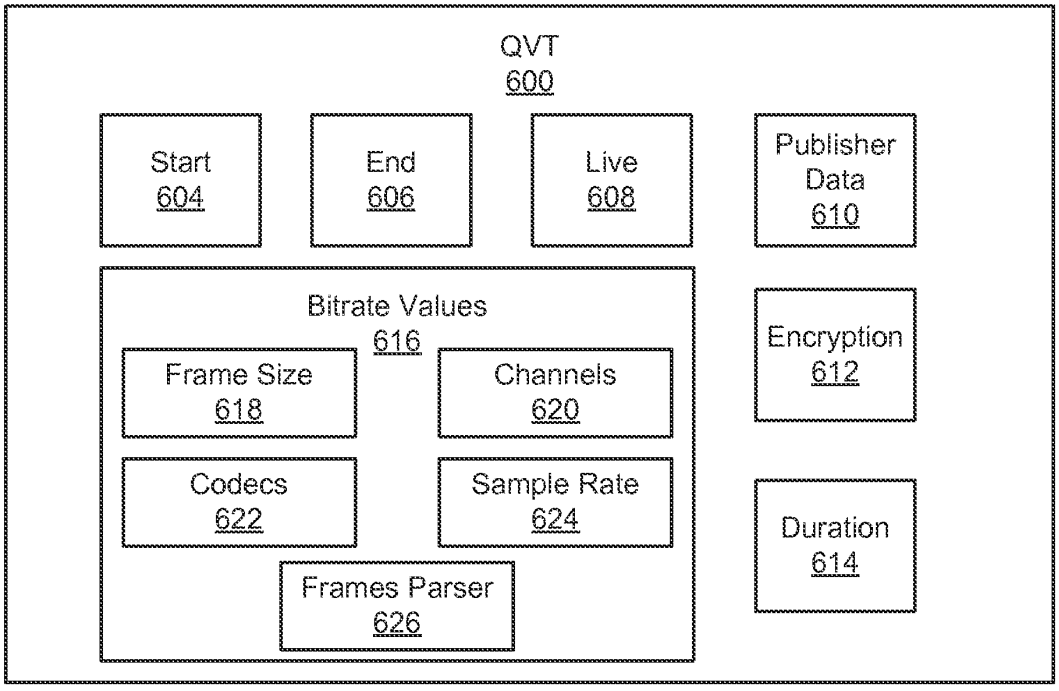


FIG. 6c

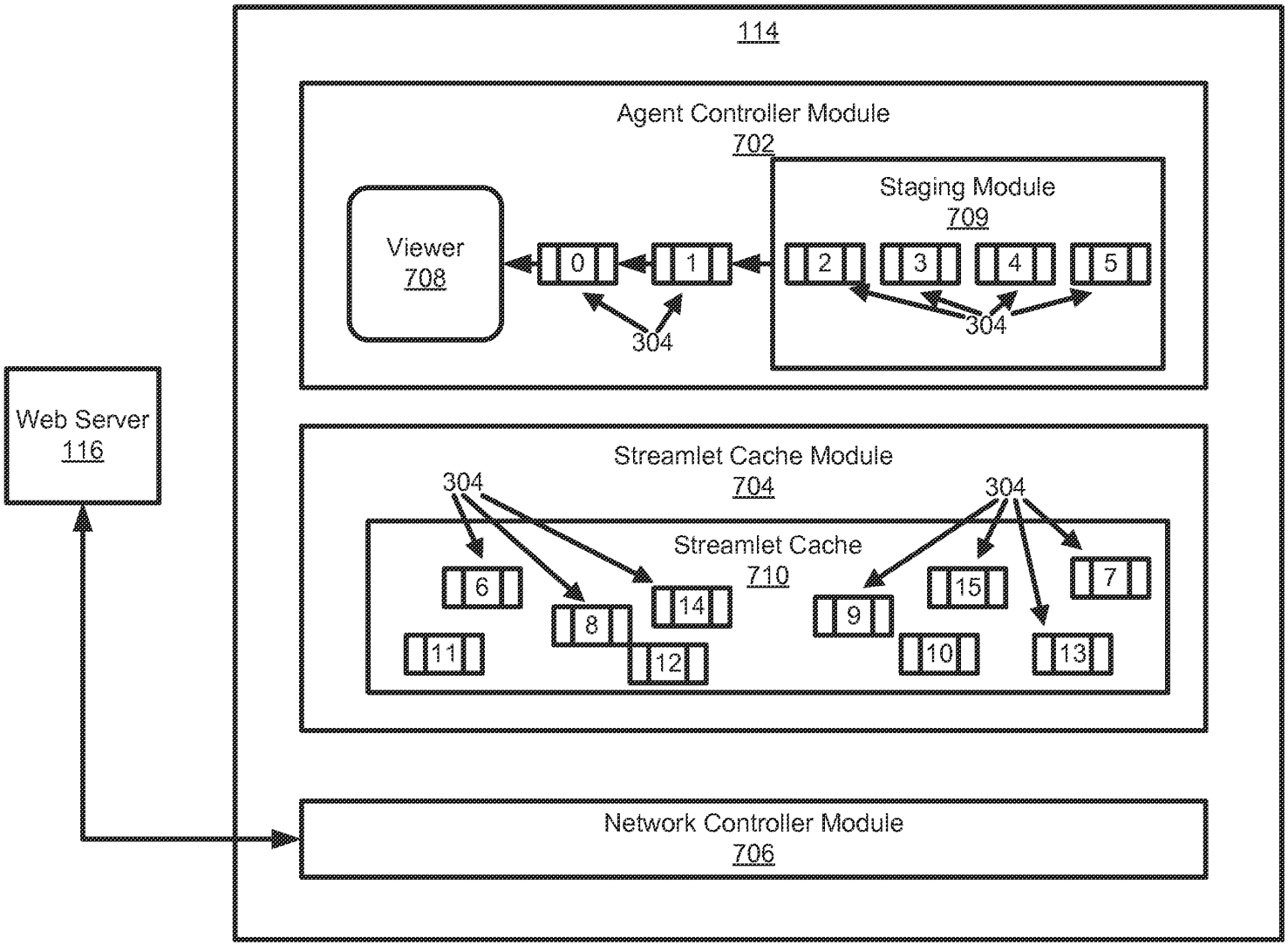


FIG. 7

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Exhibit 1002
Page 008

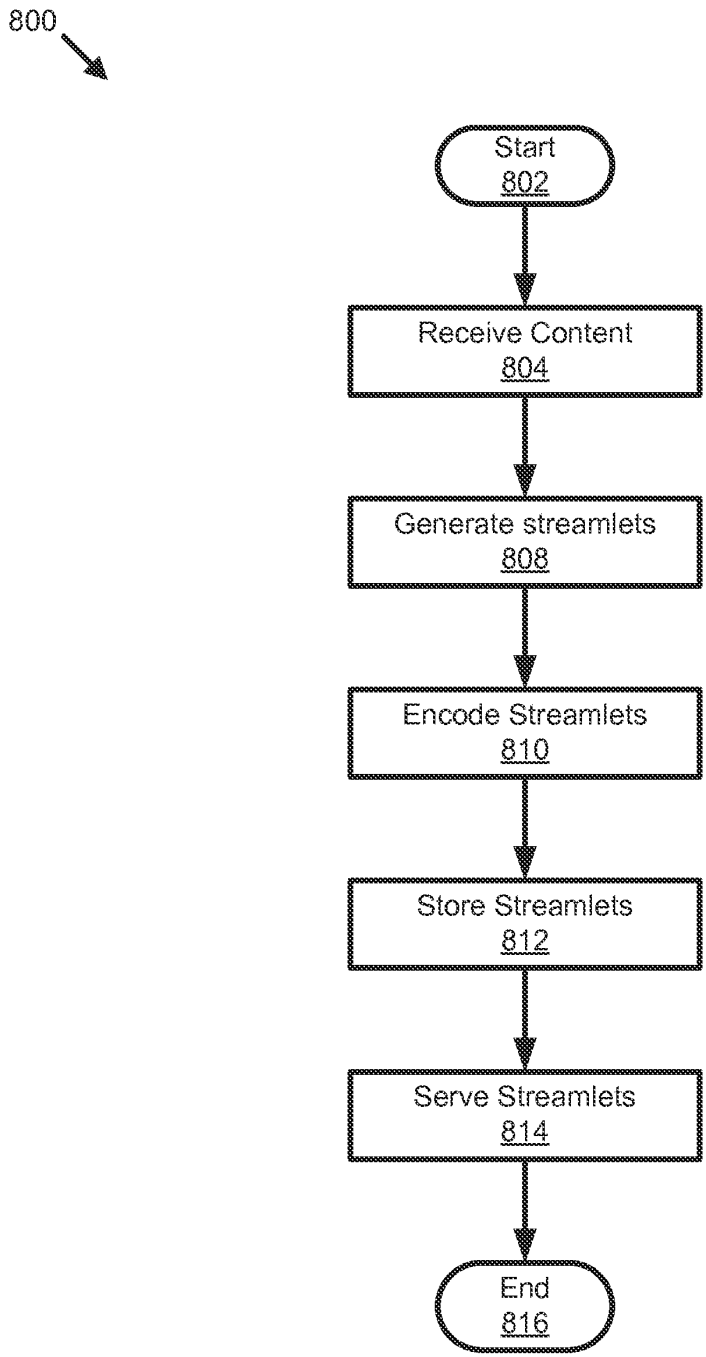

800
Start
802
Receive Content
804
Generate streamlets
808
Encode Streamlets
810
Store Streamlets
812
Serve Streamlets
814
End
816

FIG. 8

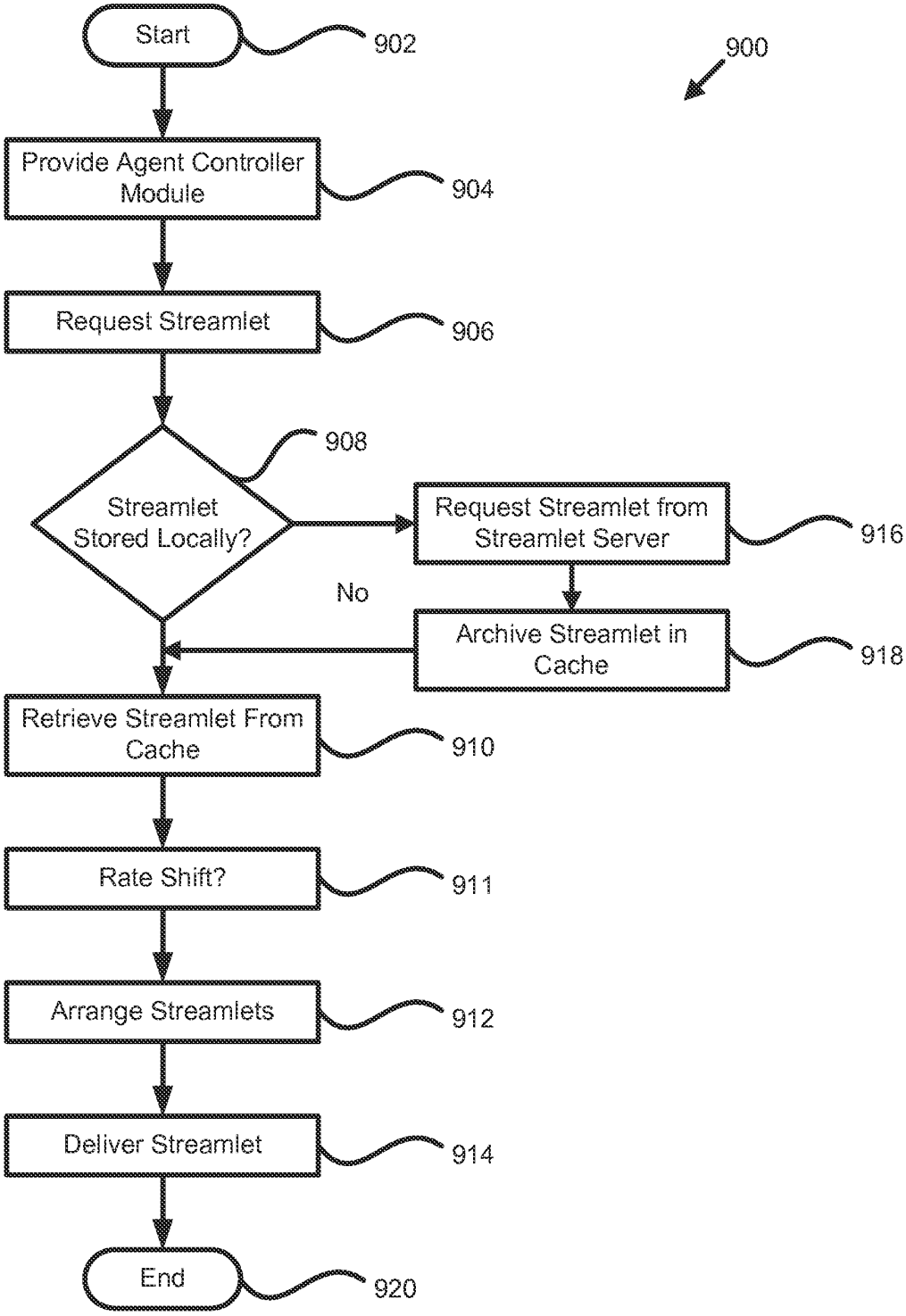

Start
902
900
Provide Agent Controller Module
904
Request Streamlet
906
908
Streamlet Stored Locally?
Request Streamlet from Streamlet Server
916
No
Archive Streamlet in Cache
918
Retrieve Streamlet From Cache
910
Rate Shift?
911
Arrange Streamlets
912
Deliver Streamlet
914
End
920

FIG. 9

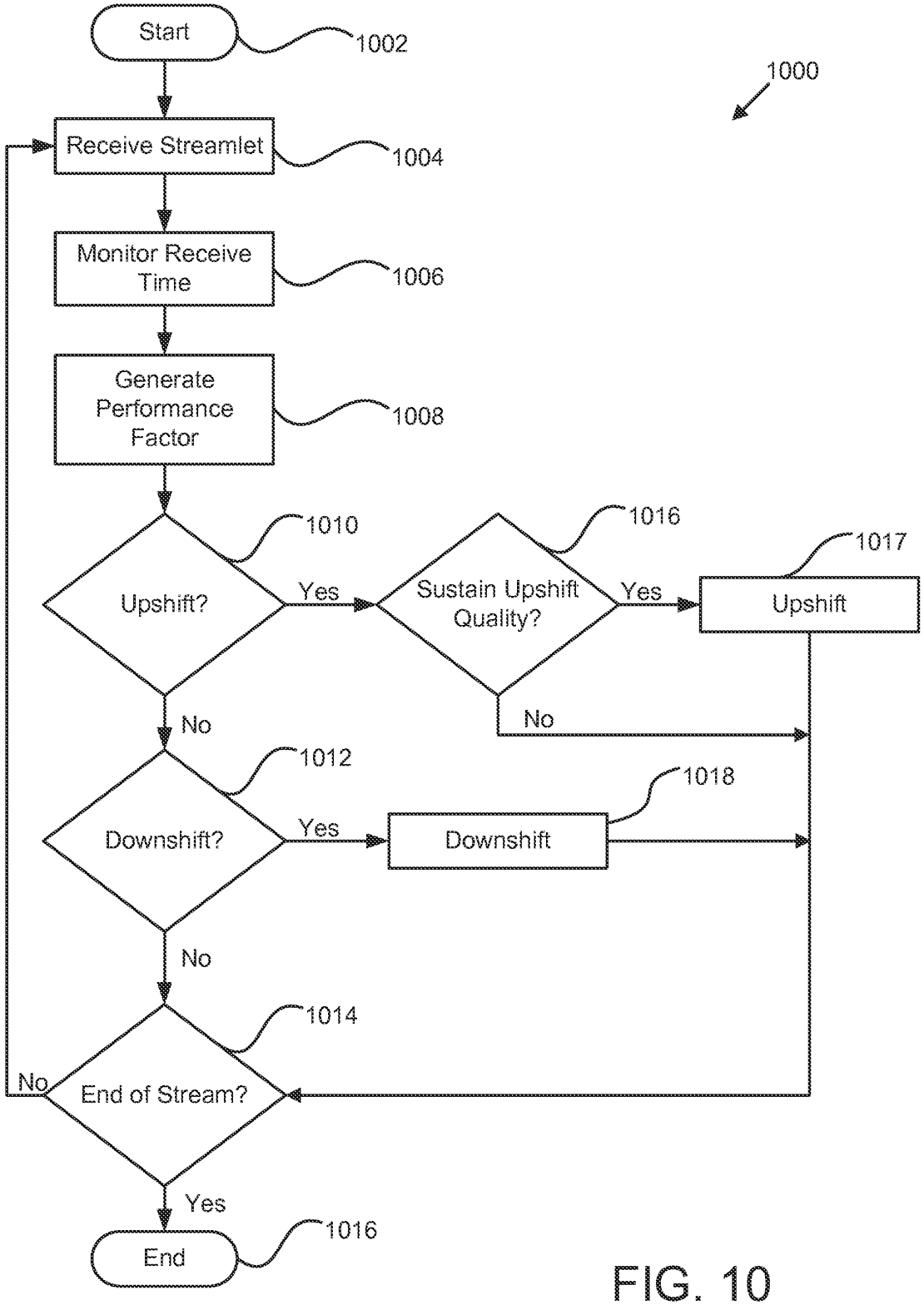

Start
1002
1000
Receive Streamlet
1004
Monitor Receive Time
1006
Generate Performance Factor
1008
1010
Upshift?
Yes
1016
Sustain Upshift Quality?
Yes
1017
Upshift
No
No
1012
Downshift?
Yes
1018
Downshift
No
1014
No
End of Stream?
Yes
End
1016

FIG. 10

PTO/SB/08a (01-10)
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	4	7369610	B2	2008-05-06	Xu et al.	
	5	7408984	B2	2008-08-05	Lu et al.	
	6	7523181	B2	2009-04-21	Swildens et al.	
	7	6976090	B2	2005-12-13	Ben-Shaul et al.	
	8	7240100	B1	2007-07-03	Wein et al.	

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	10	7334044	B1	2008-02-19	Allen	
	11	7760801	B2	2010-07-20	Ghanbari et al.	
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	13	6760772	B2	2004-07-06	Zou et al.	
	14	7054911	B1	2006-05-30	Lango et al.	
	15	7797439	B2	2010-09-14	Cherkasova et al.	
	16	7477688	B1	2009-01-13	Zhang et al.	
	17	7054774	B2	2006-05-30	Batterberry et al.	
	18	5168356		1992-12-01	Acampora et al.	
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	21	7093001	B2	2006-08-15	Yang et al.	
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	25	57685627		1998-06-16	Zhu et al.	
	26	7274740	B2	2007-09-25	van Beek et al.	
	27	7546355	B2	2009-06-09	Kalnitsky	
	28	7174385	B2	2007-02-06	Li	
	29	7376747	B2	2008-05-20	Hartop	
	30	7719985	B2	2010-05-18	Lee et al.	

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	31	7349358	B2	2008-03-25	Hennessey et al.	
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	33	6374289	B2	2002-04-16	Delaney et al.	
	34	7325073	B2	2008-01-29	Shao et al.	
	35	7609652	B2	2009-10-27	Kellerer et al.	
	36	6795863	B1	2004-09-21	Doty, Jr.	
	37	7817985	B2	2010-10-19	Moon	
	38	7788395	B2	2010-08-31	Bowra et al.	
	39	7536469	B2	2009-05-19	Chou et al.	
	40	7412531	B2	2008-08-12	Lango et al.	
	41	7295520	B2	2007-11-13	Lee et al.	

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	Examiner Name	
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	43	6122660		2000-09-19	Baransky et al.	
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	45	7260640	B1	2007-08-21	Kramer et al.	
	46	7310678	B2	2007-12-18	Gunaseelan et al.	
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	51	7593333	B2	2009-09-22	Li et al.	
	52	5953506		1999-09-14	Kalra et al.	

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	Art Unit	
	Examiner Name	
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	63	6731600		2004-05-04	Patel et al.	

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	65	6968387		2005-11-22	Lanphear	
	66	7075986		2006-07-11	Girod et al.	
	67	7096271		2006-08-22	Omoigui et al.	
	68	7349976		2008-03-25	Glaser et al.	
	69	7408984	B2	2008-08-05	Lu et al.	
	70	4535355		1985-08-13	Arn et al.	
	71	8036265	B1	2011-10-11	Reynolds et al.	
	72	5687095		1997-11-11	Haskell et al.	
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Exhibit 1002
Page 019

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Page 020

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Exhibit 1002
Page 022

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	Examiner Name	
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	Examiner Name	
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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39928

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Serial. No.:	TBD	Confirmation No.:	TBD
Examiner:	TBD	Art Unit:	TBD
Filed:	Herewith	Customer No.:	70560
Title:	**APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING**		

Attorney Docket No.: 9401-00260

PRELIMINARY AMENDMENT

Mail Stop AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

FILED ELECTRONICALLY USING THE PTO-EFS SYSTEM

Commissioner:

Please amend the above-referenced application prior to examination.

Amendments to the Specification begin on the following page (page 2).

Remarks begin on page 3 of this paper.

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Exhibit 1002
Page 034

AMENDMENTS TO THE SPECIFICATION

PLEASE AMEND PARAGRAPH 0001 OF THE SPECIFICATION AS FOLLOWS:

[0001] This application is a continuation of U.S. Patent Application Serial No. 16/876,579 filed on May 18, 2020 (now US Patent No. 11,470,138), which is a continuation of 16/004,056 filed on June 8, 2018 (now US Patent No. 10,659,513), which is a continuation of U.S. Patent Application Serial No. 15/414,025 (now US Patent No. 9,998,516) filed on January 24, 2017, which is a continuation of U.S. Patent Application No. 14/719,122 filed on May 21, 2015 (now US Patent No. 9,571,551), which is a continuation of U.S. Patent Application No. 14/106,051 filed on December 13, 2013 (now U.S. Patent No. 9,071,668), which is a continuation of U.S. Patent Application Serial No. 13/617,114, filed on September 14, 2012 (now US Patent No. 8,612,624), which is a continuation of U.S. Patent No. 12/906,940 filed on October 18, 2010 (now US Patent No. 8,402,156), which is a continuation of U.S. Patent Application Number 11/673,483, filed on February 9, 2007 (now US Patent No. 7,818,444), which is a continuation-in-part of Application No. 11/116,783, filed on April 28, 2005 (now U.S. Patent No. 8,868,772), which claims the benefit of U.S. Provisional Application No. 60/566,831, filed on April 31, 2004, all of which are incorporated herein by reference.

fuboTV Media Inc.
Exhibit 1002
Page 035

REMARKS

This preliminary amendment is being filed at the same time as the attached application to update the priority information in paragraph 0001. Please enter the foregoing amendments prior to substantive examination. No new matter has been added, and support for all of the claimed features can be found in the originally-filed application.

This application is being filed as a "Track One" application with a certification and request for prioritized examination. If any documents or fees that are required to process this application as a Track One application are not submitted herewith, ***please consider this as a petition under Rule 181 (or any other appropriate rule) for appropriate relief, and as authorization to charge Deposit Account No. 50-2091 for any fees that may be due***, including any fees to process the Track One application and any associated petitions or other documents.

Should the Examiner have any suggestions that would advance prosecution at any time during prosecution, we would welcome a telephone call to (480) 344 9885 or an email to brett@kwlaw.co. *Recognizing that Internet communications are not secure, we hereby authorize the USPTO to communicate with the undersigned and practitioners in accordance with 37 CFR 1.33 and 37 CFR 1.34 concerning any subject matter of this application via video conferencing, instant messaging, or electronic mail. We understand that a copy of these communications will be made of record in the application file. (MPEP 502.03). Without limiting the foregoing, we further authorize the use of email for informal correspondence, including the exchange of proposed amendments or other draft documents.*

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Exhibit 1002
Page 036

If any additional documents or fees are required to consider this submittal or to otherwise prevent abandonment of this application, please consider this as a petition and request for any needed relief and as authorization to charge Deposit Account No. 60-2406 for any fees that may be due.

Respectfully submitted,

KW Law, LLP

Dated: October 7, 2022

By: /Brett A. Carlson /
Brett A. Carlson
Reg. No. 39,928

KW Law, LLP
Customer No. 70560
480-241-8219 (mobile)
brett@kwlaw.co

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Exhibit 1002
Page 037

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	2	7558869	B2	2009-07-07	Leon et al.	
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	2	20030093790	A1	2003-05-15	Logan et al.	
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	4	Walpole et al, A PLAYER FOR ADAPCTIVE MPEG VIDEO STREAMING OVER THE INTERNET, Oregon Graduate Institute of Science and Technology, October 25, 2012.	☒
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☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39928

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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	Application Number	
	Filing Date	
	First Named Inventor	David F. Brueck
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5267334	A	1993-11-30	Normille et al.	
	2	5404446	A	1995-04-04	Bowater et al.	
	3	5841432	A	1998-11-24	Carmel et al.	
	4	6389473	B1	2002-05-14	Carmel et al.	
	5	6172672	B1	2001-01-09	Ramasubramanian et al.	

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	1	20020156912	A1	2002-10-24	Hurst et al.	

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	2	20030055995	A1	2003-03-20	Ala Honkola	
	3	20030233464	A1	2003-12-18	Walpole et al.	
	4	20020131496	A1	2002-09-19	Vasudevan et al.	
	5	20030135863	A1	2003-07-17	VanDer Schaar	

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	1	0365683	EP	A1	1990-05-02	OTSUKA PHARMA CO LTD		X

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	1	ROY, S., et al., "Architecture of a Modular Streaming Media Server for Content Delivery Networks," 2002 IEEE. Published in the 2003 International Conference on Multimedia and Expo ICME 2003.	X
	2	BOMMAIAH, E., et al., "Design and Implementation of a Caching System for Streaming Media over the Internet," 2000 IEEE. Published in RTAS '00 Proceedings of the Sixth IEEE Real Time Technology and Applications Symposium (RTAS 2000), page 111.	☒

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	3	DEFENDANT JADOO TV, INC.'S DISCLOSURE OF INVALIDITY CONTENTIONS, U.S. N. Dist. Ca. Case No. 5:18-cv-05214-EJD dated Sept. 22, 2020.	☒
	4	DEFENDANT JADOO TV, INC.'S DISCLOSURE OF INVALIDITY CONTENTIONS APPENDIX A, U.S. N. Dist. Ca. Case No. 5:18-cv-05214-EJD dated Sept. 22, 2020.	☒
	5	Balk et al., Adaptive Video Streaming: Pre-Encoded MPEG-4 with Bandwidth Scaling, 44 COMPUTER NETWORKS 415 (Mar. 2004)	☐

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	Filing Date	
	First Named Inventor	DAVID F. BRUECK
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5424455		1995-06-13	Yamamoto et al.	
	2	5544318		1996-08-06	Schmitz et al.	
	3	5867230		1999-02-02	Wang et al.	
	4	5933603		1999-08-03	Vahalia et al.	
	5	5941951		1999-08-24	Day et al.	
	6	5966015		1999-10-12	Horii	
	7	5966025		1999-10-12	Beffa	
	8	6003030		1999-12-14	Kenner et al.	

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	First Named Inventor	DAVID F. BRUECK
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	Attorney Docket Number	P2007-02-01.10/9401-00260

	9	6112239		2000-08-29	Kenner et al.	
	10	6154744		2000-11-28	Kenner et al.	
	11	6181867	B1	2001-01-30	Kenner et al.	
	12	6292383	B1	2001-09-18	Worley	
	13	6498897	B1	2002-12-24	Nelson et al.	
	14	6625643	B1	2003-09-23	Colby et al.	
	15	6637031	B1	2003-10-21	Chou	
	16	6665726	B1	2003-12-16	Leighton et al.	
	17	6766407	B1	2004-07-20	Lisitsa et al.	
	18	6795863	B1	2004-09-21	Doty, Jr.	
	19	7047307	B2	2006-05-16	Li	

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	20	7386627	B1	2008-06-10	Lango et al.	
	21	7974200	B2	2011-07-05	Walker et al.	

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	1	20030072376	A1	2003-04-17	Krishnamachari et al.	
	2	20030061305	A1	2003-03-27	Copley et al.	
	3	20020170062	A1	2002-11-14	Chen et al.	
	4	20020044528	A1	2002-04-18	Pogrebinsky et al.	
	5	20020002708	A1	2002-01-03	Arye	
	6	20030009578	A1	2003-01-09	Apostolopoulos et al.	
	7	20030236906	A1	2003-12-25	Klemets et al.	

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	8	20040136327	A1	2004-07-15	Sitaraman et al.	
	9	20040260827	A1	2004-12-23	Wang	
	10	20040202109	A1	2004-10-14	Akiyama et al.	
	11	20050177618	A1	2005-08-11	Zimler et al.	
	12	20050207569	A1	2005-09-22	Zhang et al.	
	13	20080022343	A1	2008-01-24	Hodzic et al.	
	14	20080086570	A1	2008-04-10	Dey et al.	

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	1	2002045372	WO	A1	2002-06-06	BRITISH TELECOMMUNICATIONS PUBLIC LIMITED COMPANY		
	2	2003009581	WO	A1	2003-01-30	BRITISH TELECOMMUNICATIONS PUBLIC LIMITED COMPANY		

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	3	2003041413	WO	A1	2003-05-15	PA CONSULTING SERVICES LIMITED		
	4	2003042856	WO	A1	2003-05-22	AEROCAST.COM, INC.		
	5	2004021668	WO	A1	2004-03-11	KONINKLIJKE PHILIPS ELECTRONICS N.V.		
	6	2004057832	WO	A1	2004-07-08	KONINKLIJKE PHILIPS ELECTRONICS N.V.		
	7	2006086717	WO	A1	2006-08-17	VIDIATOR ENTERPRISES INC.		
	8	2004295569	JP	A	2004-10-21	SONY CORP		
	9	139497	EP	A2	2004-03-03	MATSUSHITA ELECTRIC INDUSTRIAL CO. LTD.		

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	1	RealPlayer Plus™ G2 Manual", RealNetworks Inc., Seattle, WA (1998-1999), pp. 1-77	
	2	Kontothanassis, L. et al., "A Transport Layer for Live Streaming in a Content Delivery Network," Proceedings of the IEEE, 2004. pp.1408 - 1419. (Retrieved August 18, 2021 from https://www.akamai.com/it/it/multimedia/documents/technical-publication/a-transport-layer-forlive-streaming-in-a-content-delivery-network-technical-publication.pdf).	

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	3	Dawson, F. "Improving Quality May Help to Boost Streaming Media," Multichannel News, December 19, 1999. pp. 1-17 (retrieved August 18, 2021 from https://www.nexttv.com/news/improving-quality-may-help-boost-streaming-media-143325).	
	4	'InterVu Granted Key Internet Patent," Bloomberg Business, December 16, 1999 pp. 1-3 (retrieved August 18, 2021 from https://www.bloomberg.com/press-releases/1999-12-16/intervu-granted-key-internet-patent).	
	5	'InterVu Streams Ahead Behind the Scenes", Paul Festa, cnet, January 2, 2002 (retrieved August 18, 2021 from https://www.cnet.com/news/intervu-streams-ahead-behind-the-scenes/).	
	6	'Microsoft Announces Beta Release of Windows Media Technologies 4.0," April 13, 1999, pp. 1-5 (retrieved August 18, 2021 from https://news.microsoft.com/1999/04/13/microsoft-announcesbeta-release-of-windows-media-technologies-4-0/).	
	7	'Sandpiper Adds RealSystem G2 to its Content Delivery Network," CBR Staff, August 4, 1999, pp. 1-4 (retrieved August 18, 2021 from https://techmonitor.ai/techonology/sandpiper_adds_realsystem_g2_to_its_content_delivery_nnetwork.	
	8	'Speedera Posts Another Record Fiscal Year, Revenue Jumps 60 Percent," BusinessWire Digital Commerce 360, July 14, 2004, pp. 1-5 (retrieved August 18, 2021 from https://www.digitalcommerce360.com/2004/07/14/speedera-posts-another-record-fiscal-yearrevenue-jumps-60-perc/)	
	9	'Developer Documentation QuickTime 6", Apple Computer Inc., Cupertino, CA (2002), pp. 1-240.	
	10	'IBM Digital Library Version 2 Expands Its Comprehensive Solution Framework", Software Announcement, August 12, 1997, pp. 1-26 (retrieved August 18, 2021 from https://www-01.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_ca/2/897/ENUS297-312/index.html&request_locale=en).	
	11	'Fresh Approach: Axient founder finds another way to make networking pay off", Y. Tara Teichgraeber, Phoenix Business Journal, January 13, 2002, pp. 1-6 (retrieved August 18, 2021 from https://www.bizjournals.com/phoenix/stories/2002/01/14/story6.html).	
	12	Mac OS X Server QuickTime Streaming Server 5.0 Administration, Apple Computer Inc., Cupertino, CA (2003), pp. 1-65.	
	13	RESPONDENTS LULULEMON ATHLETICA INC. AND CURIOUSER PRODUCTS INC. RESPONSE TO COMPLAINT US Int'l Trade Commission Investigation. No. 337-TA-1265.	

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	14	RESPONDENT PELOTON INTERACTIVE, INC.'S RESPONSE TO COMPLAINT US Int'l Trade Commission Investigation. No. 337-TA-1265.	
	15	VERIFIED RESPONSE OF ICON HEALTH & FITNESS, INC., FREE MOTION FITNESS, INC., AND NORDICTRACK, INC. TO COMPLAINT US Int'l Trade Commission Investigation. No. 337-TA-1265.	

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☒ See attached certification statement.

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A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39928

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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	1	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Akiyama et al	
	2	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Arye et al.	
	3	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Carmel et al.	
	4	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Chou et al.	
	5	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Durrant et al.	
	6	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Gentric	
	7	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Kitamura	
	8	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Klemets et al.	
	9	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Oplayo et al.	
	10	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") QOAS	
	11	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") QuickTime Changes	

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	12	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") QuickTime	
	13	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Ravi	
	14	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") RealOne Player	
	15	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Walker	
	16	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Wang	
	17	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Wu	
	18	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") RealSystem G2	
	19	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Akiyama et al.	
	20	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Ayre	
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	36	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Dey	
	37	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Microsoft	
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	40	PELOTON - RESPONDENT PELOTON INTERACTIVE, INC.'S FIRST AMENDED RESPONSE TO COMPLAINT AND TO NOTICE OF INVESTIGATION	
	41	ICON - RESPONDENTS' JOINT DISCLOSURE OF INITIAL INVALIDITY CONTENTIONS IN RESPONSE TO INDIVIDUAL INTERROGATORIES	
	42	RESPONDENTS' NOTICE OF PRIOR ART	
	43	ICON and Free Motion Fitness, Inc. VERIFIED RESPONSE OF ICON HEALTH & FITNESS, INC., FREE MOTION FITNESS, INC., AND NORDICTRACK, INC. TO COMPLAINT OF DISH DBS CORPORATION, DISH TECHNOLOGIES L.L.C., AND SLING TV L.L.C. AND TO NOTICE OF INVESTIGATION	

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Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carslson	Registration Number	39,928

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	2	Akamai buys InterVu, February 7, 2000.	
	3	Akamai, Akamai Completes Acquisition of Speedera Networks	
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	5	Darwin Steaming Server Source Code Developer Notes, June 15, 2021, Darwin Steaming Server 2	
	6	IBM Goes Straight to Video - CNET, June 15, 2021	
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	10	Introduction to Streaming Media with RealOne Player, October 1, 2002.	
	11	Macromedia Delivers Macromedia Flash Communication Server MX Breakthrough server unifies communications and applications to deliver live, human interactions on the Internet, July 9, 2002.	

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	13	Move Networks: The Story of a Failure - GigaOm	
	14	QuickTime 6: Summary of Changes and Enhancements	
	15	CHOU, et al., "Rate-Distortion Optimized Receiver-Driven Streaming over Best-Effort Networks", IEEE Fourth Workshop on Multimedia Signal Processing, 3 October 2001, pp. 1-10	
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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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	Application Number	
	Filing Date	
	First Named Inventor	DAVID F. BRUECK
	Art Unit	
	Examiner Name	
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	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

	1	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Akiyama et al	
	2	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Arye et al.	
	3	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Carmel et al.	
	4	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Chou et al.	
	5	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Durrant et al.	
	6	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Gentric	
	7	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Kitamura	
	8	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Klemets et al.	
	9	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Oplayo et al.	
	10	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") QOAS	
	11	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") QuickTime Changes	

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	12	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") QuickTime	
	13	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Ravi	
	14	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") RealOne Player	
	15	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Walker	
	16	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Wang	
	17	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Wu	
	18	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") RealSystem G2	
	19	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Akiyama et al.	
	20	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Ayre	
	21	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Carmel et. al.	
	22	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Chou et. al.	

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	Attorney Docket Number	P2007-02-01.10/9401-00260

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	35	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Wu	
	36	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Dey	
	37	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Microsoft	

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The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

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A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carslson	Registration Number	39,928

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	Application Number	
	Filing Date	
	First Named Inventor	DAVID F. BRUECK
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5414455	A	1995-05-09	HOOPER Donald F et al.	
	2	5867230	A	1999-02-02	WANG Feng Chi et al.	
	3	5941951	A	1999-08-24	DAY Michael Norman et al.	
	4	5996025	A	1999-11-30	DAY Michael Norman et al.	
	5	6292834	B1	2001-09-18	RAVI et al.	
	6	6389473	B1	2002-05-14	CARMEL et al.	
	7	6490627	B1	2002-12-03	KALRA et al.	
	8	6498897	B1	2002-12-24	NELSON et al.	

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	9	6637031	B1	2003-10-21	CHOU	
	10	7047307	B2	2006-05-16	LI	
	11	7386627	B1	2008-06-10	LANGO et al.	
	12	8711701	B2	2014-04-29	JU	
	13	8818127	B2	2014-08-26	HAYATA et al.	
	14	9407564	B2	2016-08-02	MAJOR et al.	
	15	10469554	B2	2019-11-05	BRUECK et al.	
	16	10469555	B2	2019-11-05	BRUECK et al.	
	17	10757156	B2	2020-08-25	MAJOR et al.	
	18	10951680	B2	2021-03-16	BRUECK et al.	

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20020002708	A1	2002-01-03	ARYE	
	2	20020044528	A1	2002-04-18	POGREBINSKY et al.	
	3	20020131496	A1	2002-09-19	VASUDEVAN et al.	
	4	20030061305	A1	2003-03-27	COPLEY et al.	
	5	20030067872	A1	2003-04-10	HARRELL et al.	
	6	20030067875	A1	2003-04-10	YOSHIDA et al.	
	7	20030072376	A1	2003-04-17	KRISHNAMACHARI et al.	
	8	20030152036	A1	2003-08-14	QUIGG Brown et al.	
	9	20030236906	A1	2003-12-25	KLEMETS et al.	
	10	20040202109	A1	2004-10-14	AKIYAMA et al.	

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	11	20040260827	A1	2004-12-23	WANG	
	12	20050177618	A1	2005-08-11	ZIMLER et al.	
	13	20080086570	A1	2008-04-10	DEY et al.	

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	1	1394973	EP	B1	2010-05-26	MATSUSHITA ELECTRIC IND CO LTD		
	2	03041413	WO	A1	2003-05-15	PA CONSULTING SERVICES LIMITED		
	3	2005000116	KR	A	2005-01-06	SAMSUNG ELECTRONICS CO LTD		
	4	0245372	WO	A3	2002-09-06	BRITISH TELECOMMUNICATION PUBLIC LTD CO		
	5	2006086717	WO	A1	2006-08-17	VIDIATOR ENTERPRISES INC.		
	6	2004057832	WO	A1	2004-07-08	KONIN-KLIJKE PHILIPS ELECTRONICS N.V.		

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	7	2004021668	WO	A1	2004-03-11	KONIN-KLIJKE PHILIPS ELECTRONICS N.V.		

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Name/Print	Brett A. Carlson	Registration Number	39,928

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)		
	Application Number	
	Filing Date	
	First Named Inventor	DAVID F. BRUECK
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

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	1	Investigation No. 337-TA-1265: Redacted REBUTTAL EXPERT REPORT OF TERESA STANEK REA	
	2	Investigation No. 337-TA-1265: Redacted REBUTTAL EXPERT REPORT OF KEVIN JEFFAY, PHD., REGARDING VALIDITY	
	3	Investigation No. 337-TA-1265: Redacted EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY	
	4	Investigation No. 337-TA-1265: Redacted EXPERT REPORT OF ROBERT L. STOLL	

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	Attorney Docket Number	P2007-02-01.10/9401-00260

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39928

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

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Doc description: Information Disclosure Statement (IDS) Filed

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	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

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	Attorney Docket Number	P2007-02-01.10/9401-00260

	1	Investigation No. 337-TA-1265: APPENDIX A TO EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY: ANTICIPATION AND OBVIOUSNESS OVER CARMEL.	
	2	Investigation No. 337-TA-1265: APPENDIX B TO EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY: ANTICIPATION AND OBVIOUSNESS OVER AKIYAMA.	
	3	Investigation No. 337-TA-1265: APPENDIX C-1 TO EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY: ANTICIPATION AND OBVIOUSNESS OVER REALNETWORKS	
	4	Investigation No. 337-TA-1265: APPENDIX C-2 TO EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY: REALNETWORKS EXPERIMENTATION	
	5	Investigation No. 337-TA-1265: APPENDIX D TO EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY: ANTICIPATION AND OBVIOUSNESS OVER KLEMETS	
	6	Investigation No. 337-TA-1265: EXHIBIT E TO EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY: ANTICIPATION AND OBVIOUSNESS OVER OPLAYO	
	7	Investigation No. 337-TA-1265: APPENDIX F TO EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY: ANTICIPATION AND OBVIOUSNESS OVER KIKUCHI	
	8	Investigation No. 337-TA-1265: APPENDIX G TO EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY: ANTICIPATION AND OBVIOUSNESS OVER TAKEMURA	
	9	Investigation No. 337-TA-1265: APPENDIX H TO EXPERT REPORT OF DR. IAIN RICHARDSON ON NVALIDITY: PUBLIC USE [Redacted]	
	10	Investigation No. 337-TA-1265: Exhibit 1 Dr. Iain Richardson curriculum vitae Dec21.	
	11	Investigation No. 337-TA-1265: RICHARDSON REPORT EXHIBIT 3: MATERIALS CONSIDERED	

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	12	Investigation No. 337-TA-1265: Appendix A To Supplemental Expert Report if Dr. Iain Richardson [Redacted]	
	13	Investigation No. 337-TA-1265: SUPPLEMENTAL EXPERT REPORT OF ROBERT L. STOLL	
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Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39928

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First Named Inventor	David F. Brueck
Art Unit	
Examiner Name	
Attorney Docket Number	P2007-02-01.10/9401-00260

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	1	6389473	B1	2002-05-14	Carmel et al.	

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	1	20030061305	A1	2003-03-27	Copley et al.	
	2	20040202109	A1	2004-10-14	Akiyama et al.	
	3	20030204602	A1	2003-10-30	Hudson et al.	
	4	20040010613	A1	2004-01-15	Apostolopoulos et al.	
	5	20020144276	A1	2020-10-03	Radford et al.	

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	1	2367219	GB	A	2002-03-27	Vintage Global		
	2	1395014	EP	A1	2004-03-03	Matsushita Electric Ind Co Ltd.		
	3	1298931	EP	A2	2003-04-02	Oplayo		

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	1	Appendix H, Appendix H to Expert Report of Dr. Iain Richardson on Invalidity: Public Use (40 pages).	
	2	The Wayback Machine, dated November 8, 2021 (1 page).	
	3	In the Matter of: Certain Fitness Devices, Videotaped Deposition of BYU Broadcasting, Mark Mitchell, dated December 2, 2021 (123 pages).	
	4	The Wayback Machine, bates labeled RESP-PA06323, dated December 7, 2021 (1 page).	
	5	The Wayback Machine, bates labeled RESP-PA06257, dated November 8, 2021 (1 page).	

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	6	The Wayback Machine, bates labeled RESP-PA06256, dated November 8, 2021 (1 page).	
	7	Move Media, bates labeled RESP-PA06253, dated November 8, 2021 (1 page).	
	8	The Wayback Machine, bates labeled RESP-PA06252, dated November 8, 2021 (1 page).	
	9	BYU Television, bates labeled RESP-PA06247 to RESP-PA06248, dated November 8, 2021 (2 pages).	
	10	Mitchell Exhibit 13, BYU-TV Live, FAQ, bates labeled RESP-PA06275to RESP-PA06276, dated December 2, 2021 (2 pages).	
	11	Mitchell Exhibit 12, BYU Television, The Wayback Machine, bates labeled RESP-PA06268- to RESP-PA06269, dated December 2, 2021 (2 pages).	
	12	Mitchell Exhibit 11, BYU Television, The Wayback Machine, bates labeled RESP-PA06272 to RESP-PA06274, dated December 2, 2021 (3 pages).	
	13	Mitchell Exhibit 10, BYU Television, The Wayback Machine, bates labeled RESP-PA06266 to RESP-PA06267, dated December 2 2021 (2 pages).	
	14	Mitchell Exhibit 7, BYU Television, The Wayback Machine, bates labeled RESP-PA06270 to RESP-PA06271, dated December 2, 2021 (2 pages).	
	15	Mitchell Exhibit 6, bates labeled BYU000012-BYU000013, dated December 2, 2021 (2 pages).	
	16	Mitchell Exhibit 5, BYU Television, The Wayback Machine, bates labeled RESP-PA06263 to RESP-PA06264, dated December 2, 2021 (2 pages).	

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	Attorney Docket Number	P2007-02-01.10/9401-00260

	17	Mitchell Exhibit 4, BYU Television, The Wayback Machine, bates labeled RESP-PA06261 to RESP-PA06262, dated December 2, 2021 (2 pages).	
	18	Mitchell Exhibit 3, BYU Television, The Wayback Machine, bates labeled BYU000001, dated December 2, 2021 (1 page).	
	19	Mitchell Exhibit 2, Conference Summary for the 175th Semiannual General Conference, dated December 2, 2021 (3 pages).	
	20	Major Exhibit 62, Official Report of the One Hundred Seventy-fifth Semiannual General Conference of The Church of Jesus Christ of Latter-day Saints, dated November 5, 2021 (128 pages).	
	21	In the Matter of: In Re Certain Fitness Devices, Videotaped Deposition of Peloton Interactive, Inc., Drew Major, dated December 17, 2021 (72 pages).	
	22	In the Matter of: In Re Certain Fitness Devices and Systems Containing Same, Videotaped Deposition of John Edwards, dated November 12, 2021 (191 pages).	
	23	In the Matter of: In Re Certain Fitness Devices and Systems Containing Same, Videotaped Deposition of Robert Drew Major, dated November 5, 2021 (268 pages).	
	24	Uncertified Rough Draft Transcript, Deposition of Mark Hurst, Vol. 2, dated December 3, 2021 (51 pages).	
	25	Hurst Exhibit 68, Move Media, dated November 19, 2021 (1 page).	
	26	Bates labeled RESP-PA06326 to RESP-PA06337, dated December 7, 2021 (12 pages).	
	27	Bates labeled RESP-PA06255 (1 page).	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	
	First Named Inventor	David F. Brueck
	Art Unit	
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	Attorney Docket Number	P2007-02-01.10/9401-00260

	28	Bates labeled RESP-PA06254 (1 page).	
	29	International Search Report for EP application 20216568.4 dated April 19, 2021 (15 pages).	
	30	Response to International Search Report filed with EP application 20216568.4 on November 19, 2021 (41 pages).	

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Examiner Signature		Date Considered	

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☒ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

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Signature	/Brett A. Carlson/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39928

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

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	1	Respondents' Post-Hearing Brief (Redacted) dated March 29, 2022 (321 pages).	
	2	Complainants' Post-Hearing Reply Brief (Redacted) dated April 7, 2022 (105 pages).	
	3	Commission Investigative Staff's Post-Hearing Reply Brief (Redacted) dated April 13, 2022 (42 pages).	
	4	Commission Investigative Staff's Post-Hearing Brief (Redacted) dated April 1, 2022 (311 pages).	
	5	Respondents' Reply Post-Hearing Brief (Redacted) dated April 7, 2022 (106 pages).	
	6	Complainants' Post-Hearing Brief (Redacted) dated March 29, 2022 (326 pages).	

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Signature	/Brett A. Carlson/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39928

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

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	1	11470138		2022-10-11	Brueck et al.	

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	1	INITIAL DETERMINATION ON VIOLATION OF SECTION 337 AND RECOMMENDED DETERMINATION ON REMEDY AND BOND US Int'l Trade Commission Investigation No. 337-TA-1265 (September 9, 2022)	

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IDS CERTIFICATION STATEMENTS

I. THIS IDS IS BEING FILED UNDER 37 C.F.R. 1.97(b): (check one box)

☑ Within three months of the filing date of a national application other than a continued prosecution application under 1.53(d).

☐ Within three months of the date of entry of the national stage as set forth in 1.491 in an international application.

☐ Before the mailing date of a first Office Action on the merits. In the event that a first Office Action on the merits has been mailed, please consider this IDS under 37 C.F.R. 1.97(c) and see the statement under 1.97(e) **or** charge deposit account 50-2091 the fee specified by 37 C.F.R. 1.17(p) if such statement is not selected in Section IV.

☐ Before the mailing of a first Office Action after the filing of a request for continued examination under 1.114.

II. THIS IDS IS BEING FILED UNDER 37 C.F.R. 1.97(c):

☐ After the period specified in 37 C.F.R. 1.97(b) and before the mailing date of any of a final action under 1.113, a notice of allowance under 1.311 or an action that otherwise closes prosecution in the application, and accompanied by:

- ☐ a statement specified in 1.97(e) as subsequently provided in this IDS; or
- ☐ the fee set forth in 1.17(p).

III. THIS IDS IS BEING FILED UNDER 37 C.F.R. 1.97(d):

☐ After the period specified in 37 C.F.R. 1.97(c) and on or after the mailing date of any of a final action under 1.113, a notice of allowance under 1.311 or an action that otherwise closes prosecution in the application, but before or simultaneous with payment of the issue fee, and accompanied by a statement specified in 1.97(e) as subsequently provided in this IDS **and** the fee set forth in 1.17(p).

IV. Statement under 37 C.F.R. 1.97(e) (check only one box)

The undersigned hereby states that:

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☐ No item of information contained in the IDS was cited in a communication from a foreign patent office in a counterpart foreign application, and, to knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the IDS was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this IDS.

V. Statement under 37 C.F.R. §1.704(d) :

☐ The undersigned hereby states that each item of information contained in the information disclosure statement: (i) was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of the information disclosure statement; or (ii) is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office, and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of the information disclosure statement..

VI. CONCLUSION

It is respectfully submitted that the claims presently on file patently distinguish the present invention from each of the references cited in this IDS. The references cited in this IDS are being cited only in the interest of candor and without any admission that they constitute statutory prior art or contain matter which anticipates the invention or which would render the same obvious, either singly or in a combination, to a person of ordinary skill in the art. Furthermore the filing of this IDS should not be construed to be an admission that the information cited in this IDS is, or is considered to be, material to patentability as defined in 1.56(b). In addition, the filing of this IDS should not be construed as a representation that a search has been made.

If the Examiner has any questions concerning this IDS, the Examiner is requested to contact the undersigned at the telephone number associated with Cust. No.: 70560 If it is determined that this IDS has been filed under the wrong rule, the PTO is requested to consider this IDS under the proper rule, with a petition if necessary, and charge the appropriate fee to Deposit Account No. 60-2406.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING
First Named Inventor/Applicant Name:	David F. Brueck
Filer:	Brett Carlson/Blake Scheffey
Attorney Docket Number:	P2007-02-01.10/9401-00260

Filed as Large Entity

Filing Fees for Track I Prioritized Examination - Nonprovisional Application under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	320	320
UTILITY SEARCH FEE	1111	1	700	700
UTILITY EXAMINATION FEE	1311	1	800	800
REQUEST FOR PRIORITIZED EXAMINATION	1817	1	4200	4200
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	1202	10	100	1000
INDEPENDENT CLAIMS IN EXCESS OF 3	1201	1	480	480

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous-Filing:				
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
PROCESSING FEE, EXCEPT PROV. APPLS.	1830	1	140	140
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**7640**

Electronic Acknowledgement Receipt

EFS ID:	46779537
Application Number:	17962231
International Application Number:	
Confirmation Number:	3515
Title of Invention:	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING
First Named Inventor/Applicant Name:	David F. Brueck
Customer Number:	70560
Filer:	Brett Carlson/Blake Scheffey
Filer Authorized By:	Brett Carlson
Attorney Docket Number:	P2007-02-01.10/9401-00260
Receipt Date:	07-OCT-2022
Filing Date:	
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Application Type:	Utility under 35 USC 111(a)

Payment information:

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Payment Type	CARD
Payment was successfully received in RAM	$7640
RAM confirmation Number	E202207H25274032
Deposit Account	
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		9401-00260_Specification.pdf	15081574 5c648a40127a6bec635d21d59c1e9b67d47a64a2	yes	37
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Specification		1	28	
	Claims		29	36	
	Abstract		37	37	
Warnings:					
Information:					
2	Application Data Sheet	9401-00260_ADS.pdf	1823860 14fcceace8f12e17674cf2569825b2553aa3f04f	no	10
Warnings:					
Information:					
3	Oath or Declaration filed	9401-00260_DeclarationOfJointInvs.pdf	403173 ad5405d4f5febcc5df1a4a6863c3e6caf05e867a	no	3
Warnings:					
Information:					
4	Power of Attorney	9401-00260_POA.pdf	239332 933a5a574631bbdb237fd43625c53db201fc1005	no	2
Warnings:					
Information:					
5	Track One Request	FormPTO424-RequestForPrioritizedExamination.pdf	142100 e90dd583a129a11c7c54091071a9efdd9bba1a24	no	2

Warnings:					
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6	Preliminary Amendment	9401-00260_PreliminaryAmendment.pdf	99081 6d5096290506e757318bf5d522d7f825168ba5df	no	4
Warnings:					
Information:					
7	Drawings-only black and white line drawings	9401-00260_Drawings.pdf	674817 7c3b6b1a65681d7faca0a755b0e1eed541919fc2	no	11
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Information:					
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20	Information Disclosure Statement (IDS) Form (SB08)	9401-00260_IDS-13.pdf	1034385 a774a624b785e725bfd8827b00ad99e30b6413cd	no	4
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21	Non Patent Literature	NPL_IDS-13.pdf	5367597 1a667499ab6f793811b4d05fa40e40132fd81625	no	269
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Information:					
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23	Fee Worksheet (SB06)	fee-info.pdf	55349 ddd17d3a35a15f5e65038135aa96752f9f2ea25a	no	2

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. Patent Application Number 11/673,483, filed on February 9, 2007, which is a continuation-in-part of Application No. 11/116,783, filed on April 28, 2005, which claims the benefit of U.S. Provisional Application No. 60/566,831, filed on April 30, 2004, all of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0002] The invention relates to video streaming over packet switched networks such as the Internet, and more particularly relates to adaptive-rate shifting of streaming content over such networks.

DESCRIPTION OF THE RELATED ART

[0003] The Internet is fast becoming a preferred method for distributing media files to end users. It is currently possible to download music or video to computers, cell phones, or practically any network capable device. Many portable media players are equipped with network connections and enabled to play music or videos. The music or video files (hereinafter "media files") can be stored locally on the media player or computer, or streamed or downloaded from a server.

[0004] "Streaming media" refers to technology that delivers content at a rate sufficient for presenting the media to a user in real time as the data is received. The data may be stored in memory temporarily until played and then subsequently deleted. The user has the immediate satisfaction of viewing the requested content without waiting for the media file to completely download. Unfortunately, the audio/video quality that can be received for real time presentation is constrained by the available bandwidth of the user's network connection. Streaming may be used to deliver content on demand (previously recorded) or from live broadcasts.

fuboTV Media Inc.
Exhibit 1002
Page 121

[0005] Alternatively, media files may be downloaded and stored on persistent storage devices, such as hard drives or optical storage, for later presentation. Downloading complete media files can take large amounts of time depending on the network connection. Once downloaded, however, the content can be viewed repeatedly anytime or anywhere. Media files prepared for downloading usually are encoded with a higher quality audio/video than can be delivered in real time. Users generally dislike this option, as they tend to want to see or hear the media file instantaneously.

[0006] Streaming offers the advantage of immediate access to the content but currently sacrifices quality compared with downloading a file of the same content. Streaming also provides the opportunity for a user to select different content for viewing on an ad hoc basis, while downloading is by definition restricted to receiving a specific content selection in its entirety or not at all. Downloading also supports rewind, fast forward, and direct seek operations, while streaming is unable to fully support these functions. Streaming is also vulnerable to network failures or congestion.

[0007] Another technology, known as "progressive downloads," attempts to combine the strengths of the above two technologies. When a progressive download is initiated, 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." This waiting period before playback can be substantial depending on network conditions, and therefore is not a complete or fully acceptable solution to the problem of media presentation over a network.

[0008] Generally, three basic challenges exist with regard to data transport streaming over a network such as the Internet that has a varying amount of data loss. The first challenge is reliability. Most streaming solutions use a TCP connection, or "virtual circuit," for transmitting data. A TCP connection provides a guaranteed delivery mechanism so that data sent from one endpoint will be delivered to the destination, even if portions are lost and retransmitted. A break in the continuity of a TCP connection can have serious consequences when the data must be delivered in real-time. When a network adapter detects delays or losses in a TCP connection, the adapter "backs off" from transmission attempts for a moment and then slowly resumes the original

fuboTV Media Inc.
Exhibit 1002
Page 122

transmission pace. This behavior is an attempt to alleviate the perceived congestion. Such a slowdown is detrimental to the viewing or listening experience of the user and therefore is not acceptable.

[0009] The second challenge to data transport is efficiency. Efficiency refers to how well the user's available bandwidth is used for delivery of the content stream. This measure is directly related to the reliability of the TCP connection. When the TCP connection is suffering reliability problems, a loss of bandwidth utilization results. The measure of efficiency sometimes varies suddenly, and can greatly impact the viewing experience.

[0010] The third challenge is latency. Latency is the time measure form the client's point-of-view, of the interval between when a request is issued and the response data begins to arrive. This value is affected by the network connection's reliability and efficiency, and the processing time required by the origin to prepare the response. A busy or overloaded server, for example, will take more time to process a request. As well as affecting the start time of a particular request, latency has a significant impact on the network throughput of TCP.

[0011] From the foregoing discussion, it should be apparent that a need exists for an apparatus, system, and method that alleviate the problems of reliability, efficiency, and latency. Additionally, such an apparatus, system, and method would offer instantaneous viewing along with the ability to fast forward, rewind, direct seek, and browse multiple streams. Beneficially, such an apparatus, system, and method would utilize multiple connections between a source and destination, requesting varying bitrate streams depending upon network conditions.

fuboTV Media Inc.
Exhibit 1002
Page 123

SUMMARY OF THE INVENTION

[0012] The present invention has been developed in response to the present state of the art, and in particular, in response to the problems and needs in the art that have not yet been fully solved by currently available content streaming systems. Accordingly, 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.

[0013] The apparatus for adaptive-rate content streaming is provided with a logic unit containing a plurality of modules configured to functionally execute the necessary steps. These modules in the described embodiments include a receiving module configured to receive media content, a streamlet module configured to segment the media content and generate a plurality of sequential streamlets, and an encoding module configured to encode each streamlet as a separate content file.

[0014] The encoding module is further configured to generate a set of streamlets for each of the sequential streamlets. Each streamlet may comprise a portion of the media content having a predetermined length of time. The predetermined length of time may be in the range of between about .1 and 5 seconds.

[0015] In one embodiment, a set of streamlets comprises a plurality of streamlets having identical time indices, and each streamlet of the set of streamlets has a unique bitrate. The receiving module is configured to convert the media content to raw audio or raw video. The encoding module may include a master module configured to assign an encoding job to one of a plurality of host computing modules in response to an encoding job completion bid. The job completion bid may be based on a plurality of computing variables selected from a group consisting of current encoding job completion percentage, average encoding job completion time, processor speed, and physical memory capacity.

[0016] A system of the present invention is also presented for adaptive-rate content streaming. In particular, the system, in one embodiment, includes a receiving module configured to receive media content, a streamlet module configured to segment the media content and generate a plurality of sequential streamlets, each streamlet comprising a portion of the media content having a predetermined length of time, and an encoding

fuboTV Media Inc.
Exhibit 1002
Page 124

module configured to encode each streamlet as a separate content file and generate a set of streamlets.

[0017] The system also includes a plurality of streamlets having identical time indices and each streamlet of the set of streamlets having a unique bitrate. The encoding module comprises a master module configured to assign an encoding job to one of a plurality of host computing modules in response to an encoding job completion bid.

[0018] A method of the present invention is also presented for adaptive-rate content streaming. In one embodiment, the method includes receiving media content, segmenting the media content and generating a plurality of sequential streamlets, and encoding each streamlet as a separate content file.

[0019] The method also includes segmenting the media content into a plurality of streamlets, each streamlet comprising a portion of the media content having a predetermined length of time. In one embodiment, the method includes generating a set of streamlets comprising a plurality of streamlets having identical time indices, and each streamlet of the set of streamlets having a unique bitrate.

[0020] Furthermore, the method may include converting the media content to raw audio or raw video, and segmenting the content media into a plurality of sequential streamlets. The method further comprises assigning an encoding job to one of a plurality of host computing modules in response to an encoding job completion bid, and submitting an encoding job completion bid based on a plurality of computing variables.

[0021] Reference throughout this specification to features, advantages, or similar language does not imply that all of the features and advantages that may be realized with the present invention should be or are in any single embodiment of the invention. Rather, language referring to the features and advantages is understood to mean that a specific feature, advantage, or characteristic described in connection with an embodiment is included in at least one embodiment of the present invention. Thus, discussion of the features and advantages, and similar language, throughout this specification may, but do not necessarily, refer to the same embodiment.

[0022] Furthermore, the described features, advantages, and characteristics of the invention may be combined in any suitable manner in one or more embodiments. One skilled in the relevant art will recognize that the invention may be practiced without one

fuboTV Media Inc.
Exhibit 1002
Page 125

or more of the specific features or advantages of a particular embodiment. In other instances, additional features and advantages may be recognized in certain embodiments that may not be present in all embodiments of the invention.

[0023] These features and advantages of the present invention will become more fully apparent from the following description and appended claims, or may be learned by the practice of the invention as set forth hereinafter.

fuboTV Media Inc.
Exhibit 1002
Page 126

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] In order that the advantages of the invention will be readily understood, a more particular description of the invention briefly described above will be rendered by reference to specific embodiments that are illustrated in the appended drawings. Understanding that these drawings depict only typical embodiments of the invention and are not therefore to be considered to be limiting of its scope, the invention will be described and explained with additional specificity and detail through the use of the accompanying drawings, in which:

[0025] Figure 1 is a schematic block diagram illustrating one embodiment of a system for dynamic rate shifting of streaming content in accordance with the present invention;

[0026] Figure 2a is a schematic block diagram graphically illustrating one embodiment of a media content file;

[0027] Figure 2b is a schematic block diagram illustrating one embodiment of a plurality of streams having varying degrees of quality and bandwidth;

[0028] Figure 3a is a schematic block diagram illustrating one embodiment of a stream divided into a plurality of source streamlets;

[0029] Figure 3b is a schematic block diagram illustrating one embodiment of sets of streamlets in accordance with the present invention;

[0030] Figure 4 is a schematic block diagram illustrating in greater detail one embodiment of the content module in accordance with the present invention;

[0031] Figure 5a is a schematic block diagram illustrating one embodiment of an encoder module in accordance with the present invention;

[0032] Figure 5b is a schematic block diagram illustrating one embodiment of parallel encoding of streamlets in accordance with the present invention;

[0033] Figure 6a is a schematic block diagram illustrating one embodiment of a virtual timeline in accordance with the present invention;

[0034] Figure 6b is a schematic block diagram illustrating an alternative embodiment of a VT in accordance with the present invention;

[0035] Figure 6c is a schematic block diagram illustrating one embodiment of a QMX in accordance with the present invention;

fuboTV Media Inc.
Exhibit 1002
Page 127

[0036] Figure 7 is a schematic block diagram graphically illustrating one embodiment of a client module in accordance with the present invention;

[0037] Figure 8 is a schematic flow chart diagram illustrating one embodiment of a method for processing content in accordance with the present invention;

[0038] Figure 9 is a schematic flow chart diagram illustrating one embodiment of a method for viewing a plurality of streamlets in accordance with the present invention; and

[0039] Figure 10 is a schematic flow chart diagram illustrating one embodiment of a method for requesting streamlets within an adaptive-rate shifting content streaming environment in accordance with the present invention.

fuboTV Media Inc.
Exhibit 1002
Page 128

DETAILED DESCRIPTION OF THE INVENTION

[0040] Many of the functional units described in this specification have been labeled as modules, in order to more particularly emphasize their implementation independence. For example, a module may be implemented as a hardware circuit comprising custom VLSI circuits or gate arrays, off-the-shelf semiconductors such as logic chips, transistors, or other discrete components. A module may also be implemented in programmable hardware devices such as field programmable gate arrays, programmable array logic, programmable logic devices or the like.

[0041] Modules may also be implemented in software for execution by various types of processors. An identified module of executable code may, for instance, comprise one or more physical or logical blocks of computer instructions which may, for instance, be organized as an object, procedure, or function. Nevertheless, the executables of an identified module need not be physically located together, but may comprise disparate instructions stored in different locations which, when joined logically together, comprise the module and achieve the stated purpose for the module.

[0042] Indeed, a module of executable code may be a single instruction, or many instructions, and may even be distributed over several different code segments, among different programs, and across several memory devices. Similarly, operational data may be identified and illustrated herein within modules, and may be embodied in any suitable form and organized within any suitable type of data structure. The operational data may be collected as a single data set, or may be distributed over different locations including over different storage devices, and may exist, at least partially, merely as electronic signals on a system or network.

[0043] Reference throughout this specification to "one embodiment," "an embodiment," or similar language means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrases "in one embodiment," "in an embodiment," and similar language throughout this specification may, but do not necessarily, all refer to the same embodiment.

[0044] Reference to a signal bearing medium may take any form capable of generating a signal, causing a signal to be generated, or causing execution of a program of machine-

fuboTV Media Inc.
Exhibit 1002
Page 129

readable instructions on a digital processing apparatus. A signal bearing medium may be embodied by a transmission line, a compact disk, digital-video disk, a magnetic tape, a Bernoulli drive, a magnetic disk, a punch card, flash memory, integrated circuits, or other digital processing apparatus memory device. In one embodiment, a computer program product including a computer useable medium having a computer readable program of computer instructions stored thereon that when executed on a computer causes the computer to carry out operations for multi-bitrate content streaming as described herein.

[0045] Furthermore, the described features, structures, or characteristics of the invention may be combined in any suitable manner in one or more embodiments. In the following description, numerous specific details are provided, such as examples of programming, software modules, user selections, network transactions, database queries, database structures, hardware modules, hardware circuits, hardware chips, etc., to provide a thorough understanding of embodiments of the invention. One skilled in the relevant art will recognize, however, that the invention may be practiced without one or more of the specific details, or with other methods, components, materials, and so forth. In other instances, well-known structures, materials, or operations are not shown or described in detail to avoid obscuring aspects of the invention.

[0046] Figure 1 is a schematic block diagram illustrating one embodiment of a system 100 for dynamic rate shifting of streaming content in accordance with the present invention. In one embodiment, the system 100 comprises a content server 102 and an end user station 104. The content server 102 and the end user station 104 may be coupled by a data communications network. The data communications network may include the Internet 106 and connections 108 to the Internet 106. Alternatively, the content server 102 and the end user 104 may be located on a common local area network, wireless area network, cellular network, virtual local area network, or the like. The end user station 104 may comprise a personal computer (PC), an entertainment system configured to communicate over a network, or a portable electronic device configured to present content. For example, portable electronic devices may include, but are not limited to, cellular phones, portable gaming systems, and portable computing devices.

[0047] In the depicted embodiment, the system 100 also includes a publisher 110, and a web server 116. The publisher 110 may be a creator or distributor of content. For

fuboTV Media Inc.
Exhibit 1002
Page 130

example, if the content to be streamed were a broadcast of a television program, the publisher 110 may be a television or cable network channel such as NBC®, or MTV®. Content may be transferred over the Internet 106 to the content server 102, where the content is received by a content module 112. The content module 112 may be configured to receive, process, and store content. In one embodiment, processed content is accessed by a client module 114 configured to play the content on the end user station 104. In a further embodiment, the client module 114 is configured to receive different portions of a content stream from a plurality of locations simultaneously. For example, the client module 114 may request and receive content from any of the plurality of web servers 116.

[0048] Content from the content server 102 may be replicated to other web servers 116 or alternatively to proxy cache servers 118. Replicating may occur by deliberate forwarding from the content server 102, or by a web, cache, or proxy server outside of the content server 102 asking for content on behalf of the client module 114. In a further embodiment, content may be forwarded directly to web 116 or proxy 118 servers through direct communication channels 120 without the need to traverse the Internet 106.

[0049] Figure 2a is a schematic block diagram graphically illustrating one embodiment of a media content (hereinafter "content") file 200. In one embodiment, the content file 200 is distributed by the publisher 110. The content file 200 may comprise a television broadcast, sports event, movie, music, concert, etc. The content file 200 may also be live or archived content. The content file 200 may comprise uncompressed video and audio, or alternatively, video or audio. Alternatively, the content file 200 may be compressed using standard or proprietary encoding schemes. Examples of encoding schemes capable of use with the present invention include, but are not limited to, DivX®, Windows Media Video®, Quicktime Sorenson 3®, On2, OGG Vorbis, MP3, or Quicktime 6.5/ MPEG-4® encoded content.

[0050] Figure 2b is a schematic block diagram illustrating one embodiment of a plurality of streams 202 having varying degrees of quality and bandwidth. In one embodiment, the plurality of streams 202 comprises a low quality stream 204, a medium quality stream 206, and a high quality stream 208. Each of the streams 204, 206, 208 is a copy of the content file 200 encoded and compressed to varying bit rates. For example, the low quality stream 204 may be encoded and compressed to a bit rate of 100 kilobits per

fuboTV Media Inc.
Exhibit 1002
Page 131

second (kbps), the medium quality stream 206 may be encoded and compressed to a bit rate of 200 kbps, and the high quality stream 208 may be encoded and compressed to 600 kbps.

[0051] Figure 3a is a schematic block diagram illustrating one embodiment of a stream 302 divided into a plurality of source streamlets 303. As used herein, streamlet refers to any sized portion of the content file 200. Each streamlet 303 may comprise a portion of the content contained in stream 302, encapsulated as an independent media object. The content in a streamlet 303 may have a unique time index in relation to the beginning of the content contained in stream 302. In one embodiment, the content contained in each streamlet 303 may have a duration of two seconds. 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. Alternatively, the time duration of the streamlets 304 may be any duration smaller than the entire playback duration of the content in stream 302. In a further embodiment, the streamlets 303 may be divided according to file size instead of a time index and duration.

[0052] Figure 3b is a schematic block diagram illustrating one embodiment of sets 306 of streamlets in accordance with the present invention. As used herein, the term "set" refers to a group of streamlets having identical time indices and durations but varying bitrates. In the depicted embodiment, the set 306a encompasses all streamlets having a time index of 00:00. The set 306a includes encoded streamlets 304 having low, medium, and high 204, 206, 208 bitrates. Of course each set 306 may include more than the depicted three bitrates which are given by way of example only. One skilled in the art will recognize that any number of streams having different bitrates may be generated from the original content 200.

[0053] As described above, the duration of one streamlet 304 may be approximately two seconds. Likewise each set 306 may comprise a plurality of streamlets 304 where each streamlet 304 has a playable duration of two seconds. Alternatively, the duration of the streamlet 304 may be predetermined or dynamically variable depending upon a variety of factors including, but not limited to, network congestion, system specifications, playback resolution and quality, etc. In the depicted embodiment, the content 200 may be formed

fuboTV Media Inc.
Exhibit 1002
Page 132

of the plurality of sets 306. The number of sets 306 may depend on the length of the content 200 and the length or duration of each streamlet 304.

[0054] Figure 4 is a schematic block diagram illustrating in greater detail one embodiment of the content module 112 in accordance with the present invention. The content module 112 may comprise a capture module 402, a streamlet module 404, an encoder module 406, a streamlet database 408, and the web server 116. In one embodiment, the capture module 402 is configured to receive the content file 200 from the publisher 110. The capture module 402 may be configured to "decompress" the content file 200. For example, if the content file 200 arrives having been encoded with one of the above described encoding schemes, the capture module 402 may convert the content file 200 into raw audio and/or video. Alternatively, the content file 200 may be transmitted by the publisher in a format 110 that does not require decompression.

[0055] The capture module 402 may comprise a capture card configured for TV and/or video capture. One example of a capture card suitable for use in the present invention is the DRC-2500 by Digital Rapids of Ontario, Canada. Alternatively, any capture card capable of capturing audio and video may be utilized with the present invention. In a further embodiment, the capture module 402 is configured to pass the content file to the streamlet module 404.

[0056] The streamlet module 404, in one embodiment, is configured to segment the content file 200 and generate source streamlets 303 that are not encoded. As used herein, the term "segment" refers to an operation to generate a streamlet of the content file 200 having a duration or size equal to or less than the duration or size of the content file 200. The streamlet module 404 may be configured to segment the content file 200 into streamlets 303 each having an equal duration. Alternatively, the streamlet module 404 may be configured to segment the content file 200 into streamlets 303 having equal file sizes.

[0057] The encoding module 406 is configured to receive the source streamlets 303 and generate the plurality of streams 202 of varying qualities. The original content file 200 from the publisher may be digital in form and may comprise content having a high bit rate such as, for example, 2mbps. The content may be transferred from the publisher 110 to the content module 112 over the Internet 106. Such transfers of data are well known in

fuboTV Media Inc.
Exhibit 1002
Page 133

the art and do not require further discussion herein. Alternatively, the content may comprise a captured broadcast.

[0058] In a further embodiment, the encoding module 406 is configured to generate a plurality of sets 306 of streamlets 304. The sets 306, as described above with reference to Figure 3b, may comprise streamlets having an identical time index and duration, and a unique bitrate. As with Figure 3b, the sets 306 and subsequently the plurality of streams 202 may comprise the low quality stream 204, the medium quality stream 206, and the high quality stream 208. Alternatively, the plurality of streams 202 may comprise any number of streams deemed necessary to accommodate end user bandwidth.

[0059] The encoder module 406 is further configured to encode each source streamlet 303 into the plurality of streams 202 and streamlet sets 306 and store the streamlets in the streamlet database 408. The encoding module 406 may utilize encoding schemes such as DivX®, Windows Media Video 9®, Quicktime 6.5 Sorenson 3®, or Quicktime 6.5/ MPEG-4®. Alternatively, a custom encoding scheme may be employed.

[0060] The content module 112 may also include a metadata module 412 and a metadata database 414. In one embodiment, metadata comprises static searchable content information. For example, metadata includes, but is not limited to, air date of the content, title, actresses, actors, length, and episode name. Metadata is generated by the publisher 110, and may be configured to define an end user environment. In one embodiment, the publisher 100 may define an end user navigational environment for the content including menus, thumbnails, sidebars, advertising, etc. Additionally, the publisher 110 may define functions such as fast forward, rewind, pause, and play that may be used with the content file 200. The metadata module 412 is configured to receive the metadata from the publisher 110 and store the metadata in the metadata database 414. In a further embodiment, the metadata module 412 is configured to interface with the client module 114, allowing the client module 114 to search for content based upon at least one of a plurality of metadata criteria. Additionally, metadata may be generated by the content module 112 through automated process(es) or manual definition.

[0061] Once the streamlets 304 have been received and processed, the client module 114 may request streamlets 304 using HTTP from the web server 116. Using a standard protocol such as HTTP eliminates the need for network administrators to configure

fuboTV Media Inc.
Exhibit 1002
Page 134

firewalls to recognize and pass through network traffic for a new, specialized protocol. Additionally, since the client module 114 initiates the request, the web server 116 is only required to retrieve and serve the requested streamlet 304. In a further embodiment, the client module 114 may be configured to retrieve streamlets 304 from a plurality of web servers 116.

[0062] Each web server 116 may be located in various locations across the Internet 106. The streamlets 304 may essentially be static files. As such, no specialized media server or server-side intelligence is required for a client module 114 to retrieve streamlets 304. Streamlets 304 may be served by the web server 116 or cached by cache servers of Internet Service Providers (ISPs), or any other network infrastructure operators, and served by the cache server. Use of cache servers is well known to those skilled in the art, and will not be discussed further herein. Thus, a highly scalable solution is provided that is not hindered by massive amounts of client module 114 requests to the web server 116 at any specific location, especially the web server 116 most closely associated with or within the content module 112

[0063] Figure 5a is a schematic block diagram illustrating one embodiment of an encoder module 406 in accordance with the present invention. In one embodiment, the encoder module 406 may include a master module 502 and a plurality of host computing modules (hereinafter "host") 504. The hosts 504 may comprise personal computers, servers, etc. In a further embodiment, the hosts 504 may be dedicated hardware, for example, cards plugged into a single computer.

[0064] The master module (hereinafter "master") 502 is configured to receive streamlets 303 from the streamlet module 404 and stage the streamlet 303 for processing. In one embodiment, the master 502 may decompress each source streamlet 303 to produce a raw streamlet. As used herein, the term "raw streamlet" refers to a streamlet 303 that is uncompressed or lightly compressed to substantially reduce size with no significant loss in quality. A lightly compressed raw streamlet can be transmitted more quickly and to more hosts. Each host 504 is coupled with the master 502 and configured to receive a raw streamlet from the master 502 for encoding. The hosts 504, in one example, generate a plurality of streamlets 304 having identical time indices and durations, and varying bitrates. Essentially each host 504 may be configured to generate a set 306 from the raw

fuboTV Media Inc.
Exhibit 1002
Page 135

streamlet 503 sent from the master 502. Alternatively, each host 504 may be dedicated to producing a single bitrate in order to reduce the time required for encoding.

[0065] Upon encoding completion, the host 504 returns the set 306 to the master 502 so that the encoding module 406 may store the set 306 in the streamlet database 408. The master 502 is further configured to assign encoding jobs to the hosts 504. Each host is configured to submit an encoding job completion bid (hereinafter "bid"). The master 502 assigns encoding jobs depending on the bids from the hosts 504. Each host 504 generates a bid depending upon a plurality of computing variables which may include, but are not limited to, current encoding job completion percentage, average job completion time, processor speed and physical memory capacity.

[0066] For example, a host 504 may submit a bid that indicates that based on past performance history the host 504 would be able to complete the encoding job in 15 seconds. The master 502 is configured to select from among a plurality of bids the best bid and subsequently submit the encoding job to the host 504 with the best bid. As such, the described encoding system does not require that each host 504 have identical hardware but beneficially takes advantage of the available computing power of the hosts 504. Alternatively, the master 502 selects the host 504 based on a first come first serve basis, or some other algorithm deemed suitable for a particular encoding job.

[0067] The time required to encode one streamlet 304 is dependent upon the computing power of the host 504, and the encoding requirements of the content file 200. Examples of encoding requirements may include, but are not limited to, two or multi-pass encoding, and multiple streams of different bitrates. One benefit of the present invention is the ability to perform two-pass encoding on a live content file 200. Typically, in order to perform two-pass encoding prior art systems must wait for the content file to be completed before encoding.

[0068] The present invention, however, segments the content file 200 into source streamlets 303 and the two-pass encoding to a plurality of streams 202 may be performed on each corresponding raw streamlet without waiting for a TV show to end, for example. As such, the content module 112 is capable of streaming the streamlets over the Internet shortly after the content module 112 begins capture of the content file 200. The delay

fuboTV Media Inc.
Exhibit 1002
Page 136

between a live broadcast transmitted from the publisher 110 and the availability of the content depends on the computing power of the hosts 504.

[0069] Figure 5b is a schematic block diagram illustrating one embodiment of parallel encoding of streamlets in accordance with the present invention. In one example, the capture module 402 (of Figure 4) begins to capture the content file and the streamlet module 404 generates a first streamlet 303a and passes the streamlet to the encoding module 406. The encoding module 406 may take 10 seconds, for example, to generate the first set 306a of streamlets 304a (304a1, 304a2, 304a3, etc. represent streamlets 304 of different bitrates). Figure 5b illustrates the encoding process generically as block 502 to graphically illustrate the time duration required to process a raw or lightly encoded streamlet 303 as described above with reference to the encoding module 406. The encoding module 406 may simultaneously process more than one streamlet 303, and processing of streamlets will begin upon arrival of the streamlet from the capture module 402.

[0070] During the 10 seconds required to encode the first streamlet 303a, the streamlet module 404 has generated five additional 2-second streamlets 303b, 303c, 303d, 303e, 303f, for encoding and the master 502 has prepared and staged the corresponding raw streamlets. Two seconds after the first set 306a is available the next set 306b is available, and so on. As such, the content file 200 is encoded for streaming over the Internet and appears live. The 10 second delay is given herein by way of example only. Multiple hosts 504 may be added to the encoding module 406 in order to increase the processing capacity of the encoding module 406. The delay may be shortened to an almost unperceivable level by the addition of high CPU powered systems, or alternatively multiple low powered systems.

[0071] A system as described above beneficially enables multi-pass encoding of live events. Multi-pass encoding systems of the prior art require that the entire content be captured (or be complete) because in order to perform multi-pass encoding the entire content must be scanned and processed more than once. This is impossible with prior art systems because content from a live event is not complete until the event is over. As such, with prior art systems, multi-pass encoding can only be performed once the event is over. Streamlets, however, may be encoded as many times as is deemed necessary.

fuboTV Media Inc.
Exhibit 1002
Page 137

Because the streamlet is an encapsulated media object of 2 seconds (for example), multi-pass encoding may begin on a live event once the first streamlet is captured. Shortly after multi-pass encoding of the first streamlet 303a is finished, multi-pass encoding of the second streamlet 303b finishes, and as such multi-pass encoding is performed on a live event and appears live to a viewer.

[0072] Any specific encoding scheme applied to a streamlet may take longer to complete than the time duration of the streamlet itself, for example, a very high quality encoding of a 2-second streamlet may take 5 seconds to finish. Alternatively, the processing time required for each streamlet may be less than the time duration of a streamlet. However, because the offset parallel encoding of successive streamlets are encoded by the encoding module at regular intervals (matching the intervals at which the those streamlets are submitted to the encoding module 406, for example 2 seconds) the output timing of the encoding module 406 does not fall behind the real-time submission rate of the unencoded streamlets. Conversely, prior art encoding systems rely on the very fastest computing hardware and software because the systems must generate the output immediately in lock-step with the input. A prior art system that takes 2.1 seconds to encode 2 seconds worth of content is considered a failure. The present invention allows for slower than real-time encoding processes yet still achieves a real-time encoding effect due to the parallel offset pipes.

[0073] The parallel offset pipeline approach described with reference to Figure 5b beneficially allows for long or short encoding times without "falling behind" the live event. Additionally, arbitrarily complex encoding of streamlets to multiple profiles and optimizations only lengthens the encoding time 502 without a perceptible difference to a user because the sets 306 of streamlets 304 are encoded in a time-selective manner so that streamlets are processed at regular time intervals and transmitted at these time intervals.

[0074] Returning now to Figure 5a, as depicted, the master 502 and the hosts 504 may be located within a single local area network, or in other terms, the hosts 504 may be in close physical proximity to the master 502. Alternatively, the hosts 504 may receive encoding jobs from the master 502 over the Internet or other communications network. For example, consider a live sports event in a remote location where it would be difficult to setup multiple hosts. In this example, a master performs no encoding or alternatively

fuboTV Media Inc.
Exhibit 1002
Page 138

light encoding before publishing the streamlets online. The hosts 504 would then retrieve those streamlets and encode the streamlets into the multiple bitrate sets 306 as described above.

[0075] Furthermore, hosts 504 may be dynamically added or removed from the encoding module without restarting the encoding job and/or interrupting the publishing of streamlets. If a host 504 experiences a crash or some failure, its encoding work is simply reassigned to another host.

[0076] The encoding module 406, in one embodiment, may also be configured to produce streamlets that are specific to a particular playback platform. For example, for a single raw streamlet, a single host 504 may produce streamlets for different quality levels for personal computer playback, streamlets for playback on cell phones with a different, proprietary codec, a small video-only streamlet for use when playing just a thumbnail view of the stream (like in a programming guide), and a very high quality streamlet for use in archiving.

[0077] Figure 6a is a schematic block diagram illustrating one embodiment of a virtual timeline 600 in accordance with the present invention. In one embodiment, the virtual timeline 600 comprises at least one quantum media extension 602. The quantum media extension (hereinafter "QMX") 602 describes an entire content file 200. Therefore, the virtual timeline (hereinafter "VT") 600 may comprise a file that is configured to define a playlist for a user to view. For example, the VT may indicate that the publisher desires a user to watch a first show QMX 602a followed by QMX 602b and QMX 602c. As such, the publisher may define a broadcast schedule in a manner similar to a television station.

[0078] Figure 6b is a schematic block diagram illustrating an alternative embodiment of a VT 600 in accordance with the present invention. In the depicted embodiment, the VT 600 may include a single QMX 602 which indicates that the publisher desires the same content to be looped over and over again. For example, the publisher may wish to broadcast a never-ending infomercial on a website.

[0079] Figure 6c is a schematic block diagram illustrating one embodiment of a QMX 602 in accordance with the present invention. In one embodiment, the QMX 602 contains a multitude of information generated by the content module 112 configured to describe the content file 200. Examples of information include, but are not limited to,

fuboTV Media Inc.
Exhibit 1002
Page 139

start index 604, end index 606, whether the content is live 608, proprietary publisher data 610, encryption level 612, content duration 614 and bitrate values 616. The bitrate values 616 may include frame size 618, audio channel 620 information, codecs 622 used, sample rate 624, and frames parser 626.

[0080] A publisher may utilize the QVT 600 together with the QMX 602 in order to prescribe a playback order for users, or alternatively selectively edit content. For example, a publisher may indicate in the QMX 602 that audio should be muted at time index 10:42 or video should be skipped for 3 seconds at time index 18:35. As such, the publisher may selectively skip offensive content without the processing requirements of editing the content.

[0081] Figure 7 is a schematic block diagram graphically illustrating one embodiment of a client module 114 in accordance with the present invention. The client module 114 may comprise an agent controller module 702, a streamlet cache module 704, and a network controller module 706. In one embodiment, the agent controller module 702 is configured to interface with a viewer 708, and transmit streamlets 304 to the viewer 708. Alternatively, the agent controller module 702 may be configured to simply reassemble streamlets into a single file for transfer to an external device such as a portable video player.

[0082] In a further embodiment, the client module 114 may comprise a plurality of agent controller modules 702. Each agent controller module 702 may be configured to interface with one viewer 708. Alternatively, the agent controller module 702 may be configured to interface with a plurality of viewers 708. The viewer 708 may be a media player (not shown) operating on a PC or handheld electronic device.

[0083] The agent controller module 702 is configured to select a quality level of streamlets to transmit to the viewer 708. The agent controller module 702 requests lower or higher quality streams based upon continuous observation of time intervals between successive receive times of each requested streamlet. The method of requesting higher or lower quality streams will be discussed in greater detail below with reference to Figure 10.

[0084] The agent controller module 702 may be configured to receive user commands from the viewer 708. Such commands may include play, fast forward, rewind, pause, and

fuboTV Media Inc.
Exhibit 1002
Page 140

stop. In one embodiment, the agent controller module 702 requests streamlets 304 from the streamlet cache module 704 and arranges the received streamlets 304 in a staging module 709. The staging module 709 may be configured to arrange the streamlets 304 in order of ascending playback time. In the depicted embodiment, the streamlets 304 are numbered 0, 1, 2, 3, 4, etc. However, each streamlet 304 may be identified with a unique filename.

[0085] Additionally, the agent controller module 702 may be configured to anticipate streamlet 304 requests and pre-request streamlets 304. By pre-requesting streamlets 304, the user may fast-forward, skip randomly, or rewind through the content and experience no buffering delay. In a further embodiment, the agent controller module 702 may request the streamlets 304 that correspond to time index intervals of 30 seconds within the total play time of the content. Alternatively, the agent controller module 702 may request streamlets at any interval less than the length of the time index. This enables a "fast-start" capability with no buffering wait when starting or fast-forwarding through content file 200. In a further embodiment, the agent controller module 702 may be configured to pre-request streamlets 304 corresponding to specified index points within the content or within other content in anticipation of the end user 104 selecting new content to view. In one embodiment, the streamlet cache module 704 is configured to receive streamlet 304 requests from the agent controller module 702. Upon receiving a request, the streamlet cache module 704 first checks a streamlet cache 710 to verify if the streamlet 304 is present. In a further embodiment, the streamlet cache module 704 handles streamlet 304 requests from a plurality of agent controller modules 702. Alternatively, a streamlet cache module 704 may be provided for each agent controller module 702. If the requested streamlet 304 is not present in the streamlet cache 410, the request is passed to the network controller module 706. In order to enable fast forward and rewind capabilities, the streamlet cache module 704 is configured to store the plurality of streamlets 304 in the streamlet cache 710 for a specified time period after the streamlet 304 has been viewed. However, once the streamlets 304 have been deleted, they may be requested again from the web server 116.

[0086] The network controller module 706 may be configured to receive streamlet requests from the streamlet cache module 704 and open a connection to the web server

fuboTV Media Inc.
Exhibit 1002
Page 141

116 or other remote streamlet 304 database (not shown). In one embodiment, the network controller module 706 opens a TCP/IP connection to the web server 116 and generates a standard HTTP GET request for the requested streamlet 304. Upon receiving the requested streamlet 304, the network controller module 706 passes the streamlet 304 to the streamlet cache module 704 where it is stored in the streamlet cache 710. In a further embodiment, the network controller module 706 is configured to process and request a plurality of streamlets 304 simultaneously. The network controller module 706 may also be configured to request a plurality of streamlets, where each streamlet 304 is subsequently requested in multiple parts.

[0087] In a further embodiment, streamlet requests may comprise requesting pieces of any streamlet file. Splitting the streamlet 304 into smaller pieces or portions beneficially allows for an increased efficiency potential, and also eliminates problems associated with multiple full-streamlet requests sharing the bandwidth at any given moment. This is achieved by using parallel TCP/IP connections for pieces of the streamlets 304. Consequently, efficiency and network loss problems are overcome, and the streamlets arrive with more useful and predictable timing.

[0088] In one embodiment, the client module 114 is configured to use multiple TCP connections between the client module 114 and the web server 116 or web cache. The intervention of a cache may be transparent to the client or configured by the client as a forward cache. By requesting more than one streamlet 304 at a time in a manner referred to as "parallel retrieval," or more than one part of a streamlet 304 at a time, efficiency is raised significantly and latency is virtually eliminated. In a further embodiment, the client module allows a maximum of three outstanding streamlet 304 requests. The client module 114 may maintain additional open TCP connections as spares to be available should another connection fail. Streamlet 304 requests are rotated among all open connections to keep the TCP flow logic for any particular connection from falling into a slow-start or close mode. If the network controller module 706 has requested a streamlet 304 in multiple parts, with each part requested on mutually independent TCP/IP connections, the network controller module 706 reassembles the parts to present a complete streamlet 304 for use by all other components of the client module 114.

fuboTV Media Inc.
Exhibit 1002
Page 142

[0089] When a TCP connection fails completely, a new request may be sent on a different connection for the same streamlet 304. In a further embodiment, if a request is not being satisfied in a timely manner, a redundant request may be sent on a different connection for the same streamlet 304. If the first streamlet request's response arrives before the redundant request response, the redundant request can be aborted. If the redundant request response arrives before the first request response, the first request may be aborted.

[0090] Several streamlet 304 requests may be sent on a single TCP connection, and the responses are caused to flow back in matching order along the same connection. This eliminates all but the first request latency. Because multiple responses are always being transmitted, the processing latency of each new streamlet 304 response after the first is not a factor in performance. This technique is known in the industry as "pipelining." Pipelining offers efficiency in request-response processing by eliminating most of the effects of request latency. However, pipelining has serious vulnerabilities. Transmission delays affect all of the responses. If the single TCP connection fails, all of the outstanding requests and responses are lost. Pipelining causes a serial dependency between the requests.

[0091] Multiple TCP connections may be opened between the client module 114 and the web server 116 to achieve the latency-reduction efficiency benefits of pipelining while maintaining the independence of each streamlet 304 request. Several streamlet 304 requests may be sent concurrently, with each request being sent on a mutually distinct TCP connection. This technique is labeled "virtual pipelining" and is an innovation of the present invention. Multiple responses may be in transit concurrently, assuring that communication bandwidth between the client module 114 and the web server 116 is always being utilized. Virtual pipelining eliminates the vulnerabilities of traditional pipelining. A delay in or complete failure of one response does not affect the transmission of other responses because each response occupies an independent TCP connection. Any transmission bandwidth not in use by one of multiple responses (whether due to delays or TCP connection failure) may be utilized by other outstanding responses.

fuboTV Media Inc.
Exhibit 1002
Page 143

[0092] A single streamlet 304 request may be issued for an entire streamlet 304, or multiple requests may be issued, each for a different part or portion of the streamlet. If the streamlet is requested in several parts, the parts may be recombined by the client module 114 streamlet.

[0093] In order to maintain a proper balance between maximized bandwidth utilization and response time, the issuance of new streamlet requests must be timed such that the web server 116 does not transmit the response before the client module 114 has fully received a response to one of the previously outstanding streamlet requests. For example, if three streamlet 304 requests are outstanding, the client module 114 should issue the next request slightly before one of the three responses is fully received and "out of the pipe." In other words, request timing is adjusted to keep three responses in transit. Sharing of bandwidth among four responses diminishes the net response time of the other three responses. The timing adjustment may be calculated dynamically by observation, and the request timing adjusted accordingly to maintain the proper balance of efficiency and response times.

[0094] The schematic flow chart diagrams that follow are generally set forth as logical flow chart diagrams. As such, the depicted order and labeled steps are indicative of one embodiment of the presented method. Other steps and methods may be conceived that are equivalent in function, logic, or effect to one or more steps, or portions thereof, of the illustrated method. Additionally, the format and symbols employed are provided to explain the logical steps of the method and are understood not to limit the scope of the method. Although various arrow types and line types may be employed in the flow chart diagrams, they are understood not to limit the scope of the corresponding method. Indeed, some arrows or other connectors may be used to indicate only the logical flow of the method. For instance, an arrow may indicate a waiting or monitoring period of unspecified duration between enumerated steps of the depicted method. Additionally, the order in which a particular method occurs may or may not strictly adhere to the order of the corresponding steps shown.

[0095] Figure 8 is a schematic flow chart diagram illustrating one embodiment of a method 800 for processing content in accordance with the present invention. In one embodiment the method 800 starts 802, and the content module 112 receives 804 content

fuboTV Media Inc.
Exhibit 1002
Page 144

from the publisher 110. Receiving content 804 may comprise receiving 804 a digital copy of the content file 200, or digitizing a physical copy of the content file 200. Alternatively, receiving 804 content may comprise capturing a radio, television, cable, or satellite broadcast. Once received 804, the streamlet module 404 generates 808 a plurality of source streamlets 303 each having a fixed duration. Alternatively, the streamlets 303 may be generated with a fixed file size.

[0096] In one embodiment, generating 808 streamlets comprises dividing the content file 200 into a plurality of two second streamlets 303. Alternatively, the streamlets may have any length less than or equal to the length of the stream 202. The encoder module 406 then encodes 810 the streamlets 303 into sets 306 of streamlets 304, in a plurality of streams 202 according to an encoding scheme. The quality may be predefined, or automatically set according to end user bandwidth, or in response to pre-designated publisher guidelines

[0097] In a further embodiment, the encoding scheme comprises a proprietary codec such as WMV9®. The encoder module 406 then stores 812 the encoded streamlets 304 in the streamlet database 408. Once stored 812, the web server 116 may then serve 814 the streamlets 304. In one embodiment, serving 814 the streamlets 304 comprises receiving streamlet requests from the client module 114, retrieving the requested streamlet 304 from the streamlet database 408, and subsequently transmitting the streamlet 304 to the client module 114. The method 800 then ends 816.

[0098] Figure 9 is a schematic flow chart diagram illustrating one embodiment of a method 900 for viewing a plurality of streamlets in accordance with the present invention. The method 900 starts and an agent controller module 702 is provided 904 and associated with a viewer 708 and provided with a staging module 709. The agent controller module 702 then requests 906 a streamlet 304 from the streamlet cache module 704. Alternatively, the agent controller module 702 may simultaneously request 906 a plurality of streamlets 304 the streamlet cache module 704. If the streamlet is stored 908 locally in the streamlet cache 710, the streamlet cache module 704 retrieves 910 the streamlet 304 and sends the streamlet to the agent controller module 702. Upon retrieving 910 or receiving a streamlet, the agent controller module 702 makes 911 a

fuboTV Media Inc.
Exhibit 1002
Page 145

determination of whether or not to shift to a higher or lower quality stream 202. This determination will be described below in greater detail with reference to Figure 10.

[0099] In one embodiment, the staging module 709 then arranges 912 the streamlets 304 into the proper order, and the agent controller module 702 delivers 914 the streamlets to the viewer 708. In a further embodiment, delivering 914 streamlets 304 to the end user comprises playing video and or audio streamlets on the viewer 708. If the streamlets 304 are not stored 908 locally, the streamlet request is passed to the network controller module 706. The network controller module 706 then requests 916 the streamlet 304 from the web server 116. Once the streamlet 304 is received, the network controller module 706 passes the streamlet to the streamlet cache module 704. The streamlet cache module 704 archives 918 the streamlet. Alternatively, the streamlet cache module 704 then archives 918 the streamlet and passes the streamlet to the agent controller module 702, and the method 900 then continues from operation 910 as described above.

[0100] Referring now to Figure 10, shown therein is a schematic flow chart diagram illustrating one embodiment of a method 1000 for requesting streamlets 304 within an adaptive-rate shifting content streaming environment in accordance with the present invention. The method 1000 may be used in one embodiment as the operation 911 of Figure 9. The method 1000 starts and the agent controller module 702 receives 1004 a streamlet 304 as described above with reference to Figure 9. The agent controller module 702 then monitors 1006 the receive time of the requested streamlet. In one embodiment, the agent controller module 702 monitors the time intervals Δ between successive receive times for each streamlet response. Ordering of the responses in relation to the order of their corresponding requests is not relevant.

[0101] Because network behavioral characteristics fluctuate, sometimes quite suddenly, any given Δ may vary substantially from another. In order to compensate for this fluctuation, the agent controller module 702 calculates 1008 a performance ratio r across a window of n samples for streamlets of playback length S. In one embodiment, the performance ratio r is calculated using the equation:

$$r = S \frac{n}{\sum_{i=1}^{n} \Delta_i}$$

fuboTV Media Inc.
Exhibit 1002
Page 146

[0102] Due to multiple simultaneous streamlet processing, and in order to better judge the central tendency of the performance ratio r, the agent controller module 702 may calculate a geometric mean, or alternatively an equivalent averaging algorithm, across a window of size m, and obtain a performance factor φ:

$$\varphi_{current} = \left(\prod_{j=1}^{m} r_j \right)^{\frac{1}{m}}$$

[0103] The policy determination about whether or not to upshift 1010 playback quality begins by comparing $\varphi_{current}$ with a trigger threshold Θ_{up}. If $\varphi_{current} \geq \Theta_{up}$, then an up shift to the next higher quality stream may be considered 1016. 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 709 for presentation at the current playback time index), and a minimum safety margin. In one embodiment, the minimum safety margin may be 24 seconds. The smaller the read ahead margin, the larger Θ_{up} is to discourage upshifting until a larger read ahead margin may be established to withstand network disruptions. If the agent controller module 702 is able to sustain 1016 upshift quality, then the agent controller module 702 will upshift 1017 the quality and subsequently request higher quality streams. The determination of whether use of the higher quality stream is sustainable 1016 is made by comparing an estimate of the higher quality stream's performance factor, φ_{higher}, with Θ_{up}. If $\varphi_{higher} \geq \Theta_{up}$ then use of the higher quality stream is considered sustainable. If the decision of whether or not the higher stream rate is sustainable 1016 is "no," the agent controller module 702 will not attempt to upshift 1017 stream quality. If the end of the stream has been reached 1014, the method 1000 ends 1016.

[0104] If the decision on whether or not to attempt upshift 1010 is "no", a decision about whether or not to downshift 1012 is made. In one embodiment, a trigger threshold Θ_{down} is defined in a manner analogous to Θ_{up}. If $\varphi_{current} > \Theta_{down}$ then the stream quality may be adequate, and the agent controller module 702 does not downshift 1018 stream quality.

fuboTV Media Inc.
Exhibit 1002
Page 147

However, if $\varphi_{current} \leq \Theta_{down}$, the agent controller module 702 does downshift 1018 the stream quality. If the end of the stream has not been reached 1014, the agent controller module 702 begins to request and receive 1004 lower quality streamlets and the method 1000 starts again. Of course, the above described equations and algorithms are illustrative only, and may be replaced by alternative streamlet monitoring solutions.

[0105] The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

fuboTV Media Inc.
Exhibit 1002
Page 148

CLAIMS

What is claimed is:

1. A system for adaptive-rate content streaming of digital content playable on one or more end user stations over the Internet, the system comprising:

at least one storage device storing digital content, the digital content encoded at a plurality of different bit rates creating a plurality of streams including a first bit rate stream, a second bit rate stream, and a third bit rate stream, wherein the first bit rate stream, the second bit rate stream, and the third bit rate stream each comprise a group of streamlets encoded at a respective one of the plurality of different bit rates, each group of streamlets comprising at least first and second streamlets, each of the streamlets corresponding to a portion of the digital content;

wherein at least one of the first bit rate stream, the second bit rate stream, and the third bit rate stream is encoded at a bit rate of no less than 600 kbps; and

wherein the first streamlet of each of the groups of streamlets has the same first duration and encodes the same first temporal portion of the digital content in each of the first bit rate stream, the second bit rate stream, and the third bit rate stream, and wherein the first streamlet of the first bit rate stream encodes the same first temporal portion of the digital content at a different bit rate than the first streamlet of the second bit rate stream and the first streamlet of the third bit rate stream.

2. The system of claim 1, further comprising: a plurality of servers located at different locations across the Internet, each server configured to: receive at least one streamlet request over one or more network connections from one or more end user stations to retrieve the first streamlet storing a portion of the digital content, wherein the at least one streamlet request from the one or more end user stations includes a request for a currently selected first streamlet from one of the first bit rate stream, the second bit rate stream, and the third bit rate stream based upon a determination by the end user station to select a higher or lower bit rate copy of the streams; retrieve from the at least one storage device the requested first streamlet from the currently selected one of the first bit rate stream, the second bit rate stream, and the third bit rate stream;

fuboTV Media Inc.
Exhibit 1002
Page 149

and send the retrieved first streamlet from the currently selected one of the different copies to the requesting one of the end user stations over the one or more network connections.

3. The system of claim 2, wherein the second streamlet of each of the groups of streamlets each has the same second duration and corresponds to the same second portion of the digital content in the first bit rate stream, the second bit rate stream, and the third bit rate stream, the second streamlet of the first bit rate stream having the same bit rate as the first streamlet of the first bit rate stream.

4. The system of claim 3, wherein the first and second durations are different.

5. The system of claim 1, further comprising: a first server configured to: receive at least one streamlet request over one or more network connections from the one or more end user stations to retrieve the first streamlet storing the first temporal portion of the digital content, wherein the at least one streamlet request from the one or more end user stations includes a request for a currently selected first streamlet from one of the first bit rate stream, the second bit rate stream, and the third bit rate stream based upon a determination by the end user station to select a higher or lower bit rate copy of the digital content; retrieve from the at least one storage device the requested first streamlet from the currently selected one of the first bit rate stream, the second bit rate stream, and the third bit rate stream; and send the retrieved first streamlet from the currently selected one of the first bit rate stream, the second bit rate stream, and the third bit rate stream to the requesting one of the end user stations over the one or more network connections.

6. The system of claim 5, wherein the digital content comprises a live event video of a live event, and the first streamlets of the first bit rate stream, the second bit rate stream, and the third bit rate stream are available before the live event is complete.

7. The system of claim 6, wherein the streamlets from the first bit rate stream, the second bit rate stream, and the third bit rate stream of the live event, when played back, are presented in a live stream to a viewer.

fuboTV Media Inc.
Exhibit 1002
Page 150

8. The system of claim 7, wherein the first server is further configured to: receive at least one virtual timeline request over the one or more network connections from the one or more end user stations to retrieve a virtual timeline; and send the virtual timeline to the requesting one of the end user stations over the one or more network connections.

9. The system of claim 1, further comprising:

an encoding module configured to receive the digital content and encode the streamlets of the first bit rate.

10. The system of claim 9, wherein the encoding module is configured to encode the streamlets of the multiple copies of the digital content in each of the different bit rates using a multi-pass encoding process.

11. An end user station comprising:

a processor;

a digital processing apparatus memory device comprising non-transitory machine-readable instructions that, when executed, cause the processor to:

establish one or more network connections between the end user station and at least one server, wherein the at least one server is configured to access at least one of a plurality of groups of streamlets of digital content;

wherein the digital content is encoded at a plurality of different bit rates to create a plurality of streams including at least a first bit rate stream, a second bit rate stream, and a third bit rate stream, wherein each of the first bit rate stream, the second bit rate stream, and the third bit rate stream comprises a group of streamlets encoded at the same respective one of the different bit rates, each group comprising at least first and second streamlets, each of the streamlets corresponding to a portion of the digital content;

wherein at least one of the first bit rate stream, the second bit rate stream, and the third bit rate stream is encoded at a bit rate of no less than 600 kbps; and

wherein the first streamlets of each of the first bit rate stream, the second bit rate stream and the third bit rate stream each has an equal playback duration and each of the

fuboTV Media Inc.
Exhibit 1002
Page 151

first streamlets encodes the same portion of the digital content at a different one of the different bit rates;

determine whether to select a higher or lower bit rate copy of the stream and based on that determination, select a specific one of the first bit rate stream, the second bit rate stream, and the third bit rate stream;

place a first streamlet request to the at least one server over the one or more network connections for the first streamlet of the selected stream;

receive the requested first streamlet from the at least one server via the one or more network connections; and

provide the received first streamlet for output of the digital content to a presentation device.

12. The end user station of claim 11, wherein the non-transitory machine-readable instructions further comprise instructions that cause the processor to:

place a second streamlet request to the at least one server over the one or more network connections for the second streamlet of the selected stream;

receive the requested second streamlet from the at least one server via the one or more network connections; and

arrange the first streamlet and second streamlet in order of ascending presentation time for output of the digital content to the presentation device.

13. The end user station of claim 11, wherein at least some streamlets are requested from the at least one server via a hypertext transfer protocol (HTTP) GET request.

14. The end user station of claim 11, wherein the at least one server comprises at least two servers and wherein at least one streamlet is requested from a first server of the at least one server and at least one other streamlet is requested from a second server of the at least one server other than the first server.

fuboTV Media Inc.
Exhibit 1002
Page 152

15. The end user station of claim 11, wherein each of the streamlets is requestable by the processor without regard to whether the processor has previously requested other streamlets of the digital content.

16. The end user station of claim 11, wherein at least a plurality of streamlets are separate files stored by the at least one server.

17. The end user station of claim 11, wherein the non-transitory machine-readable instructions further comprise instructions that cause the processor to:

place a second streamlet request to the at least one server over the one or more network connections for a second streamlet of a different bit rate stream, wherein the different bit rate stream comprises a different stream than the selected stream;

receive the requested second streamlet from the at least one server via the one or more network connections;

arrange the first streamlet and second streamlet in order of ascending presentation time for output of the digital content to the presentation device.

18. The end user station of claim 16, wherein the non-transitory machine-readable instructions further comprise instructions that cause the processor to:

determine an anticipated inability to receive the digital content at the second bit rate of the second bit rate stream at a rate sufficient for presenting the digital content as the digital content is received, and in response to the determining the anticipated inability, requesting a third streamlet of the first bit rate stream, the third streamlet immediately subsequently adjacent to the second streamlet of the digital content during presentation.

19. The end user station of claim 18, wherein the second streamlet of each of the groups of streamlets each has the same second duration and corresponds to the same second portion of the digital content in the first bit rate stream, the second bit rate stream, and the third bit rate stream, the second streamlet of the first bit rate stream having the same bit rate as the first streamlet of the first bit rate stream.

fuboTV Media Inc.
Exhibit 1002
Page 153

20. The end user station of claim 12, wherein the streamlets of the first bit rate stream, the second bit rate stream, and the third bit rate stream of the live event are available on a ten second delay.

21. The end user station of claim 12, wherein the processor providing the first received streamlet for playback comprises outputting the first streamlet to a presentation device connected to the end user station.

22. A process executable by one or more servers to stream digital content for playback by one or more end user stations, the process comprising:

storing, by the one or more servers, a plurality of streams including a first bit rate stream, a second bit rate stream, and a third bit rate stream, wherein the first bit rate stream, the second bit rate stream, and the third bit rate stream each comprise a group of streamlets encoded at a respective one of a plurality of different bit rates, each group comprising at least first and second streamlets, each of the streamlets corresponding to a portion of the digital content;

wherein at least one of the first bit rate stream, the second bit rate stream, and the third bit rate stream is encoded at a bit rate of no less than 600 kbps; and

wherein the first streamlet of each of the groups of streamlets has the same first duration and encodes the same first temporal portion of the digital content in the first bit rate stream, the second bit rate stream, and the third bit rate stream, the first streamlet of the first bit rate stream having a different one of the different bit rates than the first streamlet of the second bit rate stream and the first streamlet of the third bit rate stream;

receiving at least one streamlet request over one or more network connections from the one or more end user stations to retrieve the first streamlet storing the first temporal portion of the digital content, wherein the at least one streamlet request from the one or more end user stations includes a request for a currently selected first streamlet from one of the first bit rate stream, the second bit rate stream, and the third bit rate stream based upon a determination by the end user station to select a higher or lower bit rate copy of the digital content;

retrieving from the storage device the requested first streamlet from the currently selected one of the first bit rate stream, the second bit rate stream, and the third bit rate stream; and

fuboTV Media Inc.
Exhibit 1002
Page 154

sending the retrieved first streamlet from the currently selected one of the first bit rate stream, the second bit rate stream, and the third bit rate stream to the requesting one of the end user stations over the one or more network connections.

23. The method of claim 22, wherein a second streamlet of each of the groups of streamlets each has a same second duration and corresponds to a same second temporal portion of the digital content in the first bit rate stream, the second bit rate stream, and the third bit rate stream, the second streamlet of the first bit rate stream having the same bit rate as the first streamlet of the first bit rate stream.

24. The method of claim 23, wherein the first and second durations are different.

25. The method of claim 22, wherein the digital content is a live event, and wherein the first streamlets of the first bit rate stream, the second bit rate stream, and the third bit rate stream are available before the live event is complete.

26. A system for adaptive-rate content streaming of digital content playable on one or more end user stations over the Internet, the system comprising:

at least one storage device storing the digital content, the digital content encoded at a plurality of different bit rates creating a plurality of streams, each of the plurality of streams being encoded at a respective one of the plurality of different bit rates corresponding to a different presentation quality;

wherein at least one of the plurality of streams is encoded at a bit rate of no less than 600 kbps;

wherein the amount of data in each streamlet corresponding to the same part of the digital content in each of the plurality of streams varies according to the different bit rates; and

the plurality of streamlets in the plurality of streams have a time duration that is the same as each other.

27. The system of claim 26, further comprising: a plurality of servers located at different locations across the Internet, each server configured to: receive at least one streamlet request

fuboTV Media Inc.
Exhibit 1002
Page 155

over one or more network connections from the one or more end user stations to retrieve the first streamlet storing a portion of the digital content, wherein the at least one streamlet request from the one or more end user stations includes a request for a currently selected first streamlet from one of the first bit rate stream, the second bit rate stream, and the third bit rate stream based upon a determination by the end user station to select a higher or lower bit rate copy of the streams; retrieve from the storage device the requested first streamlet from the currently selected one of the first bit rate stream, the second bit rate stream, and the third bit rate stream; and send the retrieved first streamlet from the currently selected one of the different streams to the requesting one of the end user stations over the one or more network connections.

28. The system of claim 26, further comprising: a first server configured to: receive at least one streamlet request over one or more network connections from the one or more end user stations to retrieve the first streamlet storing the first temporal portion of the digital content, wherein the at least one streamlet request from the one or more end user stations includes a request for a currently selected first streamlet from one of the first bit rate stream, the second bit rate stream, and the third bit rate stream based upon a determination by the end user station to select a higher or lower bit rate copy of the digital content; retrieve from the storage device the requested first streamlet from the currently selected one of the first bit rate stream, the second bit rate stream, and the third bit rate stream; and send the retrieved first streamlet from the currently selected one of the first bit rate stream, the second bit rate stream, and the third bit rate stream to the requesting one of the end user stations over the one or more network connections.

29. The system of claim 26, wherein the digital content comprises a live event video.

30. The system of claim 29, wherein the streamlets of the first bit rate stream, the second bit rate stream, and the third bit rate stream of the live event video are available on at least a 10 second delay relative to an original transmission from a broadcaster of the live event video.

fuboTV Media Inc.
Exhibit 1002
Page 156

ABSTRACT OF THE DISCLOSURE

An apparatus for multi-bitrate content streaming includes a receiving module configured to capture media content, a streamlet module configured to segment the media content and generate a plurality of streamlets, and an encoding module configured to generate a set of streamlets. The system includes the apparatus, wherein the set of streamlets comprises a plurality of streamlets having identical time indices and durations, and each streamlet of the set of streamlets having a unique bitrate, and wherein the encoding module comprises a master module configured to assign an encoding job to one of a plurality of host computing modules in response to an encoding job completion bid. A method includes receiving media content, segmenting the media content and generating a plurality of streamlets, and generating a set of streamlets

fuboTV Media Inc.
Exhibit 1002
Page 157

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	9401-00260
	Application Number	
Title of Invention	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

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☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

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Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	DAVID	F.	BRUECK	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
SARATOGA SPRINGS	UT	US

Mailing Address of Inventor:

Address 1	962 NORTH RATTLER ROAD
Address 2	
City	SARATOGA SPRINGS
State/Province	UT
Postal Code	84043
Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	MARK	B.	HURST	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
CEDAR HILLS	UT	US

Mailing Address of Inventor:

Address 1	10639 NORTH AVALON
Address 2	
City	CEDAR HILLS
State/Province	UT
Postal Code	84062
Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	R.	DREW	MAJOR	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	9401-00260
	Application Number	
Title of Invention	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING	

City	OREM	State/Province	UT	Country of Residence	US

Mailing Address of Inventor:

Address 1	863 WEST 600 SOUTH		
Address 2			
City	OREM	State/Province	UT
Postal Code	84058	Country	US

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Application Information:

Title of the Invention	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING		
Attorney Docket Number	9401-00260	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	11	Suggested Figure for Publication (if any)	

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Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	9401-00260
	Application Number	
Title of Invention	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING	

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This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
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Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	Continuation of	16876579	2020-05-18	11470138	2022-10-11
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16876579	Continuation of	16004056	2018-06-08	10659513	2020-05-19
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16004056	Continuation of	15414025	2017-01-24	9998516	2018-06-12
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15414025	Continuation of	14719122	2015-05-21	9571511	2017-02-14
Prior Application Status	Patented				Remove
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14719122	Continuation of	14106051	2013-12-13	9071668	2015-06-30
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14106051	Continuation of	13617114	2012-09-14	8612624	2013-12-17

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	9401-00260
	Application Number	
Title of Invention	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING	

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13617114	Continuation of	12906940	2010-10-18	8402156	2013-03-19
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12906940	Continuation of	11673483	2007-02-09	7818444	2010-10-19
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
11673483	Continuation in part of	11116783	2005-04-28	8868772	2014-10-21
Prior Application Status	Expired				Remove

Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
11116783	Claims benefit of provisional	60566831	2004-04-30

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Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	9401-00260
	Application Number	
Title of Invention	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING	

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	9401-00260
	Application Number	
Title of Invention	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

PTO/AIA/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	9401-00260
	Application Number	
Title of Invention	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
● Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	DISH Technologies L.L.C.		
Mailing Address Information For Applicant:			
Address 1	9601 S. Meridian Blvd.		
Address 2			
City	Englewood	**State/Province**	CO
Country	US	Postal Code	80112
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

PTO/AIA/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	9401-00260
	Application Number	
Title of Invention	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☒

Organization Name	DISH Technologies L.L.C.

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	9601 S. Meridian Blvd.		
Address 2			
City	Englewood	**State/Province**	CO
Country [i]	US	Postal Code	80112
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/BRETT A. CARLSON/			Date (YYYY-MM-DD)	2022-10-07
First Name	Brett A.	Last Name	Carlson	Registration Number	39,928

Additional Signature may be generated within this form by selecting the Add button. Add

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	9401-00260
	Application Number	
Title of Invention	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

DECLARATION OF JOINT INVENTORS RELATING TO PATENTS AND APPLICATIONS ENTITLED "APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING"

This is a joint declaration and statement made by David F. Brueck, Mark B. Hurst, and R. Drew Major. We the undersigned each hereby declare and state that, to the best of our information and belief:

1. Each of us (David F. Brueck, Mark B. Hurst, and R. Drew Major) contributed to the inventorship of the following United States Patents and the following pending application:

US Patents:	US Patent Application
US7818444	Serial No. 15/414,025
US8402156	
US8612624	
US9071668	
US9571551	

2. The above-identified patents and applications were made or authorized to be made by me. I believe that I am the inventor or an original joint inventor of a claimed invention in each of the applications and patents referenced above.

3. Although R. Drew Major was initially omitted as an inventor, I understand that he is now being added as a joint inventor. I agree to the change of inventorship and I have no disagreement with regard to the change in inventorship. To the best of my information and belief, Mr. Major's earlier omission was made without deceptive intent.

4. I hereby declare that all statements made herein of my own knowledge are true and that all statements on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements in this declaration are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both, and

fuboTV Media Inc.
Exhibit 1002
Page 168

that willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted by:



David F. Brueck — Date: 27 Oct 2017

Mark B. Hurst — Date

R. Drew Major — Date

1001 by fine or imprisonment of not more than five (5) years, or both, and that willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted by:

David F. Brueck	Date
Mark B. Hurst	11/6/17 Date
R. Drew Major	11/6/17 Date

fuboTV Media Inc.
Exhibit 1002
Page 170

Doc Code: PA..

Document Description: Power of Attorney

PTO/AIA/82A (07-12)

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B or equivalent) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5. If the Power of Attorney by Applicant form is not accompanied by this transmittal form or an equivalent, the Power of Attorney will not be recognized in the application.

Application Number	Unassigned
Filing Date	Unassigned
First Named Inventor	DAVID F. BRUECK
Title	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING
Art Unit	Unassigned
Examiner Name	
Attorney Docket Number	9401-00260

SIGNATURE of Applicant or Patent Practitioner

Signature	/BRETT A. CARLSON/	Date	2022-10-07
Name	Brett A. Carlson	Telephone	480.241.8219
Registration Number	39,928		

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications.

[X] *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: PA.
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 70560

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

DISH Technologies L.L.C.

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	/M S Gratton/	Date (Optional)	7/6/2016
Name	Max S. Gratton		
Title	Director & Senior Corporate Counsel of DISH Technologies L.L.C.		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: TRACK1.REQ
Document Description: TrackOne Request

PTO/SB/424 (12-11)

CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION UNDER 37 CFR 1.102(e) (Page 1 of 1)

First Named Inventor:	Brueck et al.	Nonprovisional Application Number (if known):	
Title of Invention:	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING		

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.

1. The processing fee set forth in 37 CFR 1.17(i), the prioritized examination fee set forth in 37 CFR 1.17(c), and if not already paid, the publication fee set forth in 37 CFR 1.18(d) have been filed with the request. The basic filing fee, search fee, examination fee, and any required excess claims and application size fees are filed with the request or have been already been paid.

2. The application contains or is amended to contain no more than four independent claims and no more than thirty total claims, and no multiple dependent claims.

3. The applicable box is checked below:

I. ☑ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)

i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.

---OR---

(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.

ii. An executed oath or declaration under 37 CFR 1.63 is filed with the application.

II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)

i. A request for continued examination has been filed with, or prior to, this form.
ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

Signature /BRETT A. CARLSON/	Date October 7, 2022
Name (Print/Typed) Brett A. Carlson	Practitioner Registration Number 39,928

Note: *Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below*.*

☐ *Total of _____ forms are submitted.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/962,231	10/07/2022		3300	9401-00260	30	4

CONFIRMATION NO. 3515

FILING RECEIPT

70560
KW LAW LLP (Dish Technologies L.L.C.)
6122 N 7th St Suite D
Phoenix, AZ 85014

OC00000005033817S

Date Mailed: 11/02/2022

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

DAVID F. BRUECK, SARATOGA SPRINGS, UT;
MARK B. HURST, CEDAR HILLS, UT;
R. DREW MAJOR, OREM, UT;

Applicant(s)

DISH Technologies L.L.C., Englewood, CO;

Assignment For Published Patent Application

DISH Technologies L.L.C., Englewood, CO

Power of Attorney: The patent practitioners associated with Customer Number 70560

Domestic Priority data as claimed by applicant

This application is a CON of 16/876,579 05/18/2020 PAT 11,470,138
which is a CON of 16/004,056 06/08/2018 PAT 10,659,513
which is a CON of 15/414,025 01/24/2017 PAT 9,998,516
which is a CON of 14/719,122 05/21/2015 PAT 9,571,551
which is a CON of 14/106,051 12/13/2013 PAT 9,071,668
which is a CON of 13/617,114 09/14/2012 PAT 8,612,624
which is a CON of 12/906,940 10/18/2010 PAT 8,402,156
which is a CON of 11/673,483 02/09/2007 PAT 7,818,444
which is a CIP of 11/116,783 04/28/2005 PAT 8,868,772
which claims benefit of 60/566,831 04/30/2004

fuboTV Media Inc.
Exhibit 1002
Page 175

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 11/01/2022
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/962,231**
Projected Publication Date: 02/09/2023
Non-Publication Request: No
Early Publication Request: No
Title

APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign

patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 17/962,231

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	320
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	700
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	800
TOTAL CLAIMS (37 CFR 1.16(i))	30 minus 20 =	* 10			OR	x 100 =	1000
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4 minus 3 =	* 1				x 480 =	480
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	2300

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/962,231	10/07/2022	DAVID F. BRUECK	9401-00260

CONFIRMATION NO. 3515

NEW OR REVISED PPD NOTICE

70560
KW LAW LLP (Dish Technologies L.L.C.)
6122 N 7th St Suite D
Phoenix, AZ 85014

OC000000136754301

NOTICE OF NEW OR REVISED PROJECTED PUBLICATION DATE

The above-identified application has a new or revised projected publication date. The current projected publication date for this application is 02/09/2023. If this is a new projected publication date (there was no previous projected publication date), the application has been cleared by Licensing & Review or a secrecy order has been rescinded and the application is now in the publication queue.

If this is a revised projected publication date (one that is different from a previously communicated projected publication date), the publication date has been revised due to processing delays in the USPTO or the abandonment and subsequent revival of an application. The application is anticipated to be published on a date that is more than six weeks different from the originally-projected publication date.

More detailed publication information is available through the private side of Patent Application Information Retrieval (PAIR) System. The direct link to access PAIR is currently http://pair.uspto.gov. Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Questions relating to this Notice should be directed to the Office of Data Management, Application Assistance Unit at (571) 272-4000, or (571) 272-4200, or 1-888-786-0101.

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/962,231	10/07/2022	DAVID F. BRUECK	9401-00260	3515

70560 7590 12/07/2022

KW LAW LLP (Dish Technologies L.L.C.)
6122 N 7th St Suite D
Phoenix, AZ 85014

EXAMINER	
CENTRAL, DOCKET	

ART UNIT	PAPER NUMBER
OPAP	

NOTIFICATION DATE	DELIVERY MODE
12/07/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

dish@kwlaw.co
ipdept@dish.com
uspto@dockettrak.com

Decision Granting Request for Prioritized Examination (Track I)	**Application No.** 17/962,231	**Applicant(s)** BRUECK et al.	
	Examiner FIKIRTE A GEREMEW	**Art Unit** OMBL	**AIA (FITF) Status** No

1. THE REQUEST FILED 07 October 2022 IS **GRANTED** .

The above-identified application has met the requirements for prioritized examination
- A. ☑ for an original nonprovisional application (Track I).
- B. ☐ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination**. The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:
   - A. filing a **petition for extension of time** to extend the time period for filing a reply;
   - B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims** , or a multiple dependent claim;
   - C. filing a **request for continued examination** ;
   - D. filing a notice of appeal;
   - E. filing a request for suspension of action;
   - F. mailing of a notice of allowance;
   - G. mailing of a final Office action;
   - H. completion of examination as defined in 37 CFR 41.102; or
   - I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to FIKIRTE GEREMEW at (703) 756-1930. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.

/FIKIRTE A GEREMEW/ PROGRAM SUPPORT ASSISTANT, OMBL	

Doc Code: DIST.E.FILE **Document Description: Electronic Terminal Disclaimer - Filed**	PTO/SB/26 U.S. Patent and Trademark Office Department of Commerce

Electronic Petition Request	**TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT**
Application Number	17962231
Filing Date	07-Oct-2022
First Named Inventor	DAVID BRUECK
Attorney Docket Number	9401-00260
Title of Invention	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action

☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

Owner	Percent Interest
DISH Technologies L.L.C.	100%

The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s)

11470138

as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later:
- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

◉ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.

○	I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.

Applicant claims the following fee status:

○ Small Entity

○ Micro Entity

◉ Regular Undiscounted

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

◉ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application

Registration Number 39928

○ A sole inventor

○ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application

○ A joint inventor; all of whom are signing this request

Signature	/Brett Carlson/
Name	Brett Carlson

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal

Application Number:	17962231
Filing Date:	07-Oct-2022
Title of Invention:	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING
First Named Inventor/Applicant Name:	DAVID F. BRUECK
Filer:	Brett Carlson/Blake Scheffey
Attorney Docket Number:	9401-00260

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	170	170
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**170**

Doc Code: DISQ.E.FILE
Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 17962231

Filing Date: 07-Oct-2022

Applicant/Patent under Reexamination: BRUECK

Electronic Terminal Disclaimer filed on January 5, 2023

☒ APPROVED

This patent is subject to a terminal disclaimer

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

Electronic Acknowledgement Receipt

EFS ID:	47325595
Application Number:	17962231
International Application Number:	
Confirmation Number:	3515
Title of Invention:	APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING
First Named Inventor/Applicant Name:	DAVID F. BRUECK
Customer Number:	70560
Filer:	Brett Carlson/Blake Scheffey
Filer Authorized By:	Brett Carlson
Attorney Docket Number:	9401-00260
Receipt Date:	05-JAN-2023
Filing Date:	07-OCT-2022
Time Stamp:	17:10:48
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$170
RAM confirmation Number	E202315H10454767
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Terminal Disclaimer-Filed (Electronic)	eTerminal-Disclaimer.pdf	41171 cebdcb140b97dac03d7c0aadac2c42b8a52b7b27	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	37987 c71ebfc02b533e337f987bf1e4be2a935e21910d	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	79158		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	17962231
	Filing Date	2022-10-07
	First Named Inventor	David F. Brueck
	Art Unit	2454
	Examiner Name	Chirag R. Patel
	Attorney Docket Number	9401-00260

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17962231
	Filing Date	2022-10-07
	First Named Inventor	David F. Brueck
	Art Unit	2454
	Examiner Name	Chirag R. Patel
	Attorney Docket Number	9401-00260

	1	Respondents' Reply to the Commission's November 18, 2022 Request for Written Submissions on the Issues Under Review and on Remedy, the Public Interest, and Bonding (Redacted) dated December 9, 2022 (52 pages).	
	2	[Public Version] Response of the Office of Unfair Import Investigations to the Commission's Request for Written Submissions on the Issues Under Review and on Remedy, Bonding, and the Public Interest (Redacted) dated December 2, 2022 (65 pages).	
	3	Notice of Commission Determination to Review the Final Initial Determination in Part; Request for Written Submissions on the Issues Under Review and on Remedy, the Public Interest, and Bonding dated November 18, 2022 (6 pages).	
	4	Complainants' Opening Submission on the Issues Under Review and on Remedy, the Public Interest, and Bonding (Redacted) dated December 2, 2022 (59 pages).	
	5	Respondents' Response to the Commission's November 18, 2022 Request for Written Submissions on the Issues Under Review and on Remedy, the Public Interest and Bonding (Redacted) dated December 2, 2022 (63 pages).	
	6	Complainants' Reply Submission to the Commission's Questions on the Issues Under Review and On Remedy, the Public Interest, and Bonding (Redacted) dated December 9, 2022 (31 pages).	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17962231
	Filing Date	2022-10-07
	First Named Inventor	David F. Brueck
	Art Unit	2454
	Examiner Name	Chirag R. Patel
	Attorney Docket Number	9401-00260

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Brett A. Carlson/	Date (YYYY-MM-DD)	2022-01-05
Name/Print	Brett A. Carlson	Registration Number	39928

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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PATENT AND TRADEMARK OFFICE

P.O. Box 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/962,231	**01/05/2023 05:30:21 PM ET**	**9401-00260**

Title of Invention

APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	3515	FILED BY	Blake Scheffey
PATENT CENTER #	61395068	FILING DATE	10/07/2022
CUSTOMER #	70560	FIRST NAMED INVENTOR	DAVID F. BRUECK
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Brett Carlson

Documents

TOTAL DOCUMENTS: 7

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
9401-00260_IDS-14.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	598 KB
9401-00260_IDS-14_NPL-1.pdf	52	Non Patent Literature	681 KB
9401-00260_IDS-14_NPL-2.pdf	65	Non Patent Literature	575 KB
9401-00260_IDS-14_NPL-3.pdf	6	Non Patent Literature	138 KB
9401-00260_IDS-14_NPL-4.pdf	59	Non Patent Literature	2893 KB

9401-00260_IDS-14_NPL-5.pdf	63	Non Patent Literature	600 KB
9401-00260_IDS-14_NPL-6.pdf	31	Non Patent Literature	569 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
9401-00260_IDS-14.pdf	44CFCDF503AB97F5723421811710996F767D7FF0A06D7C152B24F03C2E83EB7314E642C91658247B6BF6A4ABD285B168377F69CA3B345D20A8B00BFC18E7A422
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9401-00260_IDS-14_NPL-2.pdf	69DC55ECAF890F09C5CB597C508E2868A89ABCC7764F888857B6F6187F3DD8AB73109A8E65A02D7C883F0D9D3351D361097F08685E0CA35D8B644C6365B7D0E5
9401-00260_IDS-14_NPL-3.pdf	34D3401E837099292AF7969005B3EC8B4F1C5AE3A10DBA1D07832B44B6C6A3AAA88024B9B75B53BA335C6031E3A711EF7439D8ABFB1E0DD2FC890F88B1B2D227
9401-00260_IDS-14_NPL-4.pdf	F52D89E47FC6A0AA050F8BE0957E9C8317E8D3A325ED89C624B8F4E298494FEDBF9847563F3365109D244905482F7D0165708925918F5705E2C6896A8432E7ED
9401-00260_IDS-14_NPL-5.pdf	94CD8C9BAA9865BB4A52734142E1367304866862D1A82FB150E848194FB08C0EA7A2B711754C1D5776C41BA7D4315AA5AFDBC5DB58E372A56ACC7060620E563B
9401-00260_IDS-14_NPL-6.pdf	88CFC231906D86F065E328AE3CD9DBECB0BB15A178624F096D5007DC1E4D2DF9F9DF587E7FFC0B13365318E2F523AD03EE4D7E041943653B5EE8E38AA18A5D17

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	17962231
	Filing Date	2022-10-07
	First Named Inventor	David F. Brueck
	Art Unit	2454
	Examiner Name	Chirag R. Patel
	Attorney Docket Number	9401-00260

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17962231
	Filing Date	2022-10-07
	First Named Inventor	David F. Brueck
	Art Unit	2454
	Examiner Name	Chirag R. Patel
	Attorney Docket Number	9401-00260

	1	Letter dated October 12, 2010 from Kevin Sullivan to Kevin Grange and Marcus Liassides RE: Move Networks patent application U.S. Serial No. 11/673,483 (9 pages).	
	2		
	3		
	4		
	5		
	6		

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17962231
	Filing Date	2022-10-07
	First Named Inventor	David F. Brueck
	Art Unit	2454
	Examiner Name	Chirag R. Patel
	Attorney Docket Number	9401-00260

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Brett A. Carlson/	Date (YYYY-MM-DD)	2023-01-06
Name/Print	Brett A. Carlson	Registration Number	39928

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

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P.O. Box 1450
Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/962,231	**01/06/2023 02:27:31 PM ET**	**9401-00260**

Title of Invention

APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	3515	FILED BY	Blake Scheffey
PATENT CENTER #	61399976	FILING DATE	10/07/2022
CUSTOMER #	70560	FIRST NAMED INVENTOR	DAVID F. BRUECK
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Brett Carlson

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
9401-00260_IDS-15.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	598 KB
9401-00260_IDS-15_NPL.pdf	9	Non Patent Literature	744 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
9401-00260_IDS-15.pdf	565F950D4826690BE94D0C51116C022050697D161D41A8C456 1CD845C1D775CF114EFB5EADD5D0D4C92A5642FD15918409 DC5E91F09BDC9A999EC27B7DD9CBA1

9401-00260_IDS-15_NPL.pdf	C5CD360459E4E15183B10D57EB8877471C616D6B47E8F812A C7B49380CC1F3A02D7344416BDD98B097E6449FD42EE7C54A DFFDC979B5D29F7949CF46DD1B6A93

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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NOTICE OF ALLOWANCE AND FEE(S) DUE

70560 7590 01/30/2023
KW LAW LLP (Dish Technologies L.L.C.)
6122 N 7th St Suite D
Phoenix, AZ 85014

EXAMINER	
PATEL, CHIRAG R	
ART UNIT	PAPER NUMBER
2454	

DATE MAILED: 01/30/2023

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/962,231	10/07/2022	DAVID F. BRUECK	9401-00260	3515

TITLE OF INVENTION: APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	05/01/2023

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PTOL-85 (Rev. 02/11)

fuboTV Media Inc.
Exhibit 1002
Page 203

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

70560 7590 01/30/2023

KW LAW LLP (Dish Technologies L.L.C.)
6122 N 7th St Suite D
Phoenix, AZ 85014

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/962,231	10/07/2022	DAVID F. BRUECK	9401-00260	3515

TITLE OF INVENTION: APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	05/01/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
PATEL, CHIRAG R	2454	709-219000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑Issue Fee ❑Publication Fee (if required) ❑Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

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Exhibit 1002
Page 204

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/962,231	10/07/2022	DAVID F. BRUECK	9401-00260	3515

70560 7590 01/30/2023

KW LAW LLP (Dish Technologies L.L.C.)
6122 N 7th St Suite D
Phoenix, AZ 85014

EXAMINER	
PATEL, CHIRAG R	
ART UNIT	PAPER NUMBER
2454	

DATE MAILED: 01/30/2023

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

fuboTV Media Inc.
Exhibit 1002
Page 205

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 17/962,231	Applicant(s) BRUECK et al.	
	Examiner CHIRAG R PATEL	Art Unit 2454	AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to the filing on October 7, 2022.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-25 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 10/7/22 (x13), 1/5/23, 1/6/23.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☑ Interview Summary (PTO-413), Paper No./Mail Date. 1/6/23.
5. ☑ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/CHIRAG R PATEL/
Primary Examiner, Art Unit 2454

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

EXAMINER'S AMENDMENT

Authorization for this examiner's amendment was given in an interview with Brett Carlson on January 6, 2023.

The application has been amended as follows:

26-30. (Cancelled)

Allowable Subject Matter

Claims 1-25 are allowed.

The following is an examiner's statement of reasons for allowance: Applicants filed a terminal disclaimer to overcome an obvious double patent rejection to U.S. Patent No. 11,470,138. Please see the notice of allowance for application #16/876579 on January 5, 2022 and February 2, 2022 as the references are applicable to the allowed claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chirag R Patel whose telephone number is (571)272-7966. The examiner can normally be reached on Monday to Friday from 8:00AM to 4:30PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenton Burgess, can be reached on 571-272-3949. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pairdirect.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

/Chirag R Patel/
Primary Examiner, Art Unit 2454

Examiner-Initiated Interview Summary	**Application No.** 17/962,231	**Applicant(s)** BRUECK et al.		
	Examiner CHIRAG R PATEL	**Art Unit** 2454	**AIA (First Inventor to File) Status** No	**Page** 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
CHIRAG R PATEL	Primary Examiner	Telephonic
Brett Carlson	Attorney	

Date of Interview: 06 January 2023

Issues Discussed:

Proposed Amendment(s)

Examiner contacted applicant's representative for an examiner's amendment to incorporate claim 27 into claim 26 and file a terminal disclaimer to overcome an obvious double patent rejection to U.S. Patent No. 11,470,138. Applicants suggested to cancel claims 26-30 and take the allowed claim and filed a terminal disclaimer to move case towards allowance.

/CHIRAG R PATEL/ Primary Examiner, Art Unit 2454	

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/962,231	BRUECK et al.
	Examiner	Art Unit
	CHIRAG R PATEL	2454

CPC - Searched*		
Symbol	Date	Examiner
H04N21/2662, H04L65/70, H04L65/80	01/04/2023	C.P.

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventor - Double Patent Search	01/04/2023	C.P.
PE2E Search	01/04/2023	C.P.

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
H04N	H04N21/2662	01/04/2023	C.P.
H04L	H04L65/70, H04L65/80	01/04/2023	C.P.

fuboTV Media Inc.
Exhibit 1002
Page 211

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/962,231	BRUECK et al.
	Examiner	**Art Unit**
	CHIRAG R PATEL	2454

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant						☐ CPA	☐ T.D.	☐ R.1.47		
CLAIM		**DATE**								
Final	Original	01/06/2023								
1	1	=								
2	2	=								
3	3	=								
4	4	=								
5	5	=								
6	6	=								
7	7	=								
8	8	=								
9	9	=								
10	10	=								
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15	15	=								
16	16	=								
17	17	=								
18	18	=								
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22	22	=								
23	23	=								
24	24	=								
25	25	=								
	26	-								
	27	-								
	28	-								
	29	-								
	30	-								

fuboTV Media Inc.
Exhibit 1002
Page 212

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/962,231	BRUECK et al.
	Examiner	**Art Unit**
	CHIRAG R PATEL	2454

CPC						
Symbol					**Type**	**Version**
H04L	/	65	/	70	F	2022-05-01
H04L	/	47	/	801	I	2013-01-01
H04L	/	47	/	12	I	2013-01-01
G06F	/	16	/	71	I	2019-01-01
G06F	/	16	/	183	I	2019-01-01
H04N	/	7	/	24	I	2013-01-01
H04N	/	21	/	23439	I	2013-01-01
H04N	/	21	/	4331	I	2013-01-01
H04N	/	21	/	84	I	2013-01-01
H04N	/	21	/	8456	I	2013-01-01
H04L	/	65	/	80	I	2013-01-01
H04L	/	65	/	61	I	2022-05-01
H04L	/	65	/	65	I	2022-05-01
H04L	/	65	/	1101	I	2022-05-01
H04L	/	67	/	60	I	2022-05-01
H04L	/	67	/	568	I	2022-05-01
H04L	/	67	/	02	I	2013-01-01
H04L	/	65	/	1069	I	2013-01-01
H04N	/	21	/	2662	I	2013-01-01

CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	25	
/CHIRAG R PATEL/ Primary Examiner, Art Unit 2454	09 January 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

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fuboTV Media Inc.
Exhibit 1002
Page 213

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/962,231	BRUECK et al.
	Examiner	**Art Unit**
	CHIRAG R PATEL	2454

INTERNATIONAL CLASSIFICATION					
CLAIMED					
H04L	/	65	/	70	

NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 25	
/CHIRAG R PATEL/ Primary Examiner, Art Unit 2454 (Primary Examiner)	09 January 2023 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 4

U.S. Patent and Trademark Office

Part of Paper No.: 20230104

fuboTV Media Inc.
Exhibit 1002
Page 214

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/962,231	BRUECK et al.
	Examiner	**Art Unit**
	CHIRAG R PATEL	2454

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	10	10	19	19		28								
2	2	11	11	20	20		29								
3	3	12	12	21	21		30								
4	4	13	13	22	22										
5	5	14	14	23	23										
6	6	15	15	24	24										
7	7	16	16	25	25										
8	8	17	17		26										
9	9	18	18		27										

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	25	
/CHIRAG R PATEL/ Primary Examiner, Art Unit 2454	09 January 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

U.S. Patent and Trademark Office — Part of Paper No.: 20230104

fuboTV Media Inc.
Exhibit 1002
Page 215

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)		
	Application Number	17/962231
	Filing Date	
	First Named Inventor	David F. Brueck
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					
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	1					
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							
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NON-PATENT LITERATURE DOCUMENTS			Remove
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.R.P/

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17/962231
	Filing Date	
	First Named Inventor	David F. Brueck
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

	1	Respondents' Post-Hearing Brief (Redacted) dated March 29, 2022 (321 pages).	
	2	Complainants' Post-Hearing Reply Brief (Redacted) dated April 7, 2022 (105 pages).	
	3	Commission Investigative Staff's Post-Hearing Reply Brief (Redacted) dated April 13, 2022 (42 pages).	
	4	Commission Investigative Staff's Post-Hearing Brief (Redacted) dated April 1, 2022 (311 pages).	
	5	Respondents' Reply Post-Hearing Brief (Redacted) dated April 7, 2022 (106 pages).	
	6	Complainants' Post-Hearing Brief (Redacted) dated March 29, 2022 (326 pages).	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/CHIRAG R PATEL/	Date Considered	01/05/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.R.P/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17/962231
	Filing Date	
	First Named Inventor	David F. Brueck
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Brett A. Carlson/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39928

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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(Not for submission under 37 CFR 1.99)

Application Number	17962231
Filing Date	2022-10-07
First Named Inventor	David F. Brueck
Art Unit	2454
Examiner Name	Chirag R. Patel
Attorney Docket Number	9401-00260

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	Art Unit	2454
	Examiner Name	Chirag R. Patel
	Attorney Docket Number	9401-00260

	1	Respondents' Reply to the Commission's November 18, 2022 Request for Written Submissions on the Issues Under Review and on Remedy, the Public Interest, and Bonding (Redacted) dated December 9, 2022 (52 pages).	
	2	[Public Version] Response of the Office of Unfair Import Investigations to the Commission's Request for Written Submissions on the Issues Under Review and on Remedy, Bonding, and the Public Interest (Redacted) dated December 2, 2022 (65 pages).	
	3	Notice of Commission Determination to Review the Final Initial Determination in Part; Request for Written Submissions on the Issues Under Review and on Remedy, the Public Interest, and Bonding dated November 18, 2022 (6 pages).	
	4	Complainants' Opening Submission on the Issues Under Review and on Remedy, the Public Interest, and Bonding (Redacted) dated December 2, 2022 (59 pages).	
	5	Respondents' Response to the Commission's November 18, 2022 Request for Written Submissions on the Issues Under Review and on Remedy, the Public Interest and Bonding (Redacted) dated December 2, 2022 (63 pages).	
	6	Complainants' Reply Submission to the Commission's Questions on the Issues Under Review and On Remedy, the Public Interest, and Bonding (Redacted) dated December 9, 2022 (31 pages).	

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Examiner Signature	/CHIRAG R PATEL/	Date Considered	01/06/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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	Examiner Name	Chirag R. Patel
	Attorney Docket Number	9401-00260

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Brett A. Carlson/	Date (YYYY-MM-DD)	2022-01-05
Name/Print	Brett A. Carlson	Registration Number	39928

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	First Named Inventor	David F. Brueck
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

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	1	7577750	B2	2009-08-18	Shen et al.	
	2	6195680	B1	2001-02-27	Goldszmidt et al.	
	3	6449719	B1	2002-09-10	Baker	
	4	7369610	B2	2008-05-06	Xu et al.	
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	1	20020161898	A1	2002-10-31	Hartop et al.	
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Attorney Docket Number	P2007-02-01.10/9401-00260

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fuboTV Media Inc.
Exhibit 1002
Page 235

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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Exhibit 1002
Page 236

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fuboTV Media Inc.
Exhibit 1002
Page 237

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Exhibit 1002
Page 238

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	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

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	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

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Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39928

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Exhibit 1002
Page 247

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17/962231
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	Attorney Docket Number	P2007-02-01.10/9401-00260

	3	DEFENDANT JADOO TV, INC.'S DISCLOSURE OF INVALIDITY CONTENTIONS, U.S. N. Dist. Ca. Case No. 5:18-cv-05214-EJD dated Sept. 22, 2020.	☒
	4	DEFENDANT JADOO TV, INC.'S DISCLOSURE OF INVALIDITY CONTENTIONS APPENDIX A, U.S. N. Dist. Ca. Case No. 5:18-cv-05214-EJD dated Sept. 22, 2020.	☒
	5	Balk et al., Adaptive Video Streaming: Pre-Encoded MPEG-4 with Bandwidth Scaling, 44 COMPUTER NETWORKS 415 (Mar. 2004)	☐

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Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39928

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	17/962231
Filing Date	
First Named Inventor	DAVID F. BRUECK
Art Unit	
Examiner Name	
Attorney Docket Number	P2007-02-01.10/9401-00260

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5414455	A	1995-05-09	HOOPER Donald F et al.	
	2	5867230	A	1999-02-02	WANG Feng Chi et al.	
	3	5941951	A	1999-08-24	DAY Michael Norman et al.	
	4	5996025	A	1999-11-30	DAY Michael Norman et al.	
	5	6292834	B1	2001-09-18	RAVI et al.	
	6	6389473	B1	2002-05-14	CARMEL et al.	
	7	6490627	B1	2002-12-03	KALRA et al.	
	8	6498897	B1	2002-12-24	NELSON et al.	

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	9	6637031	B1	2003-10-21	CHOU	
	10	7047307	B2	2006-05-16	LI	
	11	7386627	B1	2008-06-10	LANGO et al.	
	12	8711701	B2	2014-04-29	JU	
	13	8818127	B2	2014-08-26	HAYATA et al.	
	14	9407564	B2	2016-08-02	MAJOR et al.	
	15	10469554	B2	2019-11-05	BRUECK et al.	
	16	10469555	B2	2019-11-05	BRUECK et al.	
	17	10757156	B2	2020-08-25	MAJOR et al.	
	18	10951680	B2	2021-03-16	BRUECK et al.	

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	1	20020002708	A1	2002-01-03	ARYE	
	2	20020044528	A1	2002-04-18	POGREBINSKY et al.	
	3	20020131496	A1	2002-09-19	VASUDEVAN et al.	
	4	20030061305	A1	2003-03-27	COPLEY et al.	
	5	20030067872	A1	2003-04-10	HARRELL et al.	
	6	20030067875	A1	2003-04-10	YOSHIDA et al.	
	7	20030072376	A1	2003-04-17	KRISHNAMACHARI et al.	
	8	20030152036	A1	2003-08-14	QUIGG Brown et al.	
	9	20030236906	A1	2003-12-25	KLEMETS et al.	
	10	20040202109	A1	2004-10-14	AKIYAMA et al.	

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	11	20040260827	A1	2004-12-23	WANG	
	12	20050177618	A1	2005-08-11	ZIMLER et al.	
	13	20080086570	A1	2008-04-10	DEY et al.	

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	1	1394973	EP	B1	2010-05-26	MATSUSHITA ELECTRIC IND CO LTD		
	2	03041413	WO	A1	2003-05-15	PA CONSULTING SERVICES LIMITED		
	3	2005000116	KR	A	2005-01-06	SAMSUNG ELECTRONICS CO LTD		
	4	0245372	WO	A3	2002-09-06	BRITISH TELECOMMUNICATION PUBLIC LTD CO		
	5	2006086717	WO	A1	2006-08-17	VIDIATOR ENTERPRISES INC.		
	6	2004057832	WO	A1	2004-07-08	KONIN-KLIJKE PHILIPS ELECTRONICS N.V.		

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	Attorney Docket Number	P2007-02-01.10/9401-00260

	7	2004021668	WO	A1	2004-03-11	KONIN-KLIJKE PHILIPS ELECTRONICS N.V.		

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Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39,928

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Doc description: Information Disclosure Statement (IDS) Filed

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	First Named Inventor	David F. Brueck
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

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/C.R.P/	1	11470138		2022-10-11	Brueck et al.	

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/C.R.P/	1	INITIAL DETERMINATION ON VIOLATION OF SECTION 337 AND RECOMMENDED DETERMINATION ON REMEDY AND BOND US Int'l Trade Commission Investigation No. 337-TA-1265 (September 9, 2022)	

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Examiner Signature	/CHIRAG R PATEL/	Date Considered	01/05/2023

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17/962231
	Filing Date	
	First Named Inventor	DAVID F. BRUECK
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

	1	Investigation No. 337-TA-1265: APPENDIX A TO EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY: ANTICIPATION AND OBVIOUSNESS OVER CARMEL.	
	2	Investigation No. 337-TA-1265: APPENDIX B TO EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY: ANTICIPATION AND OBVIOUSNESS OVER AKIYAMA.	
	3	Investigation No. 337-TA-1265: APPENDIX C-1 TO EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY: ANTICIPATION AND OBVIOUSNESS OVER REALNETWORKS	
	4	Investigation No. 337-TA-1265: APPENDIX C-2 TO EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY: REALNETWORKS EXPERIMENTATION	
	5	Investigation No. 337-TA-1265: APPENDIX D TO EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY: ANTICIPATION AND OBVIOUSNESS OVER KLEMETS	
	6	Investigation No. 337-TA-1265: EXHIBIT E TO EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY: ANTICIPATION AND OBVIOUSNESS OVER OPLAYO	
	7	Investigation No. 337-TA-1265: APPENDIX F TO EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY: ANTICIPATION AND OBVIOUSNESS OVER KIKUCHI	
	8	Investigation No. 337-TA-1265: APPENDIX G TO EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY: ANTICIPATION AND OBVIOUSNESS OVER TAKEMURA	
	9	Investigation No. 337-TA-1265: APPENDIX H TO EXPERT REPORT OF DR. IAIN RICHARDSON ON NVALIDITY: PUBLIC USE [Redacted]	
	10	Investigation No. 337-TA-1265: Exhibit 1 Dr. Iain Richardson curriculum vitae Dec21.	
	11	Investigation No. 337-TA-1265: RICHARDSON REPORT EXHIBIT 3: MATERIALS CONSIDERED	

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	Attorney Docket Number	P2007-02-01.10/9401-00260

	12	Investigation No. 337-TA-1265: Appendix A To Supplemental Expert Report if Dr. Iain Richardson [Redacted]	
	13	Investigation No. 337-TA-1265: SUPPLEMENTAL EXPERT REPORT OF ROBERT L. STOLL	
	14	Investigation No. 337-TA-1265: SUPPLEMENTAL EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY [Redacted]	
	15	Investigation No. 337-TA-1265: SUPPLEMENTAL REBUTTAL EXPERT REPORT OF KEVIN JEFFAY, PHD, REGARDING VALIDITY [Redacted]	
	16	Investigation No. 337-TA-1265: SUPPLEMENTAL REBUTTAL EXPERT REPORT OF TERESA STANEK REA [Redacted]	

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	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

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OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39928

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
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	Application Number	17/962231
	Filing Date	
	First Named Inventor	DAVID F. BRUECK
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

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	Filing Date	
	First Named Inventor	DAVID F. BRUECK
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

	1	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Akiyama et al	
	2	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Arye et al.	
	3	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Carmel et al.	
	4	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Chou et al.	
	5	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Durrant et al.	
	6	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Gentric	
	7	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Kitamura	
	8	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Klemets et al.	
	9	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Oplayo et al.	
	10	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") QOAS	
	11	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") QuickTime Changes	

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	12	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") QuickTime	
	13	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Ravi	
	14	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") RealOne Player	
	15	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Walker	
	16	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Wang	
	17	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Wu	
	18	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") RealSystem G2	
	19	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Akiyama et al.	
	20	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Ayre	
	21	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Carmel et. al.	
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	36	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Dey	
	37	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Microsoft	
	38	DISH - Respondent's Joint Disclosure of Supplemental Invalidity Contentions in Response to Individual Interrogatories.	
	39	MIRROR - RESPONDENTS LULULEMON ATHLETICA INC. and CURIOUSER PRODUCTS INC. d/b/a MIRROR FIRST AMENDED RESPONSE TO COMPLAINT UNDER SECTION 337 OF THE TARIFF ACT OF 1930, AS AMENDED, STATEMENT OF PUBLIC INTEREST AND NOTICE OF INSTITUTION OF INVESTIGATION.	
	40	PELOTON - RESPONDENT PELOTON INTERACTIVE, INC.'S FIRST AMENDED RESPONSE TO COMPLAINT AND TO NOTICE OF INVESTIGATION	
	41	ICON - RESPONDENTS' JOINT DISCLOSURE OF INITIAL INVALIDITY CONTENTIONS IN RESPONSE TO INDIVIDUAL INTERROGATORIES	
	42	RESPONDENTS' NOTICE OF PRIOR ART	
	43	ICON and Free Motion Fitness, Inc. VERIFIED RESPONSE OF ICON HEALTH & FITNESS, INC., FREE MOTION FITNESS, INC., AND NORDICTRACK, INC. TO COMPLAINT OF DISH DBS CORPORATION, DISH TECHNOLOGIES L.L.C., AND SLING TV L.L.C. AND TO NOTICE OF INVESTIGATION	

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☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39,928

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Bibliographic Data

Application No: 17/962,231

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /CHIRAG R PATEL/ Examiner's Signature | Initials

Title: APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/07/2022	709	2454	9401-00260
RULE			

APPLICANTS

DISH Technologies L.L.C.,

INVENTORS

DAVID F. BRUECK, SARATOGA SPRINGS, UT, UNITED STATES

MARK B. HURST, CEDAR HILLS, UT, UNITED STATES

R. DREW MAJOR, OREM, UT, UNITED STATES

CONTINUING DATA

This application is a CON of 16876579 05/18/2020 PAT 11470138

16876579 is a CON of 16004056 06/08/2018 PAT 10659513

16004056 is a CON of 15414025 01/24/2017 PAT 9998516

15414025 is a CON of 14719122 05/21/2015 PAT 9571551

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11673483 is a CIP of 11116783 04/28/2005 PAT 8868772

11116783 has PRO of 60566831 04/30/2004

FOREIGN APPLICATIONS

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FILING FEE RECEIVED

$7,640

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	72	brueck ADJ david.in.	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/03 10:11 PM
L2	0	L1 AND "600" ADJ kbps.clm	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/03 10:12 PM
L3	8	L1 AND "600".clm.	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/03 10:13 PM
L4	0	L1 AND "600".clm. AND TEMPORAL.CLM.	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/03 10:15 PM
L5	3	L1 AND TEMPORAL.CLM.	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/03 10:16 PM
L6	248	("10469554" OR "10469555" OR "10757156" OR "10951680" OR "11470138" OR "20010013128" OR "20010047423" OR "20020002708" OR "20020029274" OR "20020044528" OR "20020073167" OR "20020091840" OR "20020097750" OR "20020131496" OR "20020144276" OR "20020152317" OR "20020152318" OR "20020156912" OR "20020161898" OR "20020161908" OR "20020161911" OR "20020169926" OR "20020170062" OR "20020174434" OR "20020176418" OR "20020178330" OR "20020188745" OR "20030005455" OR "20030009578" OR "20030014684" OR "20030018966" OR "20030021166" OR "20030021282" OR "20030055995" OR "20030061305" OR "20030065803" OR "20030067872" OR "20030067875" OR "20030072376" OR "20030081582" OR "20030093790" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/04 05:00 PM

fuboTV Media Inc.
Exhibit 1002
Page 277

		"20030107994" OR "20030135631" OR "20030135863" OR "20030140159" OR "20030151753" OR "20030152036" OR "20030154239" OR "20030195977" OR "20030204519" OR "20030204602" OR "20030233464" OR "20030236904" OR "20030236906" OR "20040003101" OR "20040010613" OR "20040030547" OR "20040030599" OR "20040030797" OR "20040031054" OR "20040049780" OR "20040054551" OR "20040071209" OR "20040083283" OR "20040093420" OR "20040103444" OR "20040117427" OR "20040136327" OR "20040143672" OR "20040168052" OR "20040170392" OR "20040179032" OR "20040199655" OR "20040202109" OR "20040220926" OR "20040221088" OR "20040260701" OR "20040260827" OR "20040267956" OR "20050015509" OR "20050033855" OR "20050055425" OR "20050066063" OR "20050076136" OR "20050084166" OR "20050108414" OR "20050120107" OR "20050123058" OR "20050177618" OR "20050185578" OR "20050188051" OR "20050204046" OR "20050207569" OR "20050251832" OR "20050262257" OR "20060010003" OR "20060059223" OR "20060075446" OR "20060080718" OR					

		"20060130118" OR "20060133809" OR "20060165166" OR "20060168290" OR "20060206246" OR "20060236219" OR "20060277564" OR "20061068295" OR "20070024705" OR "20070030833" OR "20070067480" OR "20070079325" OR "20070094405" OR "20070204310" OR "20070280255" OR "20080022343" OR "20080028428" OR "20080037527" OR "20080046939" OR "20080056373" OR "20080086570" OR "20080104647" OR "20080120330" OR "20080120342" OR "20080133766" OR "20080162713" OR "20080184688" OR "20080195744" OR "20080205291" OR "20080219151" OR "20080222235" OR "20080263180" OR "20080281803" OR "20090043906" OR "20090055471" OR "20090055547" OR "20090210549" OR "20100098103" OR "20100262711" OR "20110307545" OR "20150058496" OR "4535355" OR "5168356" OR "5267334" OR "5404446" OR "5414455" OR "5424455" OR "5544318" OR "5687095" OR "5732183" OR "57685627" OR "5841432" OR "5867230" OR "5933603" OR "5941951" OR "5953506" OR "5966015" OR "5966025" OR					

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		"7330908" OR "7334044" OR "7349358" OR "7349976" OR "7369610" OR "7376747" OR "7386627" OR "7391717" OR "7408984" OR "7412531" OR "7477688" OR "7523181" OR "7536469" OR "7546355" OR "7558869" OR "7577750" OR "7593333" OR "7599307" OR "7609652" OR "7653735" OR "7707303" OR "7719985" OR "7760801" OR "7779135" OR "7788395" OR "7797439" OR "7817985" OR "7818444" OR "7925781" OR "7974200" OR "8036265" OR "8370514" OR "8402156" OR "8521836" OR "8612624").pn.					
L7	9	("8683066" OR "8686066" OR "8711701" OR "8818127" OR "8868772" OR "8880721" OR "9344496" OR "9407564" OR "9462074").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/04 05:00 PM
L8	257	("10469554"|"10469555 "|"10757156"|"1095168 0"|"11470138"|"200100 13128"|"20010047423"| "20020002708"|"20020 029274"|"20020044528 "|"20020073167"|"2002 0091840"|"2002009775 0"|"20020131496"|"200 20144276"|"200201523 17"|"20020152318"|"20 020156912"|"20020161 898"|"20020161908"|"2	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/04 05:04 PM

		0020161911"|"2002016 9926"|"20020170062"|" 20020174434"|"200201 76418"|"20020178330"| "20020188745"|"20030 005455"|"20030009578 "|"20030014684"|"2003 0018966"|"2003002116 6"|"20030021282"|"200 30055995"|"200300613 05"|"20030065803"|"20 030067872"|"20030067 875"|"20030072376"|"2 0030081582"|"2003009 3790"|"20030107994"|" 20030135631"|"200301 35863"|"20030140159"| "20030151753"|"20030 152036"|"20030154239 "|"20030195977"|"2003 0204519"|"2003020460 2"|"20030233464"|"200 30236904"|"200302369 06"|"20040003101"|"20 040010613"|"20040030 547"|"20040030599"|"2 0040030797"|"2004003 1054"|"20040049780"|" 20040054551"|"200400 71209"|"20040083283"| "20040093420"|"20040 103444"|"20040117427 "|"20040136327"|"2004 0143672"|"2004016805 2"|"20040170392"|"200 40179032"|"200401996 55"|"20040202109"|"20 040220926"|"20040221 088"|"20040260701"|"2 0040260827"|"2004026 7956"|"20050015509"|" 20050033855"|"200500 55425"|"20050066063"| "20050076136"|"20050 084166"|"20050108414 "|"20050120107"|"2005 0123058"|"2005017761 8"|"20050185578"|"200 50188051"|"200502040 46"|"20050207569"|"20 050251832"|"20050262 257"|"20060010003"|"2 0060059223"|"2006007 5446"|"20060080718"|" 20060130118"|"200601 33809"|"20060165166"| "20060168290"|"20060 206246"|"20060236219					

		"|"20060277564"|"2006 1068295"|"2007002470 5"|"20070030833"|"200 70067480"|"200700793 25"|"20070094405"|"20 070204310"|"20070280 255"|"20080022343"|"2 0080028428"|"2008003 7527"|"20080046939"|" 20080056373"|"200800 86570"|"20080104647"| "20080120330"|"20080 120342"|"20080133766 "|"20080162713"|"2008 0184688"|"2008019574 4"|"20080205291"|"200 80219151"|"200802222 35"|"20080263180"|"20 080281803"|"20090043 906"|"20090055471"|"2 0090055547"|"2009021 0549"|"20100098103"|" 20100262711"|"201103 07545"|"20150058496"| "4535355"|"5168356"|"5 267334"|"5404446"|"54 14455"|"5424455"|"554 4318"|"5687095"|"5732 183"|"57685627"|"5841 432"|"5867230"|"59336 03"|"5941951"|"595350 6"|"5966015"|"5966025" |"5996025"|"6003030"|" 6091775"|"6091777"|"6 112239"|"6122660"|"61 54744"|"6172672"|"618 1867"|"6185736"|"6195 680"|"6292383"|"62928 34"|"6366614"|"637428 9"|"6389473"|"6449719" |"6486803"|"6490627"|" 6498897"|"6510553"|"6 574591"|"6604118"|"66 18752"|"6625643"|"663 7031"|"6665726"|"6708 213"|"6721723"|"67316 00"|"6757796"|"676077 2"|"6766407"|"6795863" |"6845107"|"6850965"|" 6859839"|"6874015"|"6 968387"|"6976090"|"70 47307"|"7054365"|"705 4774"|"7054911"|"7075 986"|"7093001"|"70962 71"|"7099954"|"711689 4"|"7174385"|"7194549" |"7240100"|"7260640"|" 7274740"|"7295520"|"7				

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L9	4	L8 AND STREAM WITH MULTIPLE NEAR2 BIT$2RATE	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/04 08:21 PM
L10	9	L8 AND STREAMLET WITH MULTIPLE NEAR2 BIT$2RATE	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/04 08:21 PM
L11	405	encod$3 near3 (video content) WITH multiple near2 bit$2rates	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/04 08:24 PM
L12	0	encod$3 near3 (video content) WITH multiple near2 bit$2rate AND @rlad<"20040430"	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/04 08:28 PM
L13	0	encod$3 near3 (video content) SAME multiple near2 bit$2rate AND @rlad<"20040430"	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/04 08:28 PM
L14	324	encod$3 near3 (video content) SAME multiple near2 bit$2rate	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/04 08:28 PM
L15	5	encod$3 near3 (video content) SAME multiple near2 bit$2rate AND @ad<"20040430"	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/04 08:31 PM
L16	131	encod$3 near3 (video content) WITH streamlet	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/04 08:31 PM
L17	0	encod$3 near3 (video content) WITH streamlet AND @RLAD<"20040430"	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/04 08:32 PM
L18	0	encod$3 near3 (video	(US-PGPUB; USPAT;	OR	ON	ON	2023/01/04

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Exhibit 1002
Page 284

		content) WITH streamlet AND @AD<"20040430"	USOCR; EPO)				08:32 PM
L19	25624	(H04N21/2662 OR H04L65/70 OR H04L65/80).CPC.	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/04 10:14 PM
L20	73	(H04N21/2662 OR H04L65/70 OR H04L65/80).CPC. AND encod$3 near3 (video) WITH plurality near3 bit$2rates	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/04 10:14 PM
L21	1	(H04N21/2662 OR H04L65/70 OR H04L65/80).CPC. AND encod$3 near3 (video) WITH plurality near3 bit$2rates AND @ad<"20040430"	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/04 10:14 PM
L22	0	(H04N21/2662 OR H04L65/70 OR H04L65/80).CPC. AND encod$3 near3 (video) WITH plurality near3 bit$2rates AND @rlad<"20040430"	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/04 10:15 PM
L23	435	(H04N21/2662 OR H04L65/70 OR H04L65/80).CPC. AND encod$3 near3 (video) SAME bit$2rate WITH (plurality multiple)	(US-PGPUB; USPAT; USOCR; EPO)	OR	ON	ON	2023/01/04 10:18 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	435	(H04N21/2662 OR H04L65/70 OR H04L65/80).CPC. AND encod$3 near3 (video) SAME bit$2rate WITH (plurality multiple)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/04 10:18 PM
N2	10	(H04N21/2662 OR H04L65/70 OR H04L65/80).CPC. AND encod$3 near3 (video) SAME bit$2rate WITH (plurality multiple) AND @ad<"20040430"	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/04 10:18 PM
N3	0	(H04N21/2662 OR H04L65/70 OR H04L65/80).CPC. AND encod$3 near3 (video) SAME bit$2rate WITH	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/04 10:58 PM

		(plurality multiple) WITH (interval duration temporal) AND @ad<"20040430"					
N4	1	(H04N21/2662 OR H04L65/70 OR H04L65/80).CPC. AND encod$3 near3 (video) SAME bit$2rate WITH (plurality multiple) SAME (interval duration temporal) AND @ad<"20040430"	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/04 10:58 PM
N7	0	streamlets WITH multiple near2 bit$2rates	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/04 10:59 PM
N8	55	streamlets WITH bit$2rate	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/04 10:59 PM

encoding video multiple bitrates streamlet;

About 188 results

Download | Side-by-si

Sort by · Relevance | Group by · None | Deduplicate by · Family | Results / page · 10

Wireless video transmission system



WO US JP · US9544602B2 · Mehmet Umut Demircin · Sharp Laboratories Of America, Inc.
Priority 2005-12-30 · Filed 2006-06-30 · Granted 2017-01-10 · Published 2017-01-10
A transmission systems suitable for video.

Distortion avoidance while streaming public safety video in smart cities

Google Scholar · link.springer.com · Khorov E · International Workshop on Multiple Access Communications
Published 2015
... of transmission of protected **video stream** in the presence of ... **stream bit** rate peaks may make it impossible to deliver **video** ... , let us study how the errors are located along the **video** sample...

Stable video rate adaptation for congestion control

WO US CN CA GB · CA2742447C · Mojtaba Hosseini · Magor Communications Corporation
Priority 2008-11-07 · Filed 2009-09-18 · Granted 2017-03-21 · Published 2017-03-21
STABLE VIDEO RATE ADAPTATION FOR CONGESTION CONTROL FIELD OF THE INVENTION [001] The instant invention relates generally to videoconferencing, and more particularly to dynamically adjusting video encoding and input parameters for enhancing a videoconferencing experience over a best effort network.

Switching between bit-streams in video transmission

US ZA · US7720644B2 · Marta Karczewicz · Nokia Corporation
Priority 2001-01-03 · Filed 2002-01-03 · Granted 2010-04-27 · Published 2010-04-27
CROSS-REFERENCE TO RELATED APPLICATIONS This application is the U.S. National Phase of International Application PCT/FI02/0004 filed Jan. 3, 2002 and published in English on Jul. 11, 2002 under International Publication No. WO 02/054776 A1 which in turn claims priority from U.S. application Ser.

Wireless video transmission system



US · US8superscript792 · Petrus J. L. Van Beek · Sharp Laboratories Of America, Inc.
Priority 2004-10-30 · Filed 2005-04-21 · Granted 2013-01-15 · Published 2013-01-15
A transmission system suitable for video where a sender encodes video for transmission to a receiver at an adjustable date rate. The data rate may be adjusted using a delay constraint that constrains the expected delay of transmitted packets. The expected delay may be measured from a time that a ...

Switching between bit-streams in video transmission



WO EP US CN JP BR CA EE HK MY MX · EP1356684B1 · Marta Karczewicz · Nokia Technologies Oy
Priority 2001-01-03 · Filed 2002-01-03 · Granted 2016-08-03 · Published 2016-08-03
A method for transmitting video information, in which at least a first bit-stream (510) and a second bit-stream are formed from the video information, the first bit-stream (510) comprises a first set of frames comprising at least one video frame, and the second bit-stream (520) comprises a second ...

Sender-side bandwidth estimation for video transmission with receiver packet ...



US · US7784076B2 · Mehmet U. Demircin · Sharp Laboratories Of America, Inc.
Priority 2004-10-30 · Filed 2005-04-21 · Granted 2010-08-24 · Published 2010-08-24
A method of adaptively encoding video in response to an estimation of bandwidth over a transmission channel, where bandwidth estimation uses feedback packets from a receiver acknowledging receipt of video packets transmitted during an interval when the transmitted packets are not stored in a ...

Wireless video transmission system



US · US8018850B2 · Petrus J. L. Van Beek · Sharp Laboratories Of America, Inc.
Priority 2004-02-23 · Filed 2004-04-21 · Granted 2011-09-13 · Published 2011-09-13
A transmission systems suitable for video.

User-friendly H. 264/AVC for remote browsing

Google Scholar · www.simula.no · N P · Proceedings of the 14th ACM international conference on Multimedia
Published 2006
... The proportion of S-frames decides the amount of S-frames added into a **video stream**. Let N denote the number of ... sequences with different content and at different average **bitrates**. ...

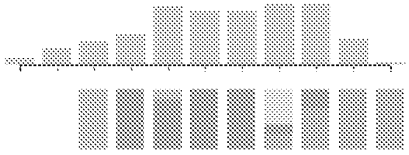
Packet scheduling for video transmission with sender queue control



US • US7729392B2 • Mehmet U. Demircin • Sharp Laboratories Of America, Inc.
Priority 2004-10-30 • Filed 2005-04-21 • Granted 2010-09-14 • Published 2010-09-14
A transmission systems suitable for video.

Next > >> About 188 results

Top 1000 results by filing date



Relative count of top 5 values

Assignees	Inventors	CPCs
DISH Technologies L.L.C.		4
Echostar Technologies L.L.C.		3
엘지전자 주식회사		3
Sharp Laboratories Of America, Inc.		3
Koninklijke Philips Electronics N.V.		2

Expand

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	17/962231
Filing Date	
First Named Inventor	David F. Brueck
Art Unit	
Examiner Name	
Attorney Docket Number	P2007-02-01.10/9401-00260

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	8521836	B2	2013-08-27	Kewalramani et al.	
	2	7558869	B2	2009-07-07	Leon et al.	
	3	7707303	B2	2010-04-27	Albers et al.	
	4	7925781	B1	2011-04-12	Chan et al.	
	5	8880721	B2	2014-11-04	Hurst et al.	
	6	9344496	B2	2016-05-17	Hurst et al.	
	7	8683066	B2	2014-03-25	Hurst et al.	
	8	8686066	B2	2014-04-01	Kwampian et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.R.P/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17/962231
	Filing Date	
	First Named Inventor	David F. Brueck
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

	9	6708213	B1	2004-03-16	Bommaiah et al.	
	10	6757796	B1	2004-06-29	Hofmann	
	11	9462074	B2	2016-10-04	Guo et al.	

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U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20050033855	A1	2005-02-10	Moradi et al.	
	2	20030093790	A1	2003-05-15	Logan et al.	
	3	20030195977	A1	2003-10-16	Liu et al.	
	4	20040199655	A1	2004-10-07	Davies et al.	
	5	20040267956	A1	2004-12-30	Leon et al.	
	6	20040220926	A1	2004-11-04	Lamkin et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.R.P/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17/962231
	Filing Date	
	First Named Inventor	David F. Brueck
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

	7	20060010003	A1	2006-01-12	Kruse	
	8	20060277564	A1	2006-12-07	Jarman	
	9	20150058496	A1	2015-02-26	Hurst et al.	
	10	20100262711	A1	2010-10-14	Bouazizi	
	11	20050251832	A1	2005-11-10	Chiueh	
	12	20040221088	A1	2004-11-04	Lisitsa et al.	
	13	20040179032	A1	2004-09-16	Huang	
	14	20020161908	A1	2002-10-31	Benitez et al.	
	15	20030021282	A1	2003-01-30	Hospodor	
	16	20080120330	A1	2008-05-22	Reed et al.	
	17	20080120342	A1	2008-05-22	Reed et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.R.P/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17/962231
	Filing Date	
	First Named Inventor	David F. Brueck
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

	18	20110307545	A1	2011-12-15	BOUAZIZI	
	19	20050262257	A1	2005-11-24	Major et al.	
	20	20030236904	A1	2003-12-25	Walpole et al.	

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	1	Krasic et al., QUALITY-ADAPTIVE MEDIA STREAMING BY PRIORITY DROP, Oregon Graduate Institute, 2001.	☒
	2	Krasic et al., QoS SCALABILITY FOR STREAMED MEDIA DELIVERY, Oregon Graduate Institute School of Science & Engineering Technical Report CSE 99-011, September 1999.	☒
	3	Huang et al., ADAPTIVE LIVE VIDEO STREAMING BY PRIORITY DROP, Portland State University PDXScholar, July 21, 2003.	☒

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	7	GOYAL, VIVEK K. "Multiple Description Coding: Compression Meets the Network," September 2001, pgs. 74-93, IEEE Signal Processing Magazine.	☒
	8	ON2 TECHNOLOGIES, INC. "TrueMotion VP7 Video Codec" White Paper, Document Version 1.0, January 10, 2005.	☒
	9	PATHAN, AL-MUKADDIM ET AL. "A Taxonomy and Survey of Content Delivery Networks" Australia, February 2007, available at http://www.gridbus.org/reports/CDN-Taxonomy.pdf.	☒
	10	PURI, ROHIT ET AL. "Multiple Description Source Coding Using Forward Error Correction Codes," October 1999, 5 pgs., Department of Electrical Engineering and Computer Science, University of California, Berkeley, CA.	☒
	11	WICKER, STEPHEN B. "Error Control Systems for Digital Communication and Storage," Prentice-Hall, Inc., New Jersey, USA, 1995, parts 1-6.	☒
	12	LIU, JIANGCHUAN ET AL. "Opportunities and Challenged of Peer-to-Peer Internet Video Broadcast," School of Computing Science, Simon Fraser University, British Columbia, Canada. no date	☒
	13	CLEMENT, B. "Move Networks closes $11.3 Million on First Round VC Funding," Page One PR, Move Networks, Inc. Press Releases, February 7, 2007, http://www.move.tv/press/press20070201.html.	☒
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	5	5941951		1999-08-24	Day et al.	
	6	5966015		1999-10-12	Horii	
	7	5966025		1999-10-12	Beffa	
	8	6003030		1999-12-14	Kenner et al.	

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	2	20030061305	A1	2003-03-27	Copley et al.	
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	13	20080022343	A1	2008-01-24	Hodzic et al.	
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	3	2003041413	WO	A1	2003-05-15	PA CONSULTING SERVICES LIMITED		
	4	2003042856	WO	A1	2003-05-22	AEROCAST.COM, INC.		
	5	2004021668	WO	A1	2004-03-11	KONINKLIJKE PHILIPS ELECTRONICS N.V.		
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	7	2006086717	WO	A1	2006-08-17	VIDIATOR ENTERPRISES INC.		
	8	2004295569	JP	A	2004-10-21	SONY CORP		
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	1	RealPlayer Plus™ G2 Manual", RealNetworks Inc., Seattle, WA (1998-1999), pp. 1-77	
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	12	Mac OS X Server QuickTime Streaming Server 5.0 Administration, Apple Computer Inc., Cupertino, CA (2003), pp. 1-65.	
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	14	RESPONDENT PELOTON INTERACTIVE, INC.'S RESPONSE TO COMPLAINT US Int'l Trade Commission Investigation. No. 337-TA-1265.	
	15	VERIFIED RESPONSE OF ICON HEALTH & FITNESS, INC., FREE MOTION FITNESS, INC., AND NORDICTRACK, INC. TO COMPLAINT US Int'l Trade Commission Investigation. No. 337-TA-1265.	

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Doc code: IDS
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	1	MUNTEAN, G-M., "A New Adaptive Multimedia Streaming System for All-iP Multi-Service Networks", IEEE Trans. On Broadcasting, March 2004, pp. 1-10, Vol. 50, No. 1.	
	2	Akamai buys InterVu, February 7, 2000.	
	3	Akamai, Akamai Completes Acquisition of Speedera Networks no date	
	4	Bill Gates Unveils the Next Wave of Digital Media with Windows Media 9 Series, September 3, 2002.	
	5	Darwin Steaming Server Source Code Developer Notes, June 15, 2021, Darwin Steaming Server 2	
	6	IBM Goes Straight to Video - CNET, June 15, 2021	
	7	News in Brief: IBM VideoCharger, December 18, 1996	
	8	BIRNEY, "Intelligent Streaming", May 21, 2021	
	9	InterVu & Excalibur Partner to Deliver Live Internet Newscasts - Bloomberg, December 9, 1999.	
	10	Introduction to Streaming Media with RealOne Player, October 1, 2002.	
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	12	Press Releases: Macromedia Flash Media Server 2 Now Available. Flash Media Server 2 Brings the Power of the Flash Platform to Web Video. no date	
	13	Move Networks: The Story of a Failure - GigaOm no date	
	14	QuickTime 6: Summary of Changes and Enhancements no date	
	15	CHOU, et al., "Rate-Distortion Optimized Receiver-Driven Streaming over Best-Effort Networks", IEEE Fourth Workshop on Multimedia Signal Processing, 3 October 2001, pp. 1-10	
	16	FESTA P., RealNetworks tests G2, July 13, 1998.	
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	23	CONKLIN, G.J., et al. "Video Coding for Streaming Media Delivery on the Internet", IEEE Trans. on Circuits and Systems for Video Technology, March 3, 2001, pp. 281, Vol. 11. No 3.	

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Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39928

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	1	Investigation No. 337-TA-1265: Redacted REBUTTAL EXPERT REPORT OF TERESA STANEK REA	
	2	Investigation No. 337-TA-1265: Redacted REBUTTAL EXPERT REPORT OF KEVIN JEFFAY, PHD., REGARDING VALIDITY	
	3	Investigation No. 337-TA-1265: Redacted EXPERT REPORT OF DR. IAIN RICHARDSON ON INVALIDITY	
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/C.R.P./	1	Letter dated October 12, 2010 from Kevin Sullivan to Kevin Grange and Marcus Liassides RE: Move Networks patent application U.S. Serial No. 11/673,483 (9 pages).	
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Signature	/Brett A. Carlson/	Date (YYYY-MM-DD)	2023-01-06
Name/Print	Brett A. Carlson	Registration Number	39928

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)		
	Application Number	17/962231
	Filing Date	
	First Named Inventor	DAVID F. BRUECK
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Filing Date	
	First Named Inventor	DAVID F. BRUECK
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

	1	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Akiyama et al	
	2	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Arye et al.	
	3	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Carmel et al.	
	4	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Chou et al.	
	5	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Durrant et al.	
	6	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Gentric	
	7	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Kitamura	
	8	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Klemets et al.	
	9	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Oplayo et al.	
	10	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") QOAS	
	11	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") QuickTime Changes	

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	Attorney Docket Number	P2007-02-01.10/9401-00260

	12	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") QuickTime	
	13	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Ravi	
	14	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") RealOne Player	
	15	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Walker	
	16	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Wang	
	17	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") Wu	
	18	Claim Chart Against U.S. Patent No. 9,407,564 ("'564 patent") RealSystem G2	
	19	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Akiyama et al.	
	20	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Ayre	
	21	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Carmel et. al.	
	22	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Chou et. al.	

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	35	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Wu	
	36	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Dey	
	37	Claim Chart Against U.S. Patent No. 10,469,554 ("'554 patent") Microsoft	

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	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

CERTIFICATION STATEMENT

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That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39,928

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	Filing Date	
	First Named Inventor	David F. Brueck
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6389473	B1	2002-05-14	Carmel et al.	

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	1	20030061305	A1	2003-03-27	Copley et al.	
	2	20040202109	A1	2004-10-14	Akiyama et al.	
	3	20030204602	A1	2003-10-30	Hudson et al.	
	4	20040010613	A1	2004-01-15	Apostolopoulos et al.	
	5	20020144276	A1	2020-10-03	Radford et al.	

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	Filing Date	
	First Named Inventor	David F. Brueck
	Art Unit	
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	Attorney Docket Number	P2007-02-01.10/9401-00260

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	1	2367219	GB	A	2002-03-27	Vintage Global		
	2	1395014	EP	A1	2004-03-03	Matsushita Electric Ind Co Ltd.		
	3	1298931	EP	A2	2003-04-02	Oplayo		

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	1	Appendix H, Appendix H to Expert Report of Dr. Iain Richardson on Invalidity: Public Use (40 pages).	
	2	The Wayback Machine, dated November 8, 2021 (1 page).	
	3	In the Matter of: Certain Fitness Devices, Videotaped Deposition of BYU Broadcasting, Mark Mitchell, dated December 2, 2021 (123 pages).	
	4	The Wayback Machine, bates labeled RESP-PA06323, dated December 7, 2021 (1 page).	
	5	The Wayback Machine, bates labeled RESP-PA06257, dated November 8, 2021 (1 page).	

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	Attorney Docket Number	P2007-02-01.10/9401-00260

	6	The Wayback Machine, bates labeled RESP-PA06256, dated November 8, 2021 (1 page).	
	7	Move Media, bates labeled RESP-PA06253, dated November 8, 2021 (1 page).	
	8	The Wayback Machine, bates labeled RESP-PA06252, dated November 8, 2021 (1 page).	
	9	BYU Television, bates labeled RESP-PA06247 to RESP-PA06248, dated November 8, 2021 (2 pages).	
	10	Mitchell Exhibit 13, BYU-TV Live, FAQ, bates labeled RESP-PA06275to RESP-PA06276, dated December 2, 2021 (2 pages).	
	11	Mitchell Exhibit 12, BYU Television, The Wayback Machine, bates labeled RESP-PA06268- to RESP-PA06269, dated December 2, 2021 (2 pages).	
	12	Mitchell Exhibit 11, BYU Television, The Wayback Machine, bates labeled RESP-PA06272 to RESP-PA06274, dated December 2, 2021 (3 pages).	
	13	Mitchell Exhibit 10, BYU Television, The Wayback Machine, bates labeled RESP-PA06266 to RESP-PA06267, dated December 2 2021 (2 pages).	
	14	Mitchell Exhibit 7, BYU Television, The Wayback Machine, bates labeled RESP-PA06270 to RESP-PA06271, dated December 2, 2021 (2 pages).	
	15	Mitchell Exhibit 6, bates labeled BYU000012-BYU000013, dated December 2, 2021 (2 pages).	
	16	Mitchell Exhibit 5, BYU Television, The Wayback Machine, bates labeled RESP-PA06263 to RESP-PA06264, dated December 2, 2021 (2 pages).	

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	17	Mitchell Exhibit 4, BYU Television, The Wayback Machine, bates labeled RESP-PA06261 to RESP-PA06262, dated December 2, 2021 (2 pages).	
	18	Mitchell Exhibit 3, BYU Television, The Wayback Machine, bates labeled BYU000001, dated December 2, 2021 (1 page).	
	19	Mitchell Exhibit 2, Conference Summary for the 175th Semiannual General Conference, dated December 2, 2021 (3 pages).	
	20	Major Exhibit 62, Official Report of the One Hundred Seventy-fifth Semiannual General Conference of The Church of Jesus Christ of Latter-day Saints, dated November 5, 2021 (128 pages).	
	21	In the Matter of: In Re Certain Fitness Devices, Videotaped Deposition of Peloton Interactive, Inc., Drew Major, dated December 17, 2021 (72 pages).	
	22	In the Matter of: In Re Certain Fitness Devices and Systems Containing Same, Videotaped Deposition of John Edwards, dated November 12, 2021 (191 pages).	
	23	In the Matter of: In Re Certain Fitness Devices and Systems Containing Same, Videotaped Deposition of Robert Drew Major, dated November 5, 2021 (268 pages).	
	24	Uncertified Rough Draft Transcript, Deposition of Mark Hurst, Vol. 2, dated December 3, 2021 (51 pages).	
	25	Hurst Exhibit 68, Move Media, dated November 19, 2021 (1 page).	
	26	Bates labeled RESP-PA06326 to RESP-PA06337, dated December 7, 2021 (12 pages).	
	27	no date Bates labeled RESP-PA06255 (1 page).	

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	28	Bates labeled RESP-PA06254 (1 page). no date	
	29	International Search Report for EP application 20216568.4 dated April 19, 2021 (15 pages).	
	30	Response to International Search Report filed with EP application 20216568.4 on November 19, 2021 (41 pages).	

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That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Brett A. Carlson/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39928

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.R.P/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.R.P/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/962,231	10/07 2022	DAVID F. BRUECK	9401-00260	3515

70560 7590 02/06/2023

KW LAW LLP (Dish Technologies L.L.C.)
6122 N 7th St Suite D
Phoenix, AZ 85014

EXAMINER	
PATEL, CHIRAG R	

ART UNIT	PAPER NUMBER
2454	

NOTIFICATION DATE	DELIVERY MODE
02/06/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

dish@kwlaw.co
ipdept@dish.com
uspto@dockettrak.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
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Application No. : 17962231
Applicant : Brueck
Filing Date : 10/07/2022
Date Mailed : 02/06/2023

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The informalities requiring correction are indicated in the attachment(s). If the informality pertains to the abstract, specification (including claims) or drawings, the informality must be corrected with an amendment in compliance with 37 CFR 1.121 (or, if the application is a reissue application, 37 CFR 1.173). Such an amendment may be filed after payment of the issue fee if limited to correction of informalities noted herein. See Waiver of 37 CFR 1.312 for Documents Required by the Office of Patent Publication, 1280 Off. Gaz. Patent Office 918 (March 23, 2004). In addition, if the informality is not corrected until after payment of the issue fee, for purposes of 35 U.S.C. 154(b)(1)(iv), "all outstanding requirements" will be considered to have been satisfied when the informality has been corrected. A failure to respond within the above-identified time period will result in the application being ABANDONED.

See attachment(s).

A copy of this notice MUST be returned with the reply. Please address response to "Mail Stop Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450".

/Julia Walsh/
Publication Branch
Office of Data Management
(571) 272-4200

Application No. 17962231

IDENTIFICATION OF APPLICATION DEFICIENCIES IN APPLICATION FILED ON OR AFTER SEPTEMBER 16, 2012

[X] Applicant must provide legible text for the following item(s).

- [X] Specification filed 10/07/2022, page(s) p. 26-27 - equations.
- [ ] Claims filed , claim(s) .
- [ ] Other: .

[ ] Applicant must provide missing information on the following page(s) of the specification by amending the specification to add the missing text. No new matter may be added.
Page/line no(s).

[ ] The specification refers to one or more applications by attorney docket number and does not show the U.S. application number(s). Applicant must supply the U.S. application number in place of each attorney docket number.
Page/line no(s).

[ ] Applicant must provide an Abstract of the Disclosure.

[ ] The Application Data Sheet (ADS dated) does not supply the inventor's city and/or does not supply the inventor's U.S. state and/or does not supply the inventor's country. Applicant must submit a signed, in accordance with 37 CFR 1.76(e) and 1.33(b), application data sheet that corrects this deficiency. To be in compliance with 37 CFR 1.76, the corrected application data sheet must identify the information being changed by using underlining for additions and strikethroughs or brackets for deletions.

[ ] Other:

The response to this notice should contain only amended papers, as the waiver of 37 CFR 1.312 is limited to corrections of documents specifically requested in the notice.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/962,231	10/07/2022	DAVID F. BRUECK	9401-00260

CONFIRMATION NO. 3515

70560
KW LAW LLP (Dish Technologies L.L.C.)
6122 N 7th St Suite D
Phoenix, AZ 85014

PUBLICATION NOTICE

OC000000137371523

Title:APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

Publication No.US-2023-0041900-A1
Publication Date:02/09/2023

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

fuboTV Media Inc.
Exhibit 1002
Page 337

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No.:	17/962,231	Confirm. No.:	3515
Inventor:	David F. Brueck	Art Unit:	2454
Filed:	October 7, 2022	Examiner:	Chirag R. Patel
Docket No.:	9401-00260	Customer No.:	70560
Title:	**APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING**		

AMENDMENT AND RESPONSE TO
NOTICE TO FILE CORRECTED APPLICATION PAPERS

Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

This is an amendment filed in response to the Notice to File Corrected Application Papers mailed February 6, 2023. Please enter the following amendments under 37 C.F.R. § 1.112(b)(1), or any other appropriate section.

AMENDMENTS TO THE SPECIFICATION begin on page 2 of this paper; and

REMARKS begin on page 3 of this paper.

fuboTV Media Inc.
Exhibit 1002
Page 338

AMENDMENTS TO THE SPECIFICATION

Please replace paragraph 0101 and 0102 of the specification with the following:

[00101] Because network behavioral characteristics fluctuate, sometimes quite suddenly, any given Δ may vary substantially from another. In order to compensate for this fluctuation, the agent controller module 702 calculates 1008 a performance ratio *r* across a window of *n* samples for streamlets of playback length *S*. In one embodiment, the performance ratio *r* is calculated using the equation:

$$r = S\frac{n}{\sum_{i=1}^{n}\Delta_i}.$$

[00102] Due to multiple simultaneous streamlet processing, and in order to better judge the central tendency of the performance ratio *r*, the agent controller module 702 may calculate a geometric mean, or alternatively an equivalent averaging algorithm, across a window of size *m*, and obtain a performance factor φ:

$$\varphi_{current} = \left(\prod_{j=1}^{m} r_j\right)^{\frac{1}{m}}$$

fuboTV Media Inc.
Exhibit 1002
Page 339

REMARKS

This is a full and timely response to the Notice mailed on February 6, 2023 requesting a more legible version of the equations originally appearing on pages 26-27 of the specification. No changes are made, other than providing a more legible version. Support for the amendment can therefore be found in our originally-filed specification and its parents. No new matter has been added.

If any issues remain with this application, the undersigned would welcome a telephone call to 602-344-9885 to discuss further amendment, if appropriate. Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with the undersigned and other practitioners of record in accordance with 37 CFR 1.33 and 37 CFR 1.34 concerning any subject matter of this application via video conferencing, instant messaging, or electronic mail. I understand that a copy of these communications will be made of record in the application file. (MPEP 502.03). Without limiting the foregoing, we specifically consent to the use of email to exchange proposed amendments or other draft documents.

If any time extension, fee or other action is required to consider this response or any accompanying documents or to otherwise prevent abandonment, please consider this as a request for an extension of time, as a petition for any needed relief, and/or as authorization to charge Deposit Account No. 60-2406 for any fees that may be due.

Respectfully submitted,

KW Law, LLP

Dated: April 6, 2023

By: /Brett A. Carlson /
Brett A. Carlson
Reg. No. 39,928

KW Law, LLP
Customer No. 70560
brett@kwlaw.co

fuboTV Media Inc.
Exhibit 1002
Page 340

UNITED STATES
PATENT AND TRADEMARK OFFICE

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Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/962,231	**04/06/2023 03:11:41 PM ET**	**9401-00260**

Title of Invention

APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	3515	FILED BY	Blake Scheffey
PATENT CENTER #	61880236	FILING DATE	10/07/2022
CUSTOMER #	70560	FIRST NAMED INVENTOR	DAVID F. BRUECK
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Brett Carlson

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
9401-00260_RNTFCAP-APP.TEXT.docx	3	Application body structured text document	21 KB
Warning: Text decorations have been removed.			
9401-00260_RNTFCAP.pdf	3	Auxiliary PDF of Application	56 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
9401-00260_RNTFCAP-	FF55BDC3B3DD65A180030A009621710A680D1CE0F682E4A26

APP.TEXT.docx	1419A7BC85EA7F382BA64E0AC64C215F94AE119A218AFE01E EA809CA5775EAE8BDE9406C431328B
9401-00260_RNTFCAP.pdf	64426DB51C1CF9F3F096CA1A762E1A2F253BFC95B3F560276 ED65B98BD6297B1558102A2672B9FF8DE3986C85CEBCDBBA AD59B18465A48FEBFD09BAAAC0BD0DA

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/962,231	10/07/2022	DAVID F. BRUECK	9401-00260	3515

70560 7590 04/17/2023

KW LAW LLP (Dish Technologies L.L.C.)
6122 N 7th St Suite D
Phoenix, AZ 85014

EXAMINER	
PATEL, CHIRAG R	

ART UNIT	PAPER NUMBER
2454	

NOTIFICATION DATE	DELIVERY MODE
04/17/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

dish@kwlaw.co
ipdept@dish.com
uspto@dockettrak.com

Response to Rule 312 Communication	Application No.	Applicant(s)	
	17/962,231	BRUECK et al.	
	Examiner	Art Unit	AIA (FITF) Status
	CHIRAG R PATEL	2454	No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

1. ☑ The amendment filed on 06 April 2023 under 37 CFR 1.312 has been considered, and has been:

a) ☑ entered.

b) ☐ entered as directed to matters of form not affecting the scope of the invention.

c) ☐ disapproved because the amendment was filed after the payment of the issue fee.

Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.

d) ☐ disapproved. See explanation below.

e) ☐ entered in part. See explanation below.

f) ☐ not entered because the supplemental or corrected Application Data sheet (ADS)

☐ was not accompanied by a petition to accept an unintentionally delayed claim under 37 CFR 1.55 or 27 CFR 1.78;

☐ did not identify the information being changed in accordance with 37 CFR 1.76(c)(2);

☐ was not properly signed in accordance with 37 CFR 1.76(e) (or 37 CFR 1.33(b) for applications filed prior to September 16, 2012).

/CHIRAG R PATEL/
Primary Examiner, Art Unit 2454

OK TO ENTER: /C.R.P/

04/11/2023

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No.:	17/962,231	Confirm. No.:	3515
Inventor:	David F. Brueck	Art Unit:	2454
Filed:	October 7, 2022	Examiner:	Chirag R. Patel
Docket No.:	9401-00260	Customer No.:	70560
Title:	**APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING**		

AMENDMENT AND RESPONSE TO
NOTICE TO FILE CORRECTED APPLICATION PAPERS

Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

This is an amendment filed in response to the Notice to File Corrected Application Papers mailed February 6, 2023. Please enter the following amendments under 37 C.F.R. § 1.112(b)(1), or any other appropriate section.

AMENDMENTS TO THE SPECIFICATION begin on page 2 of this paper; and

REMARKS begin on page 3 of this paper.

fuboTV Media Inc.
Exhibit 1002
Page 345

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)		
	Application Number	17962231
	Filing Date	2022-10-07
	First Named Inventor	David F. Brueck
	Art Unit	2454
	Examiner Name	Chirag R. Patel
	Attorney Docket Number	9401-00260

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					
If you wish to add additional U.S. Patent citation information please click the Add button.						

U.S.PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					
If you wish to add additional U.S. Published Application citation information please click the Add button.						

FOREIGN PATENT DOCUMENTS								
Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐
If you wish to add additional Foreign Patent Document citation information please click the Add button								

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17962231
	Filing Date	2022-10-07
	First Named Inventor	David F. Brueck
	Art Unit	2454
	Examiner Name	Chirag R. Patel
	Attorney Docket Number	9401-00260

	1	Commission Opinion in the Matter of Certain Fitness Devices, Streaming Components Thereof, and Systems Containing Same [Public Version] dated March 23, 2023 (96 pages).	☐
	2		☐
	3		☐
	4		☐
	5		☐
	6		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17962231
	Filing Date	2022-10-07
	First Named Inventor	David F. Brueck
	Art Unit	2454
	Examiner Name	Chirag R. Patel
	Attorney Docket Number	9401-00260

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Brett A. Carlson/	Date (YYYY-MM-DD)	2023-04-28
Name/Print	Brett A. Carlson	Registration Number	39928

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

fuboTV Media Inc.
Exhibit 1002
Page 349

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/962,231	**04/28/2023 04:24:45 PM ET**	**9401-00260**

Title of Invention

APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	3515	FILED BY	Blake Scheffey
PATENT CENTER #	62007166	FILING DATE	10/07/2022
CUSTOMER #	70560	FIRST NAMED INVENTOR	DAVID F. BRUECK
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Brett Carlson

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
9401-00260_IDS-15.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	66 KB
Warning: This is not a USPTO supplied IDS fillable form. Data in the form cannot be automatically loaded to other USPTO systems.			
9401-00260_IDS-15_NPL-1.pdf	96	Non Patent Literature	849 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)

9401-00260_IDS-15.pdf	0218D9D597813FFB23FDD983E75F810398B5A50B6C93248B952E5A261E8092D0D03321E5D067F1668AFC7BCFFBA0B93ABE86AEB7C93BE58CCF5B519223AE85E9
9401-00260_IDS-15_NPL-1.pdf	C9A8A3315E1BC06D8FE84BAEA34BE765F78F081860ABD1E6C899319BCDBDED40ED1970246AA4AD8A304101D89D147299C1DA4C36D1D10D1265C16A05CD05D03E

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/962,231	04/28/2023 04:24:45 PM ET	9401-00260

Title of Invention

APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	3515	FILED BY	Blake Scheffey
PATENT CENTER #	62007166	AUTHORIZED BY	Brett Carlson
CUSTOMER #	70560	FILING DATE	10/07/2022
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	DAVID F. BRUECK

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 6960	E20234RG25385938	Blake Scheffey

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1806	SUBMISSION OF AN INFORMATION DISCLOSURE STATEMENT	260.00	1	260.00
			TOTAL AMOUNT:	$260.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

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New International Application Filed with the USPTO as a Receiving Office

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Doc Code: MFEE.C.AD
Document Description: Maintenance Fee Address Change

PTO/SB/47 (11-21)
Approved for use through 11/30/2024. OMB 0651-0016
U.S. Patent and Trademark Office; U.S. Department of Commerce
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

"FEE ADDRESS" INDICATION FORM

Address to:
Mail Stop Maintenance Fee
Director of the United States
Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

-OR-

Fax to: 571-273-6500

INSTRUCTIONS: The issue fee must have been paid for application(s) listed on this form. In addition, only an address represented by a Customer Number can be established as the fee address for maintenance fee purposes (hereafter, fee address). A fee address should be established when correspondence related to maintenance fees should be mailed to a different address than the correspondence address for the application.
When to check the first box below: If you have a Customer Number to represent the fee address.
When to check the second box below: If you have no Customer Number representing the desired fee address, in which case a completed Request for Customer Number (PTO/SB/125) must be attached to this form. For more information on Customer Numbers, see section 403 of the Manual of Patent Examining Procedure (MPEP).

For the following listed application(s), please recognize as the "Fee Address" under the provisions of 37 CFR 1.363 the address associated with:

☑ Customer Number 000197

OR

☐ The attached Request for Customer Number (PTO/SB/125) form.

PATENT NUMBER (if known)	APPLICATION NUMBER
	17/962,231

Completed by (check one):

☐ Applicant/Inventor — /Brett A. Carlson/ (Signature)

☑ Attorney or agent of record — 39,928 (Reg. No.) — Brett A. Carlson (Typed or printed name)

☐ Assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) (Form PTO/SB/96) is enclosed or was filed on _____ (Date)

480-241-8219 (Requester's telephone number)

May 1, 2023 (Date)

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. If the assignee is a juristic entity, this form must be signed by a patent practitioner (attorney or agent) of record. Submit multiple forms if more than one signature is required (see below*).

☐ *Total of _____ PTO/SB/47 forms are submitted

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0016. Public burden for this form is estimated to average 5 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing this form, please call 1-800-PTO-9199 and then select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. The United States Patent and Trademark Office (USPTO) collects this information under authority of 5 CFR 1.290. The information in this system of records is used to manage all records of applicant including name, citizenship, residence, post office address and other information with respect to inventors and their legal representatives pertaining to the applicant's activities in connection with the invention for which a patent is sought. This information is protected from disclosure to third parties in accordance with the Privacy Act.

However, routine uses of this information may include disclosure to the following: to law enforcement and investigation in the event that the system of records indicates a violation or potential violation of law; to a Federal, state, local, or international agency, in response to its request; to an agency, organization, or individual for the purpose of performing audit or oversight operations as authorized by law; to non-federal personnel under contract to the agency; to a court for adjudication and litigation; to the Department of Justice for Freedom of Information Act (FOIA) assistance; to members of congress working on behalf of an individual; to the Office of Personnel Management (OPM) for personnel research purposes; to National Archives and Records Administration for inspection of records; and to the Office of Management and Budget (OMB)for legislative coordination and clearance. Failure to provide any part of the requested information may result in an inability to process requests for access and information. The applicable Privacy Act System of Records Notice for this information is COMMERCE/PAT-TM-7 Patent Application Files, available at Federal Register / Vol. 78, No. 61 / Friday, March 29, 2013 /Notices 19243. https://www.govinfo.gov/content/pkg/FR-2013-03-29pdf/2013-07341.pdf

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/962,231	**05/01/2023 01:50:37 PM ET**	**9401-00260**

Title of Invention

APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	3515	FILED BY	Blake Scheffey
PATENT CENTER #	62014379	FILING DATE	10/07/2022
CUSTOMER #	70560	FIRST NAMED INVENTOR	DAVID F. BRUECK
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Brett Carlson

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
9401-00260_IFT.pdf	1	Issue Fee Payment (PTO-85B)	168 KB
9401-00260_FeeAddress.pdf	2	Maintenance Fee Address Change	241 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
9401-00260_IFT.pdf	EE77CF2D3F766DAC55F92CBA5EA3412108E443918BACB1D6 6360B40EA17B1471950A220629F3C268D4E1686D7F2E42BEC9 B2461D7D5E6ADE67564FDA7AA0DB7E

9401-00260_FeeAddress.pdf	C996B859F77E346A3BB283E22001D51BBF03CF15276606831E55BEA3547F56280E390F3BF3A31FEA5087C47E85C9978BBCBD09153429D400601B1FF914F22FC7

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

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New International Application Filed with the USPTO as a Receiving Office

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/962,231	05/01/2023 01:50:37 PM ET	9401-00260

Title of Invention

APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	3515	FILED BY	Blake Scheffey
PATENT CENTER #	62014379	AUTHORIZED BY	Brett Carlson
CUSTOMER #	70560	FILING DATE	10/07/2022
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	DAVID F. BRUECK

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 6960	E202351D51478565	Blake Scheffey

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1501	UTILITY ISSUE FEE	1200.00	1	1200.00
			TOTAL AMOUNT:	$1,200.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage

submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

70560 7590 01/30/2023
KW LAW LLP (Dish Technologies L.L.C.)
6122 N 7th St Suite D
Phoenix, AZ 85014

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/962,231	10/07/2022	DAVID F. BRUECK	9401-00260	3515

TITLE OF INVENTION: APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	05/01/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
PATEL, CHIRAG R	2454	709-219000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 KW Law, LLP
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: DISH Technologies L.L.C.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Englewood, CO

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ☒ Issue Fee ❑ Publication Fee (if required) ❑ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge [redacted], any deficiency, or credit any overpayment to Deposit Account No. 602406

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Brett Carlson/ Date May 1, 2023

Typed or printed name Brett Carlson Registration No. 39928

fuboTV Media Inc.
Exhibit 1002
Page 360

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/962,231	10/07/2022	DAVID F. BRUECK	9401-00260	3515

70560 7590 05/10/2023

KW LAW LLP (Dish Technologies L.L.C.)
6122 N 7th St Suite D
Phoenix, AZ 85014

EXAMINER	
PATEL, CHIRAG R	

ART UNIT	PAPER NUMBER
2454	

NOTIFICATION DATE	DELIVERY MODE
05/10/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

dish@kwlaw.co
ipdept@dish.com
uspto@dockettrak.com

Corrected ***Notice of Allowability***	**Application No.** 17/962,231	**Applicant(s)** BRUECK et al.	
	Examiner CHIRAG R PATEL	**Art Unit** 2454	**AIA (FITF) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to the printer rush on May 4, 2023.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-25 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 10/7/22, 4/28/23.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/CHIRAG R PATEL/
Primary Examiner, Art Unit 2454

fuboTV Media Inc.
Exhibit 1002
Page 362

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/962,231	BRUECK et al.
	Examiner	**Art Unit**
	CHIRAG R PATEL	2454

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☑ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/06/2023	05/05/2023							
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2	2	=	=							
3	3	=	=							
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	29	-	-							
	30	-	-							

fuboTV Media Inc.
Exhibit 1002
Page 363

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/962,231	BRUECK et al.
	Examiner	Art Unit
	CHIRAG R PATEL	2454

CPC - Searched*		
Symbol	Date	Examiner
H04N21/2662, H04L65/70, H04L65/80	01/04/2023	C.P.

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventor - Double Patent Search	01/04/2023	C.P.
PE2E Search	01/04/2023	C.P.
Inventor search to correct incorrect documents number	05/05/2023	C.P.

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
H04N	H04N21/2662	01/04/2023	C.P.
H04L	H04L65/70, H04L65/80	01/04/2023	C.P.

fuboTV Media Inc.
Exhibit 1002
Page 364

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/962,231	BRUECK et al.
	Examiner	**Art Unit**
	CHIRAG R PATEL	2454

CPC						
Symbol					**Type**	**Version**
H04L	/	65	/	70	F	2022-05-01
H04L	/	47	/	801	I	2013-01-01
H04L	/	47	/	12	I	2013-01-01
G06F	/	16	/	71	I	2019-01-01
G06F	/	16	/	183	I	2019-01-01
H04N	/	7	/	24	I	2013-01-01
H04N	/	21	/	23439	I	2013-01-01
H04N	/	21	/	4331	I	2013-01-01
H04N	/	21	/	84	I	2013-01-01
H04N	/	21	/	8456	I	2013-01-01
H04L	/	65	/	80	I	2013-01-01
H04L	/	65	/	61	I	2022-05-01
H04L	/	65	/	65	I	2022-05-01
H04L	/	65	/	1101	I	2022-05-01
H04L	/	67	/	60	I	2022-05-01
H04L	/	67	/	568	I	2022-05-01
H04L	/	67	/	02	I	2013-01-01
H04L	/	65	/	1069	I	2013-01-01
H04N	/	21	/	2662	I	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	25	
/CHIRAG R PATEL/ Primary Examiner, Art Unit 2454	05 May 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

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fuboTV Media Inc.
Exhibit 1002
Page 365

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/962,231	BRUECK et al.
	Examiner	**Art Unit**
	CHIRAG R PATEL	2454

INTERNATIONAL CLASSIFICATION					
CLAIMED					
H04L	/	65	/	70	

NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	25	
/CHIRAG R PATEL/ Primary Examiner, Art Unit 2454	05 May 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

U.S. Patent and Trademark Office — Part of Paper No.: 20230505

fuboTV Media Inc.
Exhibit 1002
Page 366

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
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	CHIRAG R PATEL	2454

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☑ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	10	10	19	19		28								
2	2	11	11	20	20		29								
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8	8	17	17		26										
9	9	18	18		27										

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	25	
/CHIRAG R PATEL/ Primary Examiner, Art Unit 2454	05 May 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

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fuboTV Media Inc.
Exhibit 1002
Page 367

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	17962231
	Filing Date	2022-10-07
	First Named Inventor	David F. Brueck
	Art Unit	2454
	Examiner Name	Chirag R. Patel
	Attorney Docket Number	9401-00260

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐
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NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Examiner Name	Chirag R. Patel
	Attorney Docket Number	9401-00260

/C.R.P/	1	Commission Opinion in the Matter of Certain Fitness Devices, Streaming Components Thereof, and Systems Containing Same [Public Version] dated March 23, 2023 (96 pages).	☐
	2		☐
	3		☐
	4		☐
	5		☐
	6		☐

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Examiner Signature	/CHIRAG R PATEL/	Date Considered	05/05/2023

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[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Art Unit	2454
	Examiner Name	Chirag R. Patel
	Attorney Docket Number	9401-00260

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Brett A. Carlson/	Date (YYYY-MM-DD)	2023-04-28
Name/Print	Brett A. Carlson	Registration Number	39928

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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fuboTV Media Inc.
Exhibit 1002
Page 371

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(Not for submission under 37 CFR 1.99)

Application Number	17/962,231
Filing Date	
First Named Inventor	David F. Brueck
Art Unit	
Examiner Name	
Attorney Docket Number	P2007-02-01.10/9401-00260

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7577750	B2	2009-08-18	Shen et al.	
	2	6195680	B1	2001-02-27	Goldszmidt et al.	
	3	6449719	B1	2002-09-10	Baker	
	4	7369610	B2	2008-05-06	Xu et al.	
	5	7408984	B2	2008-08-05	Lu et al.	
	6	7523181	B2	2009-04-21	Swildens et al.	
	7	6976090	B2	2005-12-13	Ben-Shaul et al.	
	8	7240100	B1	2007-07-03	Wein et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.R.P/

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	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

	9	6850965	B2	2005-02-01	Allen	
	10	7334044	B1	2008-02-19	Allen	
	11	7760801	B2	2010-07-20	Ghanbari et al.	
	12	7099954	B2	2006-08-29	Li et al.	
	13	6760772	B2	2004-07-06	Zou et al.	
	14	7054911	B1	2006-05-30	Lango et al.	
	15	7797439	B2	2010-09-14	Cherkasova et al.	
	16	7477688	B1	2009-01-13	Zhang et al.	
	17	7054774	B2	2006-05-30	Batterberry et al.	
	18	5168356		1992-12-01	Acampora et al.	
	19	7818444	B2	2010-10-19	Brueck et al.	

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	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

	20	7599307	B2	2009-10-06	Seckni et al.	
	21	7093001	B2	2006-08-15	Yang et al.	
	22	6874015	B2	2005-03-29	Kaminsky et al.	
	23	6845107	B1	2005-01-18	Kitazawa et al.	
	24	6185736	B1	2001-02-06	Ueno	
	25	5768527 ~~5768627~~		1998-06-16	Zhu et al.	
	26	7274740	B2	2007-09-25	van Beek et al.	
	27	7546355	B2	2009-06-09	Kalnitsky	
	28	7174385	B2	2007-02-06	Li	
	29	7376747	B2	2008-05-20	Hartop	
	30	7719985	B2	2010-05-18	Lee et al.	

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fuboTV Media Inc.
Exhibit 1002
Page 374

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	First Named Inventor	David F. Brueck
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	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

	31	7349358	B2	2008-03-25	Hennessey et al.	
	32	7194549	B1	2007-03-20	Lee et al.	
	33	6374289	B2	2002-04-16	Delaney et al.	
	34	7325073	B2	2008-01-29	Shao et al.	
	35	7609652	B2	2009-10-27	Kellerer et al.	
	36	6795863	B1	2004-09-21	Doty, Jr.	
	37	7817985	B2	2010-10-19	Moon	
	38	7788395	B2	2010-08-31	Bowra et al.	
	39	7536469	B2	2009-05-19	Chou et al.	
	40	7412531	B2	2008-08-12	Lango et al.	
	41	7295520	B2	2007-11-13	Lee et al.	

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fuboTV Media Inc.
Exhibit 1002
Page 375

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	42	7054365	B2	2006-05-30	Kim et al.	
	43	6122660		2000-09-19	Baransky et al.	
	44	7391717	B2	2008-06-24	Kiemets et al.	
	45	7260640	B1	2007-08-21	Kramer et al.	
	46	7310678	B2	2007-12-18	Gunaseelan et al.	
	47	6618752	B1	2003-09-09	Moore et al.	
	48	6721723	B1	2004-04-13	Gibson et al.	
	49	6859839	B1	2005-02-22	Zahorjan et al.	
	50	7779135	B2	2010-08-17	Hudson et al.	
	51	7593333	B2	2009-09-22	Li et al.	
	52	5953506		1999-09-14	Kalra et al.	

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	53	6091775		2000-07-18	Hibi et al.	
	54	6091777		2000-07-18	Guetz et al.	
	55	6195680		2001-02-27	Goldszmidt et al.	
	56	6366614		2002-04-02	Pian et al.	
	57	6389473		2002-05-14	Carmel et al.	
	58	6486803	B1	2002-11-26	Luby et al.	
	59	6490627		2002-12-03	Kalra et al.	
	60	6510553		2003-01-21	Hazra	
	61	6574591		2003-06-03	Kleiman et al.	
	62	6604118		2003-08-05	Kleiman et al.	
	63	6731600		2004-05-04	Patel et al.	

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	64	5732183		2004-05-04	Graham	
	65	6968387		2005-11-22	Lanphear	
	66	7075986		2006-07-11	Girod et al.	
	67	7096271		2006-08-22	Omoigui et al.	
	68	7349976		2008-03-25	Glaser et al.	
	69	7408984	B2	2008-08-05	Lu et al.	
	70	4535355		1985-08-13	Arn et al.	
	71	8036265	B1	2011-10-11	Reynolds et al.	
	72	5687095		1997-11-11	Haskell et al.	
	73	7116894	B1	2006-10-03	Chatterton	
	74	7328243	B2	2008-02-05	Yaeger et al.	

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	75	7330908	B2	2008-02-12	Jungek	
	76	7653735	B2	2010-01-26	Mandato et al.	
	77	8612624	B2	2013-12-17	Brueck et al.	
	78	8868772	B2	2014-10-21	Major et al.	
	79	8402156	B2	2013-03-19	Brueck et al.	
	80	8370514	B2	2013-02-05	Hurst et al.	
	81	8880721	B2	2014-11-04	Hurst et al.	

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	1	20020161898	A1	2002-10-31	Hartop et al.	
	2	20050055425		2005-03-00	Lango et al.	

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fuboTV Media Inc.
Exhibit 1002
Page 379

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17/962,231
	Filing Date	
	First Named Inventor	David F. Brueck
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P2007-02-01.10/9401-00260

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fuboTV Media Inc.
Exhibit 1002
Page 383

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17/962,231
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	Examiner Name	
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fuboTV Media Inc.
Exhibit 1002
Page 384

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Art Unit	
	Examiner Name	
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fuboTV Media Inc.
Exhibit 1002
Page 387

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17/962,231
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	Art Unit	
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fuboTV Media Inc.
Exhibit 1002
Page 390

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17/962,231
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Examiner Signature	/CHIRAG R PATEL/	Date Considered	05/05/2023

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CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2022-10-07
Name/Print	Brett A. Carlson	Registration Number	39928

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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fuboTV Media Inc.
Exhibit 1002
Page 393

Bibliographic Data

Application No: 17/962,231

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /CHIRAG R PATEL/ Examiner's Signature | Initials

Title: APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/07/2022	709	2454	9401-00260
RULE			

APPLICANTS

DISH Technologies L.L.C.,

INVENTORS

DAVID F. BRUECK, SARATOGA SPRINGS, UT, UNITED STATES

MARK B. HURST, CEDAR HILLS, UT, UNITED STATES

R. DREW MAJOR, OREM, UT, UNITED STATES

CONTINUING DATA

This application is a CON of 16876579 05/18/2020 PAT 11470138

16876579 is a CON of 16004056 06/08/2018 PAT 10659513

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fuboTV Media Inc.
Exhibit 1002
Page 396

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17/962231
	Filing Date	
	First Named Inventor	David F. Brueck
	Art Unit	
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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.R.P/

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/962,231	06/13/2023	11677798	9401-00260	3515

70560 7590 05/24/2023

KW LAW LLP (Dish Technologies L.L.C.)
6122 N 7th St Suite D
Phoenix, AZ 85014

ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at https://patentcenter.uspto.gov/. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

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Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PAIR WEB site http://pair.uspto.gov for additional inventors):

DAVID F. BRUECK, SARATOGA SPRINGS, UT;
MARK B. HURST, CEDAR HILLS, UT;
R. DREW MAJOR, OREM, UT;

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

DISH Technologies L.L.C., Englewood, CO

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	17962231
	Filing Date	2022-10-07
	First Named Inventor	David F. Brueck
	Art Unit	2454
	Examiner Name	Chirag R. Patel
	Attorney Docket Number	9401-00260

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	1	1202487	EP	B1	2006-05-04	Nagai et al.		

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17962231
	Filing Date	2022-10-07
	First Named Inventor	David F. Brueck
	Art Unit	2454
	Examiner Name	Chirag R. Patel
	Attorney Docket Number	9401-00260

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Brett A. Carlson/	Date (YYYY-MM-DD)	2023-06-12
Name/Print	Brett A. Carlson	Registration Number	39928

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APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/962,231	**06/12/2023 08:14:24 PM ET**	**9401-00260**

Title of Invention

APPARATUS, SYSTEM, AND METHOD FOR MULTI-BITRATE CONTENT STREAMING

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	11677798
CONFIRMATION #	3515	FILED BY	Blake Scheffey
PATENT CENTER #	62255101	FILING DATE	10/07/2022
CUSTOMER #	70560	FIRST NAMED INVENTOR	DAVID F. BRUECK
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Brett Carlson

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
9401-00260_IDS-16.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	598 KB
9401-00260_IDS-16_FPD-1.pdf	21	Foreign Reference	1145 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
9401-00260_IDS-16.pdf	9E80B9DDF55835E52A3CCE28DCB0B2EF037B7BE3EF1423FE73EC0402882F31631E4A3432C5CB642DED678973C4CB080DD

	A8FFF5730A2CDA28A9936F22DBCBF2B
9401-00260_IDS-16_FPD-1.pdf	6E3902D8DF90156EA6D98572704F2FC36DE65BEC31B3510E630A130F9409E8AFB27A42E03F8251BEFC6F0C7AE9553941B770880EAD39E2FCE8E29F6BFE75D6AA

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(19) Europäisches Patentamt
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(11) EP 1 202 487 B1

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(54) **Data transmission apparatus and method**

Datenübertragungssystem und -Verfahren

Système et procédé de transmission de données

(84) Designated Contracting States:
DE FR GB

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29.06.2001 JP 2001200156

(43) Date of publication of application:
02.05.2002 Bulletin 2002/18

(73) Proprietor: **KABUSHIKI KAISHA TOSHIBA**
Tokyo 105-8001 (JP)

(72) Inventors:
- **Nagai, Takeshi,**
  c/o Kabushiki Kaisha Toshiba
  Minato-ku,
  Tokyo 105-8001 (JP)
- **Kikuchi, Yoshihiro,**
  c/o Kabushiki Kaisha Toshiba
  Minato-ku,
  Tokyo 105-8001 (JP)
- **Masuda, Tadaaki,**
  c/o Kabushiki Kaisha Toshiba
  Minato-ku,
  Tokyo 105-8001 (JP)

(74) Representative: **Midgley, Jonathan Lee**
Marks & Clerk
90 Long Acre
London WC2E 9RA (GB)

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EP 1 202 487 B1

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Exhibit 1002
Page 406

Description

[0001] The present invention relates to a data transmission method for transmitting encoded moving/still picture by using a wired communication network such as ISDN (Integrated Services Digital Network) or a wireless communication network such as PHS (Personal handy-phone System) or satellite communication and a data transmission apparatus to which such method is applied.

[0002] In recent years, with progress of digital encoding technology of a variety of information such as image and a broadband network technology, the development of applications using these technologies becomes active, and a system of transmitting compression-encoded image by utilizing a communication network is developed.

[0003] For example, an input video signal is encoded at a video encoder, the obtained encoded data is provided to an encoded data transmitter, and transmission data is transmitted to a transmission channel. In this way, a video is encoded and transmitted. In recent years, with the spread of Internet/Intranet, there has been increased an application or system of transmitting/receiving a packet of data. Providing data as a packet is very effective means for efficiently sharing a bandwidth of a communication channel by a plurality of users.

[0004] In the meantime, as a protocol for transmitting/receiving packet data via Internet/Intranet, there exists TCP/IP (Transmission Control Protocol/Internet Protocol) or UDP/IP (User Datagram Protocol/Internet Protocol) and the like.

[0005] Among them, TCP/IP is.an Internet standard protocol. This protocol is applied as the world's best known protocol to Intranet or LAN as well as Internet. TCP works in a transport layer that is a fourth layer of an OSI basic reference model, and IP works in a network layer that is a third layer.

[0006] In addition, UDP/IP is one of the TCP/IP suite transport layer protocols. TCP is a connection type protocol. UDP is a disconnection type protocol. As with TCP, a host application is identified by using a port number. This protocol is often used to carry short data for monitor control of a network or real time oriented data such as audio data or video data.

[0007] TCP/IP incorporates a frame such as retransmission. Thus, this protocol is strong against errors or the like. Even if a large amount of time is required, this protocol is effective to download type applications if an attempt is made to validly receive data. However, this protocol is not powerful for applications requiring real time properties.

[0008] In contrast, although UDP/IP does not have a retransmission frame, a delay associated with retransmission does not occur. Thus, this protocol is very effective to applications requiring real time processing.

[0009] Transmission of moving picture is exemplified as a typical example of application requiring real time processing. However, in the case of general video communication, video data has a very large amount of data, and overflows a network bandwidth in most cases. In this case, a technique for encoding a video data signal, and transmitting a reduced amount of data is used. Techniques such as motion compensation, discrete cosine transform (DCT), sub-band encoding, pyramid encoding, and variable-length encoding or a combination of these techniques are developed as compression-encoding of a video signal.

[0010] As an international standard system for moving picture encoding, there are ISO MPEG-1, MPEG-2, ITU-T H. 261, H. 262, and H. 263. In addition, as an international standard system for multiplying an encoded data stream having a speech/audio signal compressed or other data, there are an ISO MPEG system, ITU-T H. 221, and H. 223.

[0011] Internet or the like is encompassed via an infinite number of networks. Usually, no one knows which network is used or what state is. In addition, an amount of data flowing a network changes from time to time. Thus, a system of judging what amount of data can be communicated in a real time is required.

[0012] Therefore, with further advancement from real time applications utilizing UDP/IP, there have been increased in number applications using a packet format called RTP (Real-time Transport Protocol) for adding and transmitting time information or the like to a packet.

[0013] This RTP is a protocol for transferring audio data signal or video data signal ruled in RFC 1889 in real time. Usually, data is carried on UDP (User Datagram Protocol). This protocol is assumed to be applied to a multimedia system such as video conference, and data can be exchanged in a real time interactive scheme. However, the protocol has no sound quality or picture quality assurance function. Sequential number or time stamp data is assigned into an RTP header, thereby supporting a read time operation.

[0014] RFC is an abbreviation of Request for Comments, and denotes a document such as technical proposal or comments disclosed by TETF (Internet Engineering Task Force). Many de-fact standards such as a variety of protocols of TCP/IP suite are described in RFC.

[0015] By utilizing this RTP, time information and a packet number are added to a packet, so that a receiver can display a voice or image by using correct time information, can determine a packet or the like whose order is replaced in a network, and can detect that a packet is lost by referring to a packet number.

[0016] Moreover, the RTP provides with a system (RTCP) for notifying network state information such as jitter or packet loss rate from a transmitter to a receiver.

[0017] However, how this RTCP information is utilized depends on applications, and is not determined in standards.

[0018] In addition, in the case of an image, a bandwidth corresponding to video transmission cannot be allocated in a network bandwidth, thus making it necessary to compress and deliver a video signal in an encoding system such as

fuboTV Media Inc.
Exhibit 1002
Page 407

MPEG, as described previously. Although this encoding system is effective in a decreased amount of data, the system becomes very fragile to a packet loss or error entry by supplying data to unstable Internet. This is because a moving picture encoding system transmits only a difference between a current frame and a previous frame. Thus, partial data missing causes a very serious problem. In the case of using the UDP or RTP, data retransmission is not basically carried out, thus making it necessary to counteract this problem.

[0019] There generally exist two modes in picture encoding, that is, one is an inter-frame encoding mode for transmitting a difference between the current frame and the previous frame and an intra-frame encoding mode for carrying out encoding in one frame. In general, intra-frame encoded pictures are provided at a proper timing, and inter-frame encoded pictures are provided between them. An interval between the frames encoded in an intra-frame encoding mode is called a GOP (Group of Picture) interval.

[0020] When an encoded picture is missing during transmission to the decoder, the decoded picture corresponding to the missing encoded picture is destroyed. Thereafter, the intra-encoded pictures following the missing encoded picture are decoded based on the destroyed picture. Thus, all the subsequent decoding pictures are affected by the destroyed picture, and decoding cannot be carried out correctly. Therefore, an intra-frame encoded picture is inserted in the way of a stream of frames to cut off a propagation of missing error and recover adequate decoding.

[0021] In a conventional technology, it can determine that errors occur in a network. However, how to utilize the determination result has been unknown. Also, a system for notifying the network information to the transmitter in an unique format is conceived. However, the system is based on the specification of associated applications and lacks a general-purpose use. The system receives transmission data using an information receiver, and controls a video encoder within a range of the information received from the network via a transmission channel.

[0022] A conventional network condition determination is conceived on assumption of network congestion. However, since Internet is popularized in mobile environment, it is required to consider an error or the like in wireless environment. Current technique does not assume countermeasures against such error.

[0023] Further, in the case of dealing with the error, a case in which a network condition changes, and an error rate is not constant is not considered. If a short GOP interval is set in order to counteract a case in which errors frequently occur, the intra-frame encoding increases resulting in impairing the encoding efficiency. When errors occur frequently qualitatively, it may be required to establish such state in which such errors occur frequently. However, in the case of a network in which an error hardly occurs in a normal state, and an error occurs only at one moment, this setting is very wasteful. Conversely, when a long GOP interval is set, it is troublesome that a great influence occurs when an error occurs.

[0024] Thus, a real time transmission using RTP is noted. As described above, by utilizing the RTP that is a protocol for transferring audio data signal or video data signal data in real time, time information and a packet number are added to a packet, whereby the receiver can display a voice or image by using correct time information, can determine a packet or the like whose order is replaced in a network, or can detect that a packet is lost by referring to a packet number.

[0025] Moreover, at the RTP, there is provided a system (RTCP) for notifying network state information such as jitter or packet loss rate from the transmitter or receiver.

[0026] US-6,085,252 describes a device for real time streaming of multimedia data stored in a remote server over a packet network to a client connected to the same network via a low-speed connection. The system determines a bandwidth budget for the link in advance. It then monitors the streaming data rate and the number of copies of retransmitted data to ensure that the overall bit rate does not exceed the predetermined bandwidth budget.

[0027] EP-A-1011245 discloses a radio communication apparatus which comprises a coder for providing coding for an error detection to transmitting signals, a data buffer for temporarily storing the coded transmitting signals, a hierarchical modulator for hierarchically modulating the coded signals, an amplifier for amplifying the hierarchically modulated signals, an antenna, an amplifier for amplifying a retransmission request signal from the receiving side, and a demodulator.

[0028] The present invention aims to provide a data transmission apparatus capable of adjusting a transmission rate by using the RTP characteristics in accordance with a transmission state of a transmission channel based on notification of network state information such as jitter or packet loss rate, obtained from the receiver in the transmitter or capable of carrying out controls such as changing error resilience, thereby making it possible to efficiently transmit data to the maximum, and fully utilize transmission that requires real time properties.

[0029] The invention provides image transmission apparatus as defined in Claim 1.

[0030] The invention can be more fully understood from the following detailed description when taken in conjunction with the accompany drawings, in which:

FIG. 1 is a view showing a basic configuration of a data transmission apparatus according to a first example of the present invention;
FIG. 2 is a view showing another configuration;
FIG. 3 is a view showing a configuration of a network condition determination device;
FIG. 4 is a view showing a configuration of a video encoder;
FIG. 5 is a view showing a configuration of an encoded parameter determining device;

fuboTV Media Inc.
Exhibit 1002
Page 408

FIG. 6 is a view showing a basic configuration of a data transmission apparatus in an embodiment of the present invention;
FIG. 7 is a view showing a configuration of an encoded data switch device;
FIG. 8 is a view illustrating a timing of encoded data switching at an encoded data switch device;
FIG. 9 is a view illustrating a timing of switching encoded data with its different frame interval at the encoded data switch device;
FIG. 10 is a flow chart showing a basic example of the network condition determination method at the network condition determination device;
FIG. 11 is a flow chart showing a basic example when a delay is forced to occur by using the network condition determination method at the network condition determination device;
FIG. 12 is a flow chart showing a basic example considering a time direction change with the network condition determination method at the network condition determination device;
FIG. 13 is a view showing an exemplary configuration;
FIG. 14 is a flow chart showing an example of a GOP interval calculation method at a GOP interval calculator;
FIG. 15 is a flow chart showing another example of a GOP interval calculation method at a GOP interval calculator; and
FIG. 16 is a flow chart showing still another example of a GOP interval calculation method at a GOP interval calculator.

[0031] Hereinafter, embodiments of the present invention will be described with reference to the accompanying drawings.

[0032] The present invention utilizes RTP or RTCP that is a protocol for transferring audio data signal or video data signal in real time. The transmitter performs controls such as adjusting a transmission rate or changing error resilience in accordance with a transmission state of a transmission channel based on notification of network state information acquired from the receiver such as jitter (Jitter information) or packet loss rate. In this manner, data transmission can be carried out efficiently to the maximum. Hereinafter, embodiments of the present invention will be described in detail.

(First example)

[0033] FIG. 1 shows a basic configuration of an image transmission apparatus according to a first example of the present invention. In FIG. 1, a video signal 131 input from an image input device 101 is processed to be encoded. That is, an encoded data transmitter 103 processes encoded data 132 that has been encoded by a video decoder 102 in the form which conforms to a network, and transmits the encoded data to a receiver. A network information receiver 104 receives network information 134 delivered from the receiver, and outputs the received information to a network condition determination device 105. This network condition determination device 105 has a function that determines a network condition from network information 135 output from the network information receiver 104, and notifies the result as network condition information 136 to the video encoder 102.

[0034] The video encoder 102 encodes the video signal 131 using the network condition information 136. This encoding is carried out as follows. That is, in the case of RTP or RTCP, a packet loss rate or Jitter information is provided to the network condition determination device 105. The network condition determination device 105 determines that, if a packet loss rate is not "0" or if a delay time is longer than a predetermined value, any load is applied to a network, and a presumed amount of data cannot be supplied. Then, the network condition determination device 105 is configured so as to carry out processing so as to issue an instruction (network condition information 136) for lowering a bit rate to the video encoder 102, and to lowly set a target bit rate in encoding.

[0035] According to the thus configured apparatus, when the video signal 131 is inputted from the image input device 101, the inputted video signal 131 is encoded by the video encoder 102. Encoded data 132 encoded by the video encoder 102 is inputted to the encoded data transmitter 103.

[0036] The encoded data transmitter 103 processes the encoded data in the form suitable to a network, and receives the processed data to a receiver. The network information receiver 104 receives the network information 134 delivered from the receiver, and outputs the received information to the network condition determination device 105.

[0037] The network condition determination device 105 determines a network condition from the network information 135 outputted from a network information receiver, and notifies the result as the network condition information 136 to the video encoder 102.

[0038] The video encoder 102 encodes the video signal 131 using the thus notified network condition information 136.

[0039] FIG. 10 shows a very simple example of a method for determining a network condition at the network condition determination device 105 by way of showing a flow chart.

[0040] According to this flow chart, at the step S1001, a packet loss rate of network information is checked to see if the rate is "0" or not. As the result of this check, if the packet loss is not "0", an effective bit rate is calculated from the packet loss rate in accordance with the step S1002. This bit rate can be calculated by formula (1) shown below.

fuboTV Media Inc.
Exhibit 1002
Page 409

$$b' = b \times (1 - r) \quad (1)$$

where "b" denotes a current bit rate, b' denotes a new bit rate, and "r" denotes a packet loss rate.

[0041] Next, at the step S1003, a parameter (encoding parameter) obtained at the step S1002 is notified to the video encoder 102. Here, the above parameter is used to determine a rate control or error resilience level for encode processing at the image encoder 102. This parameter is also used for adjustments such as adjusting and controlling the encode processing speed of the input image signal 131 to this parameter, thereby changing a bit rate, a frame interval, or an error resilience level.

[0042] On the other hand, at the step S1001, when the packet loss rate is "0", no parameter change occurs at the step S1004. This determination method is provided as a mere example. It is possible to employ any other method for obtaining a bit rate based on a case in which the criterion of the step S1001 is determined by thresholds without being set to "0" or others or based on a formula other than the above formula (1).

[0043] Therefore, according to the first example, even when a transmission network bandwidth is unknown or when the bandwidth changes halfway, it is possible to reset a parameter or the like based on the receiver's network information, and then, encode and transmit an image in accordance with the parameter suitable to a current network. In this manner, even in the case of a network congestion, although a bit rate is automatically lowered, and an image quality is lowered, it is possible to communicate an image without an occurrence of a phenomenon that an image is destroyed due to such packet loss. This method is very effective in image transmission in real time.

[0044] The first example can be carried out by modifying it as follows. For example, as shown in FIG. 11, a method other than that shown in FIG. 10 is employed as a method for determining a network condition at the network condition determination device 105. That is, in the flow chart shown in FIG. 10, a parameter is set at only a packet loss rate. In contrast, in the method shown in FIG. 11, even when no packet loss occurs at the step S1104, a delay quantity is checked. As a result of this check, if a delay occurs in excess of a predetermined value, it is determined that a network is congested. When it is determined that a network is congested, a bit rate is calculated, and a new parameter is set by using formula (2) below, for example, at the step S1105.

$$b' = b \times \{(TN-TS)+(d-dth)\}/(TN-TS) \quad (2)$$

where "b" denotes a delay time, b' denotes a new bit rate, TN denotes a current time, TS denotes a start time, "d" denotes a delay time, and "dth" denotes delay time thresholds.

[0045] FIG. 2 shows an example when the network condition determination device 105 is provided with a function for generating the network condition information 136 so as to provide the information to the image encoder 102 by extending the configuration shown in FIG. 1.

[0046] According to a configuration shown in FIG. 2, the network condition determination device 105 is provided with a function for acquiring a current parameter at the current image encoder 102 and a function for generating the network condition information 136 on what parameter should be set next from the thus acquired current parameter and network information 135, thereby providing the parameter to the image encoder 102.

[0047] In the case of this construction, the network condition determination device 105 can recognize a state of a video parameter, i.e., a state of the encode processing currently done at the video encoder 102, thus making it possible for the network condition determination device to calculate and grasp a bit rate or the like. This construction is advantageous in the case of determining a network condition by comparing the network information 135 with parameter information 137. Thus, a system is realized which is capable of changing a parameter so as to set an optimal bit rate in accordance with the network condition, and providing the parameter to the video encoder 102, thereby adjusting the encode processing.

[0048] In this way, according to the present invention, transmission is adjusted in accordance with a transmission state of a transmission channel or error resilience is changed. The transmission state is adjusted by changing a bit rate or changing a frame interval. With respect to a change in quality of a transmission channel, the error resilience is changed according to the transmission state of the transmission channel (for example, the error resilience is changed by changing an interval of an MPEG4 synchronous signal). Therefore, data transmission can be carried out efficiently to the maximum, thereby enabling data transmission that makes it possible to fully utilize transmission requiring real time processing.

[0049] FIG. 3 shows a configuration when the configuration shown in FIG. 2 is further developed. This network condition determination device 105 comprises a network information storage device 301 that stores past network information and an encoded parameter information storage device 302 that stores encoded parameter information supplied to the current video encoder 102. A network condition determination device 303 recognizes the past network information and the current encoded parameter from these elements, decides an elapse of time in network condition from these elements

fuboTV Media Inc.
Exhibit 1002
Page 410

to determine an optimal parameter assigned to the video encoder 102, and provides the parameter to the video encoder 102.

[0050] With this construction, it is possible to determine a network condition more accurately by referring to an elapse of time relevant to network information. FIG. 12 shows a flow chart of a network condition determination method in the case of using this system. Processing at the network condition determination device 303 will be described in accordance with this flow chart. First, the network condition determination device 303 determines whether or not packet loss is "0" at the step S1201. As a result of this determination, when the packet loss is present, it is determined by the step S1202 whether or not the past packet loss occurs. As a result, when the past packet loss occurs, the loss rate is compared with the current rate. If the current packet loss rate is higher than the past packet loss rate, it can be determined that the past correction has been invalid.

[0051] It is understood from this determination that the bandwidth overflow of transmission data such as network congestion is not troublesome, but a possibility that a noise or the like occurs over a channel resulting in destroying is high. Therefore, the network condition determination device 303 does not change a bit rate at the step S1204, and carries out parameter setting to ensure reliable error correction, and notifies the fact to the video encoder 102 at the step S1205.

[0052] If the current packet loss rate is lower than the past packet loss rate at the step S1203, the network condition determination device 303 determines that the past change works efficiently, and re-calculates a valid bit rate from the packet loss rate at the step S1206. When the past packet loss does not occur at the step S1202, the last loss is determined as a channel noise, and processing goes to the step S1204.

[0053] On the other hand, when no packet loss occurs at the step S1201, the network condition determination device 303 checks a delay quantity at the step S1207. As a result, when the delay quantity exceeds thresholds "Th", a valid bit rate is calculated from the delay quantity at the step S1208, and the calculation result is notified to the video encoder 102 at the step S1205.

[0054] Lastly, when the delay quantity does not exceeds the thresholds "Th", the network condition determination device 303 determines that successful communication is established, and does not change a parameter at the step S1209.

[0055] By causing the network condition determination device 303 to carry out such processing, the network condition determination device 105 can have a function capable of determining whether a packet loss occurs on a transmission channel due to network congestion or whether a noise is generated, and the loss occurs due to the impairment of a channel state such as radio equipment.

[0056] This function is provided as a mere example. For example, when the past packet loss does not occur at the step S1202, a control for lowering a bit rate may be made by determining network congestion instead of determination of noise. If the current packet loss rate is improved more remarkably than the past packet loss rate at the step S1203, similar parameter change may be made after checking how the past change has been made. In this way, in this system, a variety of determination systems can be set according to a network.

[0057] In the foregoing, although there has been shown an example in which the video encoder 102 carries out encode processing based on encoded parameters determined and assigned at the network condition determination device 105, a configuration for the video encoder 102 to determine a parameter can be provided without being limited to the network condition determination device 105. An example is shown in FIG. 4.

[0058] FIG. 4 is a block diagram depicting an inclusive configuration when the video encoder 102 determines an encoded parameter. In the case of this example, the video encoder 102 comprises an encoded parameter determination device 401 and a signal processor 402.

[0059] In the case of this configuration, the network condition determination device 105 is configured to output the network condition information 136 from the network condition determination device 303, and then, provide the information to the video encoder 102.

[0060] In such a configuration, the network condition determination device 105 provides the network condition information 136 delivered from the network condition determination device 303 to the video encoder 102. Then, the video encoder 102 first inputs the network condition information 136 to an encoded parameter determination device 401. Then, the encoded parameter determination device 401 recognizes a network condition from this network condition information 136, and generates an encoded parameter 431 in the form suitable to the network condition.

[0061] The thus generated encoded parameter 431 is inputted to a signal processor 402. Then, this signal processor 402 encodes the video signal 131 inputted from the video input device 101 by using this encoded parameter 431.

[0062] Encoding information 432 such as the number of encoded bits after encoding is inputted to the encoded parameter determination device 401, and is used for the next encoded parameter determination. Encoded data 132 encoded at the signal processor 402 is output to the encoded data transmitter 103.

[0063] FIG. 5 is a block diagram depicting a configuration including a intra-frame encoding determination device 501 that forcibly sets intra-frame encoding at the encoded parameter determination device 401 shown in FIG. 4. As shown in the figure, the encoded parameter determination device 401 comprises an intra-frame encoding/determination device 501 and an encoded parameter determination device 502.

fuboTV Media Inc.
Exhibit 1002
Page 411

[0064] In the case of this configuration, the network condition information 136 outputted from the network condition determination device 105 is input to the encoded parameter determination device 502 possessed by the encoded parameter determination device 401. Then, encoded parameter information 531 corresponding to the network condition information 136 is output from the encoded parameter determination device 502.

[0065] The encoded parameter information 531 is input to the intra-frame encoding determination device 501, and it is determined whether inter-frame encoding is carried out as is or intra-frame encoding is forcibly carried out. When it is determined as intra-frame encoding, the encoding parameter information 531 is updated so as to carry out intra-frame encoding, and is output as the encoded parameter information 431 to the signal processor 402 of the video encoder 102.

[0066] By doing this, even if the past data is not transmitted correctly to a receiver, when the data can be received correctly after parameter change, a correct image can be reproduced.

[0067] It is possible to configure a video encoder capable of determining a network condition, which has functions of the video encoder 102 and network condition determination device 105, thereby making it possible to provide the previously described function in one block.

[0068] The encoded parameter determination device 401 or network condition determination device 105 makes determination concerning the next encoded parameter setting. However, if a picture quality is changed suddenly due to temporary instability of network, an unclear picture may be produced. In order to suppress such a phenomenon, it is possible to incorporate a mechanism in which a change in encoded parameter is suppressed within its predetermined range. In the above described circumstance, this mechanism functions efficiently.

[0069] Although a bit rate or an error resilience parameter may be set as its calculated value, it is possible to employ a method of predetermining some patterns, and then, selecting the closest pattern from among them. Further, instead of the closest pattern, it is possible to make a selection of the closest bit rate which is lower than the calculated bit rate. This makes it possible to prevent the generation of a video image with its unexpected image quality due to a combination of a variety of parameters, and makes it possible to prepare a combination of encoded parameters that have been tested to some extent.

[0070] In the foregoing example, when the packet loss rate is not "0" or when a delay exceeds the thresholds, there has been made a control such that parameters such as bit rate or error resilience are changed, and the changed is reset to that suitable to the current state.

[0071] However, after recovery of a network condition, when no packet loss occurs or when a small delay occurs, it is possible to make a control for increasing a bit rate or decreasing an error resilience parameter.

[0072] The foregoing example will be described below according to a second embodiment.

(Embodiment of the invention)

[0073] FIG. 6 is a view showing a basic configuration of an image transmission apparatus according to the embodiment of the present invention. The image transmission apparatus shown in FIG. 6 comprises a plurality of media 601, an encoded data switch device 602, an encoded data selector 603, an encoded data transmitter 103, a network information receiver 104, and a network condition determination device 105.

[0074] The storage media 601 are used to store encoded data 631 on contents that have been encoded in advance. The storage media 601 each store encoded data on the same contents encoded by different encoded parameters, respectively.

[0075] The encoded data switch device 602 selects one of a plurality of storage media 601, and provides encoding data 631 stored in the thus selected storage medium 601 to the encoded data transmitter 103. A selection of the storage media is carried out in accordance with switch information 632 from the encoded data selector 603.

[0076] The network information receiver 104 has a function that receives network information 134 such as packet loss rate or Jitter information delivered from a receiver or a network, and provides the received information as network information 135 to the network condition determination device 105.

[0077] The network condition determination device 105 determines a network condition from the input network information 135, and outputs the result as network condition information 136 to the encoded data selector 603. The encoded data selector 603 has a function for estimating, from this network condition information 136, which of the encoded data on encoding parameters is optimal to the current network, and then, outputting to the encoded data switch device 602 the switch information 632 used for switching in order to select encoded data caused by the estimated optimal encoding parameter as an output.

[0078] The encoded data switch device 602 selects one item of encoded data from among the input encoded data 631, and outputs encoded data 132.

[0079] With such a configuration, the encoded data 631 encoded in advance and store in the storage medium 601 or the like is input to an encoding data switch device 602 when the data is reproduced from the storage medium 601. That is, respective encoded data encoded by the differential encoding parameters are maintained in a plurality of storage media 601. As a result of reproducing these items of data, the encoded data encoded by the different encoding parameters,

fuboTV Media Inc.
Exhibit 1002
Page 412

respectively, is inputted. The encoded data switch device 602 selects one from among these items of data, and outputs it to the encoded data transmitter 103.

[0080] This selection is carried out in accordance with switch information 632 from the encoded data selector 603.

[0081] On the other hand, network information 134 such as packet loss rate or Jitter information from a receiver is received at the network information receiver 104, and then, the received information is delivered to the network condition determination device 105. The network condition determination device 105 determines a network condition from the inputted network information 135, and outputs the result as network condition information 136 to an encoded data selector 603.

[0082] The encoded data selector 603 estimates, from the network condition information 136, which of the encoded data of the encoding parameters is optimal to the current network, and outputs the switch information 632 to the encoded data switch device 602.

[0083] The encoded data switch device 602 selects one item of the encoded data from among the input encoded data 631, and outputs encoded data 132.

[0084] The present embodiment will be described by way of a specific example.

[0085] Now, assume that there exist five storage media 601a to 601e each having stored therein five items of encoded data encoded at 384 kbps, 128 kbps, 64 kbps, 32 kbps, and 16 kbps.

[0086] That is, for example, a storage medium having stored therein encoded data on contents encoded at 384 kbps is defined as a storage medium 601a; a storage medium having stored therein encoded data on contents encoded at 128 kbps is defined as a storage medium 601b; a storage medium having stored therein encoded data on contents encoded at 64 kbps is defined as a storage medium 601c; a storage medium having stored therein encoded data on contents encoded at 32 kbps is defined as a storage medium 601d; and a storage medium having stored therein encoded data on contents encoded at 16 kbps is defined as a storage medium 601e.

[0087] In the case of using a transmission channel having its quality capable of being transmitted at 384 kbps, first, reproduced encoded data is selected by the storage medium 601a that is a storage medium having stored therein encoded data on contents encoded at 384 kbps; transmission is started at 384 kbps, and reception of network information from the receiver starts at the same time.

[0088] Although network information is received at a predetermined interval, if a problem occurs with a network based on the received information, a valid bit rate is calculated at a stage at which a packet loss or delay occurs. The encoded data selector 603 selects encoded data on a bit rate close to the calculated bit rate, and the encoded data switch device 602 switches and transmits the selected data.

[0089] For example, the calculated bit rate is 140 kbps, a value close to this bit rate is 128 kbps. In this case, the above switch device selects and switches encoded data reproduced from the storage medium 601b having stored therein encoded data on contents encoded at 128 kbps. In addition, if the calculated bit rate is 100 kbps, a value close to a bit rate lower than the calculated bit rate is 64 kbps. In this case, the switch device selects and switches encoded data reproduced from the storage medium 601c having stored therein encoded data on contents encoded at 64 kbps.

[0090] In this way, in the present embodiment, contents are prepared after encoded in advance for type of transmission bit rate, and a current optimal transmission rate is obtained based on network information such as packet loss rate or Jitter information from a receiver that is a function possessed by RTP. A storage medium having stored therein encoded data obtained at the bit rate corresponding to this transmission rate is selected by the switch 602, and reproduced encoded data output of the storage medium is transmitted. In this manner, there is no need for a server to carry out encode processing in real time, making it possible to reduce a load on the server. This is very effective in distributing a pre-produced video such as broadcast in particular.

[0091] Now, a modified example of the invention embodiment will be described here. FIG. 7 is a block diagram depicting a method for carrying out control for a switch timing of encoded data to be inputted at the encoded data switch device 602.

[0092] Encoded data 631 is inputted to the switching position detecting device 701 and a switch device 702. Switch information 632 is inputted to the switching position detecting device 701. If there occurs a need to execute switching from the current encoded data to the other encoded data according to the switch information 632, the switching position detecting device 701 analyzes encoded data, and detects a switching enable position.

[0093] This means that a search is made for a frame encoded by intra-frame encoding (I-Picture).

[0094] When the switching enable position is set, an instruction for switching encoded data is supplied to the switch device 702 by using the switching instruction information 731. FIG. 8 shows an example of this instruction. Assume that encoded data A is currently selected, and there occurs a need to execute switching to encoded data B according to the switch information 632.

[0095] At this stage, assume that a frame is processed at the time of "switching instruction" shown in FIG. 8. In such a case, if encoded data is switched, an unmatched image occurs. This is because a difference from the previous image is encoded in intra-frame encoding (P-Picture). Therefore, if encoded data is switched at the time of P-Picture, an attempt is made to reproduce the next picture (picture P11 of encoded data (B)) by using immediately preceding picture (decoded picture I11 of encoding data (A)). This provides a problem that a correct decode picture cannot be obtained, and a picture

fuboTV Media Inc.
Exhibit 1002
Page 413

is destroyed. Thus, there occurs a need to execute switching at a timing of a picture of intra-frame encoding (I-Picture) undergoing encoding by that frame only. This timing is defined as a timing at a position marked with "execute switching".

[0096] As in FIG. 9, a case in which the number of frames or time position differs depending on encoded data is considered. In this case as well, a switching enable position of encoded data at a switching destination is detected, and switching of encoded data is executed when the switching enable position is set.

[0097] At the switching position detecting device 701 shown in FIG. 7, when a need to execute switching according to the switch information 632 occurs, it is possible to employ a method for temporarily stopping an output 132 to the encoded data transmitter 103, and then, outputting new encoded data to the encoded data transmitter 103 at a stage at which the switching position is set.

[0098] This method is effective when it is necessary to suppress a buffer overflow or the like by switching encoded data. When an underflow is problematic; a stuffing bit is forcibly inserted, thereby making it possible to counteract such an underflow.

(Second example)

[0099] Now, a second example according to the present invention will be described here.

[0100] The present example describes an exemplary configuration of an encoding parameter determination device 401 of the video encoder 102 shown in FIG. 4 according to the first example when a time interval (GOP interval) between frames encoded in a intra-frame encoded mode is adjusted based on the network condition information 136 outputted from the network state determination device 105. Here, a description will be given by focusing on differences from the first embodiment.

[0101] FIG. 13 shows an exemplary configuration of the encoding parameter determination device 401. This device comprises a GOP interval calculator (GOP interval calculator) 1501 and an encoding parameter determination device 502.

[0102] The network condition information 136 outputted from the network condition determination device 105 (including at least packet loss rate information) is input to an encoding parameter determination device 502. The parameter determination device 502 inputs packet loss rate information 1531 of the network condition information 136 to the GOP interval calculator 1501. The GOP interval calculator 1501 calculates a GOP interval from the packet loss rate information 1531. The GOP interval information 1532 is notified to the encoding parameter determination device 401. The encoding parameter determination device 401 outputs encoding parameter information 431 that contains the inputted GOP interval information 1532. When internally generated parameter information exists, the encoding parameter determination device 401 outputs GOP interval information 1532 and encoding parameter information 431 that contains the internally generated parameter information.

[0103] FIG. 14 shows an example of a method for determining a GOP interval at the GOP interval calculator.

[0104] At the step S1601, it is determined whether or not a packet loss occurs from the network condition information 136. When such a packet loss occurs, the GOP interval is estimated by formula (3) below, for example, at the step S1602.

$$Gop = (TN - TL)/\{(FN - FL) \times r\} \qquad (3)$$

where "gop" denotes a GOP interval, "r" denotes a packet loss rate, FN denotes a total number of current frames, FL denotes a total number of frames during past calculation, TN denotes a time, and TL denotes a time during past calculation.

[0105] The GOP interval obtained at the step S1602 is notified to the signal processor 402 at the step S1603, and encoding is carried out based on the notified value.

[0106] On the other hand, when no packet loss has occurred at the step S1601, the default GOP thresholds are read out at the step S1604. At the step S1603, this value is notified to the signal processor 402.

[0107] According to the present example, it is possible to change dynamically the GOP interval to a value suitable to a network. In this manner, when a small number of errors occur, the GOP interval is increased, thereby making it possible to reduce wasteful intra-frame encoded modes in number. In contrast, when a large number of errors occur, the GOP interval is decreased, and a frame in the intra-frame encoded mode appears quickly, thereby making it possible to accelerate recovery. In the present example, it is possible to efficiently select an intra-frame encoded mode.

[0108] FIG. 15 shows another example of a method for determining a GOP interval at the GOP interval calculator in accordance with a flow chart.

[0109] In this example, even when packet loss is fewer than that in the system shown in FIG. 14, the network condition is estimated from the past history of packet loss at the step S1704, and an optimal GOP interval is calculated. This technique makes it possible to estimate whether a network is completely free of an error or an error may occurs by checking the past history instead of resetting the GOP interval to the default value by determining that no packet loss occurs at one moment. In this manner, it is possible to determine the network condition more accurately.

fuboTV Media Inc.
Exhibit 1002
Page 414

[0110] FIG. 16 shows still another example of a method for determining a GOP interval at the GOP internal calculator in accordance with a flow chart.

[0111] In this example, the GOP interval is determined by a unique calculation system instead of determination based on the presence/absence of a packet loss. This system can be used to determine the GOP interval from the current packet loss rate in accordance with a single formula or to determine the most suitable GOP interval by checking the past history.

[0112] The following formula (4) shows an example of calculation formula for determining the GOP interval.

$$Gop = [(TN - TL)/\{(FN - FL) \times r\}] \times \alpha \qquad (4)$$

where "gop" denotes a GOP interval, "r" denotes a packet loss rate, α denotes a sensitivity coefficient, FB denotes a total number of current frames, FL denotes a total number of frames during past calculation, TN denotes a current time, and TL denotes a time during past calculation.

[0113] In this example, the GOP interval calculated from an actual value is multiplied by a sensitivity coefficient, thereby making it possible to meet a requirement for accelerating recovery by sacrificing efficiency or a requirement when one does not take care even if an effect of error is somewhat extended. For example, if the sensitivity coefficient α is set to be smaller than 1, a GOP interval which is smaller than that calculated from an actually measured value is output. In this manner, although the efficiency is sacrificed, when an error occurs, it is possible to estimate faster recovery.

[0114] The present example is not limited to formulas (3) and (4). For example, in these formulas, a value is calculated by using an increment during past calculation and subsequent, it is possible to calculate the value by taking a margin such as the n preceding increment. In this manner, it is possible to cope with a gradual change hidden in a change in detailed state or to eliminate a temporal change to some extent. Similarly, algorithms are not limited to those shown in the present embodiment.

[0115] The foregoing embodiment has described an exemplary configuration when a time interval (GOP interval) is adjusted, the time interval being between the frames encoded in the intra-frame encoded mode based on the network condition information 136 at the encoding parameter determination device 401 of the video encoder 102 shown in FIG. 4 according to the first embodiment. Alternatively, there can be provided a configuration in which the network condition determination device 105 according to the first example (FIGS. 1, 2, or 3) determines a time interval (GOP interval) encoded in the intra-frame encoded mode based on information from the network information or information from the network information receiver 104 and information from the video encoder 102, and provides the encoded time interval to the image encoder 102.

[0116] As described in the first example it is possible to configure a video encoder capable of determining a network condition, the video encoder having functions of the video encoder 102 and network condition determination device 105, thereby providing the previously described functions in one block.

[0117] In the foregoing, although a variety of examples have been described, in short, the present invention utilizes characteristics of RTP, and comprises a system (RTCP) for notifying network state information such as jitter or packet loss rate from a transmitter or receiver. At the transmitter, a bit rate of transmission data at the transmitter is adjusted according to a transmission state of a transmission channel based on the notification of network state information acquired from the receiver in the transmitter such as jitter or packet loss rate so that control such as change of the error resilience level can be carried out. Therefore, according to the above described present invention, data can be transmitted efficiently to the maximum so as to achieve data transmission that makes it possible to fully utilize transmission requiring real time properties as well.

[0118] The techniques described in the examples of the present invention can be distributed to be stored as a computer executable program in a recording medium such as a magnetic disk (such as a flexible disk or a hard disk); an optical disk (such as CD-ROM, CD-R, CD-RW, DVD, or MO), and a recording medium such as a semiconductor memory. Further, the above program can be distributed by means of transmission via a network.

[0119] According to the present invention, it is possible to determine a network condition, and then, optimally set an encoding parameter. In addition, when a packet loss caused by congestion and a loss of a channel error coexist in a network, it is possible to determine the loss, and then, to set a parameter.

[0120] Therefore, according to the present invention, there can be provided a data transmission apparatus in which data can be transmitted efficiently to the maximum so as to achieve data transmission that makes it possible to fully utilize transmission requiring real time properties.

fuboTV Media Inc.
Exhibit 1002
Page 415

Claims

1. Image transmission apparatus comprising:

   a plurality of media (601) arranged to store plural video encoded data, respectively, the plural video encoded data generated by encoding the same contents at different bit rates by using different encoding parameters, respectively;
   an encoded data switch device (602) arranged to switch selectively the plurality of storage media (601) to select one of the storage media and provide video encoded data (631) stored in the selected storage medium (601), the selection being dependant on network condition information, which it is arranged to receive; and
   an encoded data transmitter (103) for transmitting the video encoded data selected by the encoded data switch device (602).

2. Image transmission apparatus according to Claim 1, in which the encoded data switch device (602) is arranged to switch the media (601) to one storing data encoded at a bit rate optimal for the network condition when it receives the network condition information.

3. Image transmission apparatus according to Claim 1 or 2, in which the encoded data switch device (602) is arranged to switch the media (601) at a timing of a picture of intra-frame encoding.

4. Image transmission apparatus according to any preceding claim, further including an encoded data selector (603) for estimating, from the network condition information (136), which of the video encoded data of the encoding parameters is optimal to the current network to output switch information (632) to the encoded data switch device (602).

5. Image transmission apparatus according to Claim 4, further including a network condition determination device (105) for determining a network condition from network information (135) to output an estimation result as the network condition information (136) to the encoded data selector (603).

6. Image transmission apparatus according to Claim 3, in which the encoded data switch device (602) includes a switching position detecting device (701) for analyzing the video encoded data to detect a switching enable position at which a frame encoded by intra-frame encoding is searched and output switching instruction information (731), and a switching device (702) for switching the encoded data according to the switching instruction information (731).

Revendications

1. Appareil de transmission d'images comprenant :

   plusieurs supports (601) agencés pour mémoriser plusieurs données codées de vidéo, respectivement, les plusieurs données codées de vidéo étant engendrées par codage du même contenu à des débits binaires différents en utilisant, respectivement, des paramètres de codage différents ;
   un dispositif (602) de commutation de données codées agencé pour commuter sélectivement la pluralité de supports (601) de mémorisation pour choisir l'un des supports de mémorisation et fournir des données codées (631) de vidéo mémorisées sur le support (601) de mémorisation choisi, le choix dépendant de l'information d'état de réseau, et qui est agencé pour recevoir ; et
   un émetteur (103) de données codées destiné à émettre les données codées de vidéo choisies par le dispositif (602) de commutation de données codées.

2. Appareil de transmission d'image selon la revendication 1, dans lequel le dispositif (602) de commutation de données codées est agencé pour commuter le support (601) vers certaines des données mémorisées codées à un débit binaire optimal pour l'état de réseau lorsqu'il reçoit l'information d'état de réseau.

3. Appareil de transmission d'image selon la revendication 1 ou 2, dans lequel le dispositif (602) de commutation de données codées est agencé pour commuter le support (601) à un cadencement d'une image de codage interne à une vue.

4. Appareil de transmission d'image selon l'une quelconque des revendications précédentes, comprenant en outre un

fuboTV Media Inc.
Exhibit 1002
Page 416

sélecteur (603) de données codées destiné à estimer, à partir de l'information (136) d'état de réseau, lesquelles des données codées de vidéo des paramètres de codage sont optimales pour le réseau courant pour sortir de l'information (632) de commutation vers le dispositif (602) de commutation de données codées.

5. Appareil de transmission d'image selon la revendication 4, incluant en outre un dispositif (105) de détermination d'état de réseau destiné à déterminer un état de réseau à partir d'une information (135) de réseau pour sortir, vers le sélecteur (603) de données codées, un résultat d'estimation en tant qu'information (136) d'état de réseau.

6. Appareil de transmission d'image selon la revendication 3, dans lequel le dispositif (602) de commutation de données codées comprend un dispositif (701) de détection de position de commutation destiné à analyser les données codées de vidéo pour détecter une position d'autorisation de commutation à laquelle on cherche une vue codée par codage interne à une vue et pour sortir une information (731) d'instruction de commutation, et un dispositif (702) de commutation destiné à commuter les données codées en fonction de l'information (731) d'instruction de commutation.

Patentansprüche

1. Bildübertragungsvorrichtung, umfassend:

   eine Vielzahl von Medien (601), angeordnet, jeweils viele video-kodierte Daten zu speichern, die vielen video-kodierten Daten jeweils generiert durch Kodieren des gleichen Inhalts in unterschiedlichen Bitraten durch Verwenden unterschiedlicher Kodierungsparameter;
   eine Kodierungsdatenschalteinrichtung (602), angeordnet, die Vielzahl von Speichermedien (601) selektiv umzuschalten, um eines der Speichermedien auszuwählen und video-kodierte Daten (631) vorzusehen, die auf dem ausgewählten Speichermedium (601) gespeichert sind, wobei die Auswahl von Netzbedingungsinformation abhängig ist, die sie angeordnet ist zu empfangen; und
   einen Kodierungsdatensender (103) zum Übertragen der video-kodierten Daten, die durch die Kodierungsdatenschalteinrichtung (602) ausgewählt sind.

2. Bildübertragungsvorrichtung nach Anspruch 1, in der die Kodierungsdatenschalteinrichtung (602) angeordnet ist, die Medien (601) zu einem umzuschalten, das Daten speichert, die in einer Bitrate kodiert sind, die für die Netzbedingung optimal ist, wenn sie die Netzbedingungsinformation empfängt.

3. Bildübertragungsvorrichtung nach Anspruch 1 oder 2, in der die Kodierungsdatenschalteinrichtung (602) angeordnet ist, die Medien (601) in einer Zeitsteuerung eines Bildes von Intrarahmenkodierung umzuschalten.

4. Bildübertragungsvorrichtung nach einem beliebigen vorangehenden Anspruch, ferner enthaltend einen Kodierungsdatenselektor (603) zum Schätzen, aus der Netzbedingungsinformation (136), welche der video-kodierten Daten der Kodierungsparameter optimal für das aktuelle Netz sind, um Schaltinformation (632) zu der Kodierungsdatenschalteinrichtung (602) auszugeben.

5. Bildübertragungsvorrichtung nach Anspruch 4, ferner enthaltend eine Netzbedingungsbestimmungseinrichtung (105) zum Bestimmen einer Netzbedingung aus Netzinformation (135), um ein Schätzungsergebnis als die Netzbedingungsinformation (136) zu dem Kodierungsdatenselektor (603) auszugeben.

6. Bildübertragungsvorrichtung nach Anspruch 3, in der die Kodierungsdatenschalteinrichtung (602) eine Schaltpositionserfassungseinrichtung (701) zum Analysieren der video-kodierten Daten enthält, um eine Schaltfreigabeposition zu erfassen, in der ein Rahmen, der durch Intrarahmenkodierung kodiert ist, gesucht wird und Schaltinstruktionsinformation (731) auszugeben, und eine Schalteinrichtung (702) zum Umschalten der kodierten Daten gemäß der Schaltinstruktionsinformation (731).

fuboTV Media Inc.
Exhibit 1002
Page 417

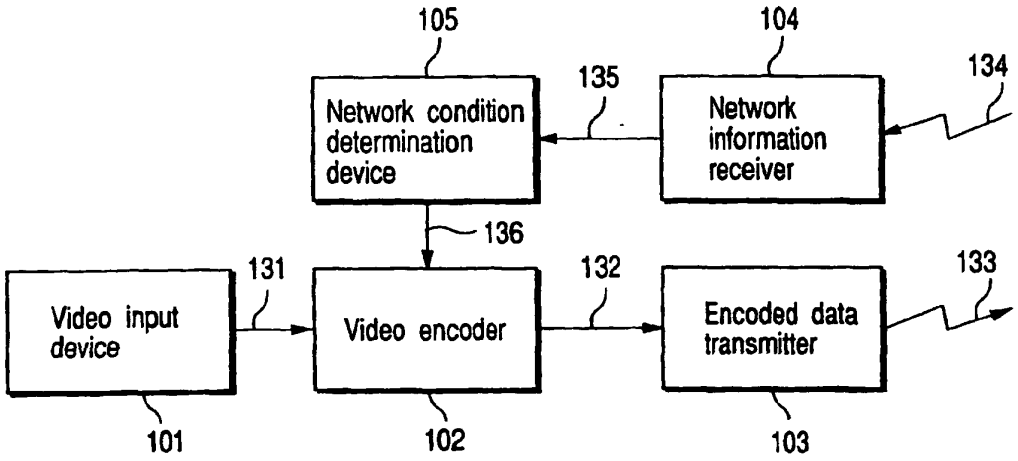


FIG. 1

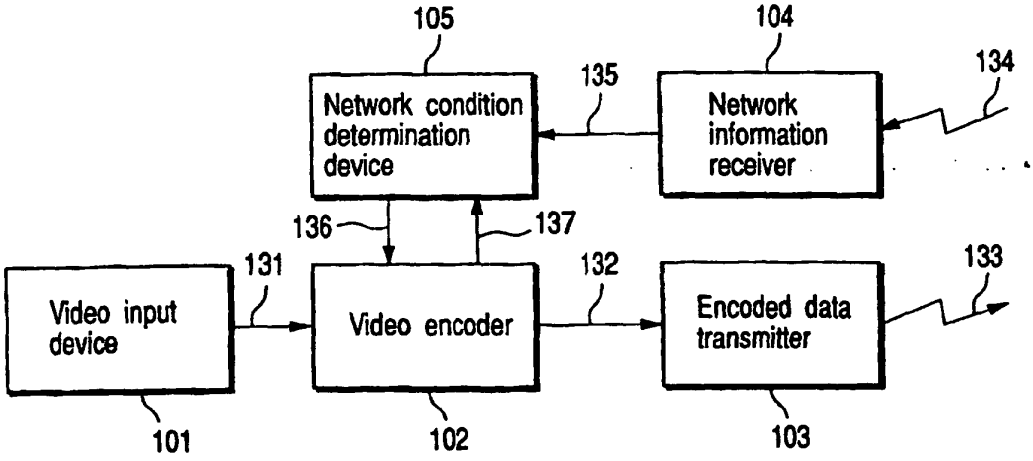


FIG. 2

fuboTV Media Inc.
Exhibit 1002
Page 418

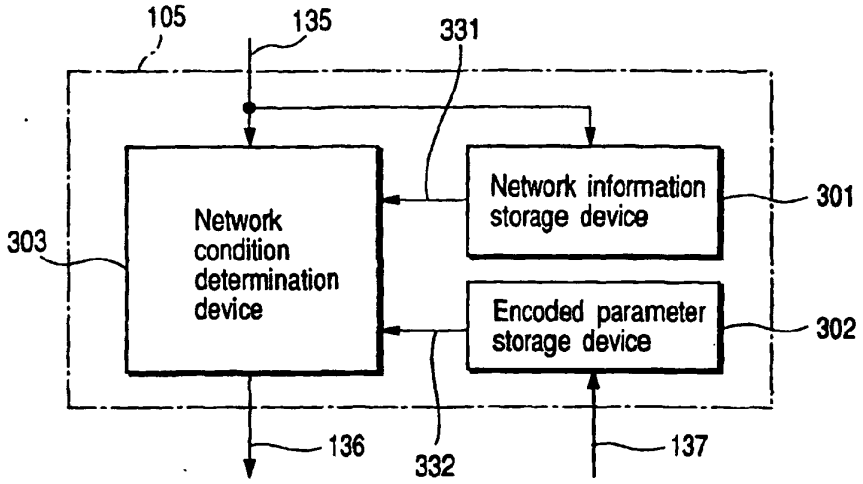


FIG. 3

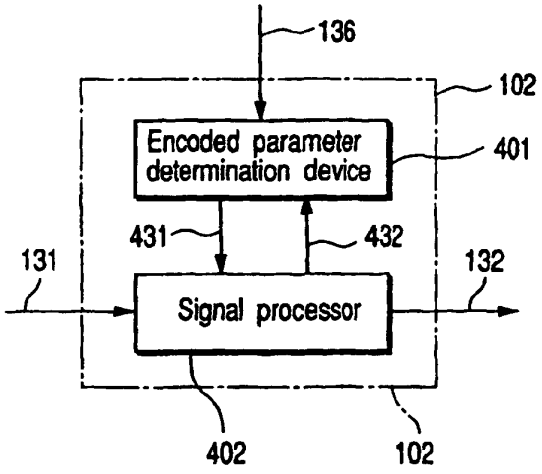


FIG. 4

fuboTV Media Inc.
Exhibit 1002
Page 419

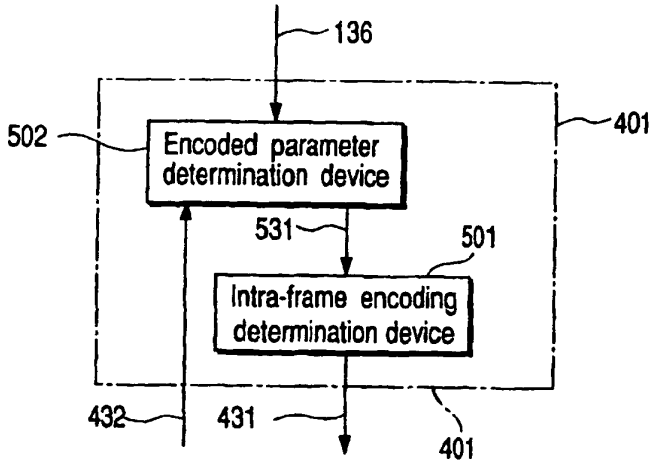


FIG. 5

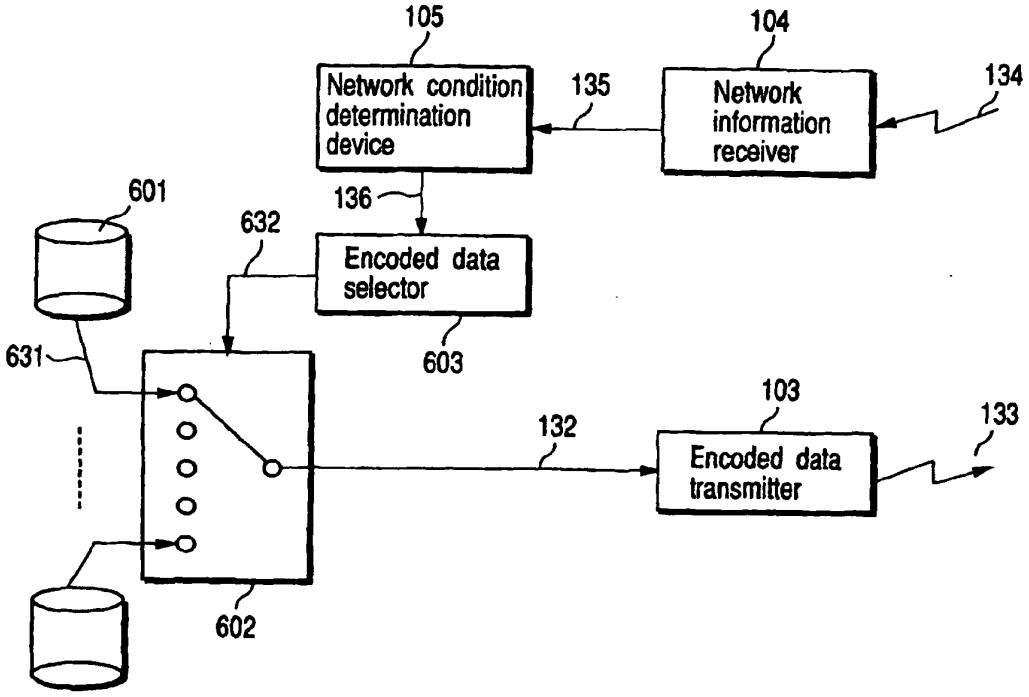


FIG. 6

fuboTV Media Inc.
Exhibit 1002
Page 420

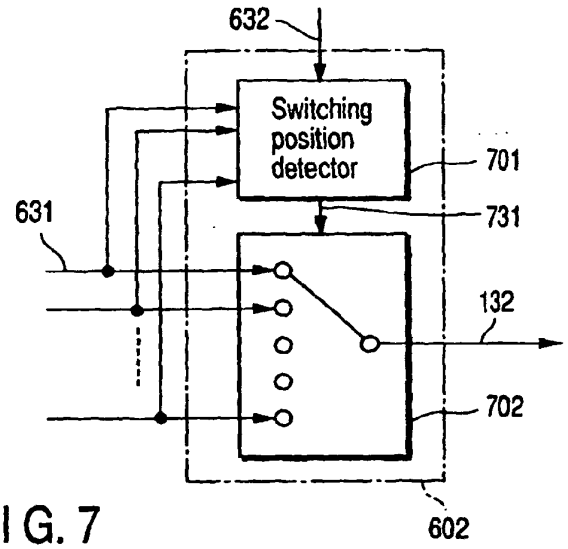


FIG. 7

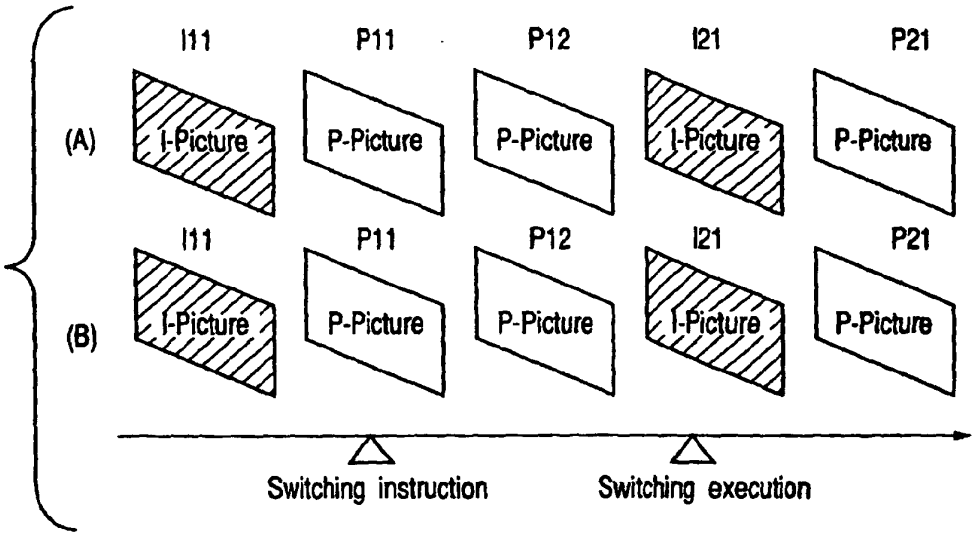


FIG. 8

fuboTV Media Inc.
Exhibit 1002
Page 421

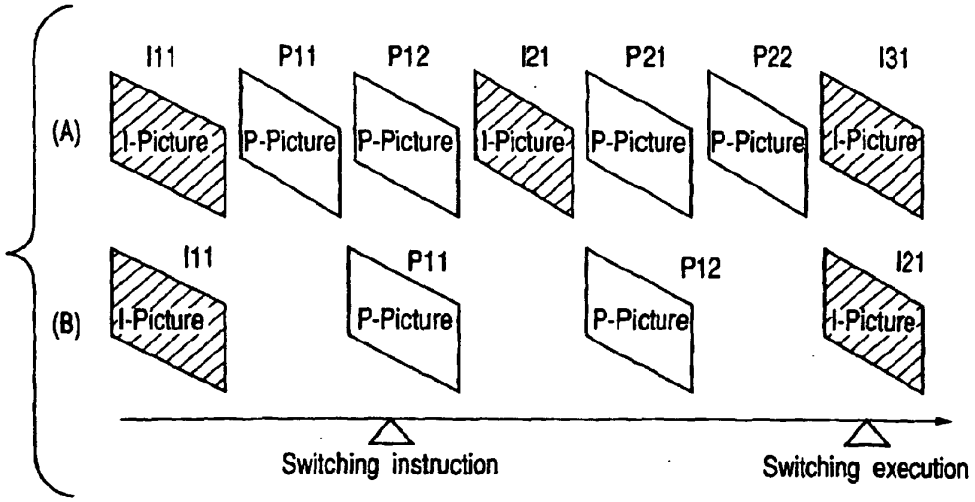


FIG. 9

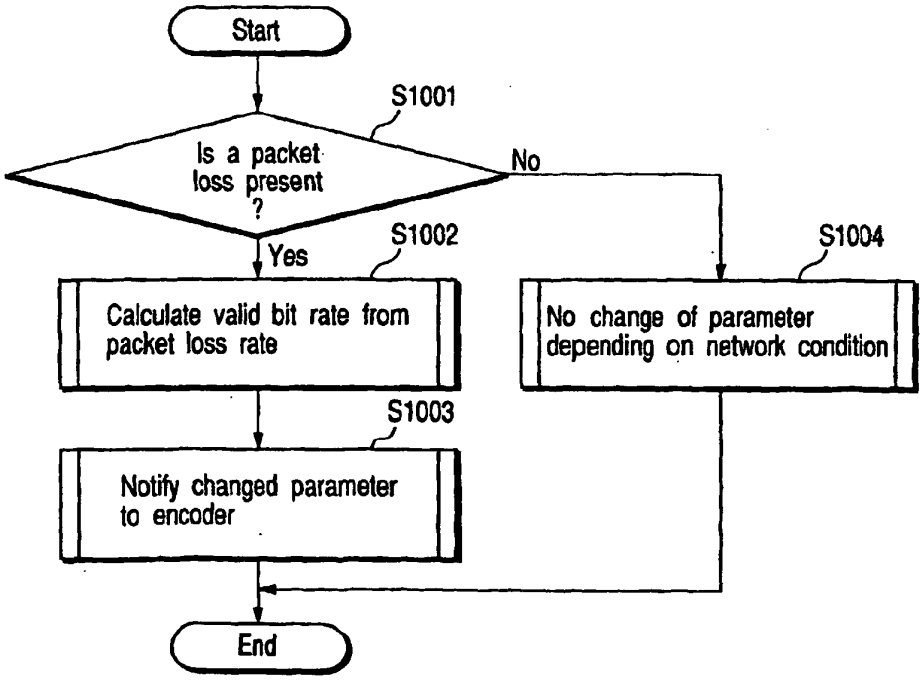


FIG. 10

fuboTV Media Inc.
Exhibit 1002
Page 422

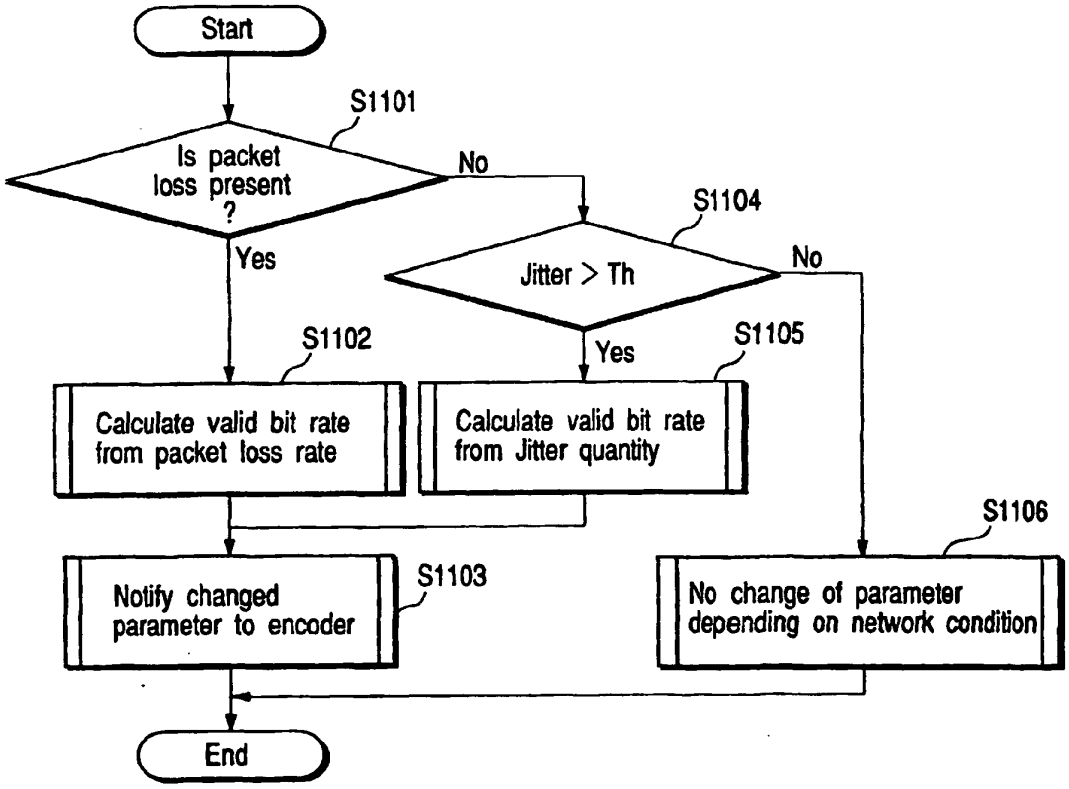


FIG. 11

fuboTV Media Inc.
Exhibit 1002
Page 423

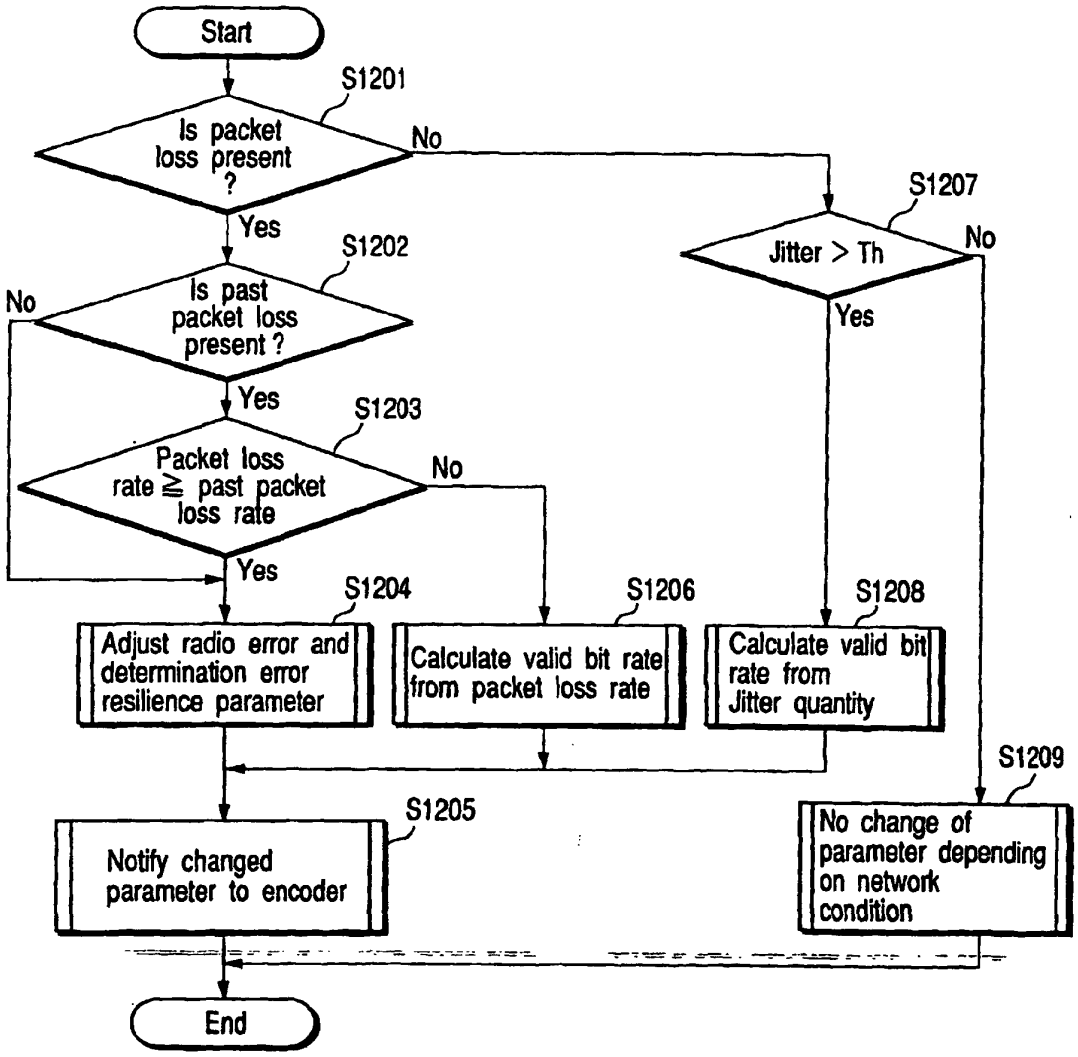


FIG. 12

fuboTV Media Inc.
Exhibit 1002
Page 424

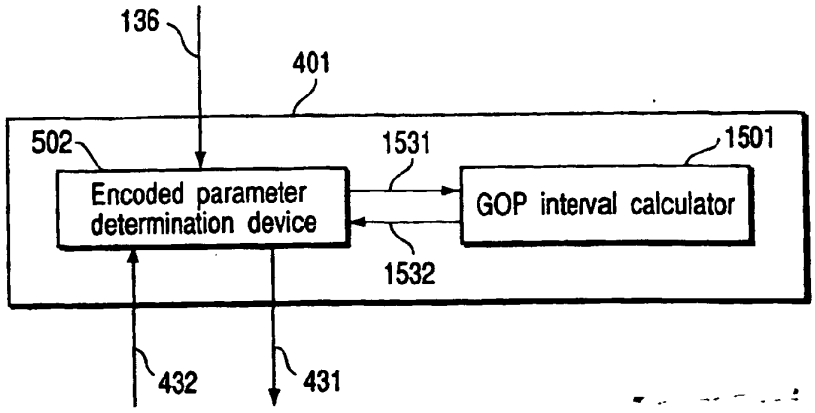


FIG. 13

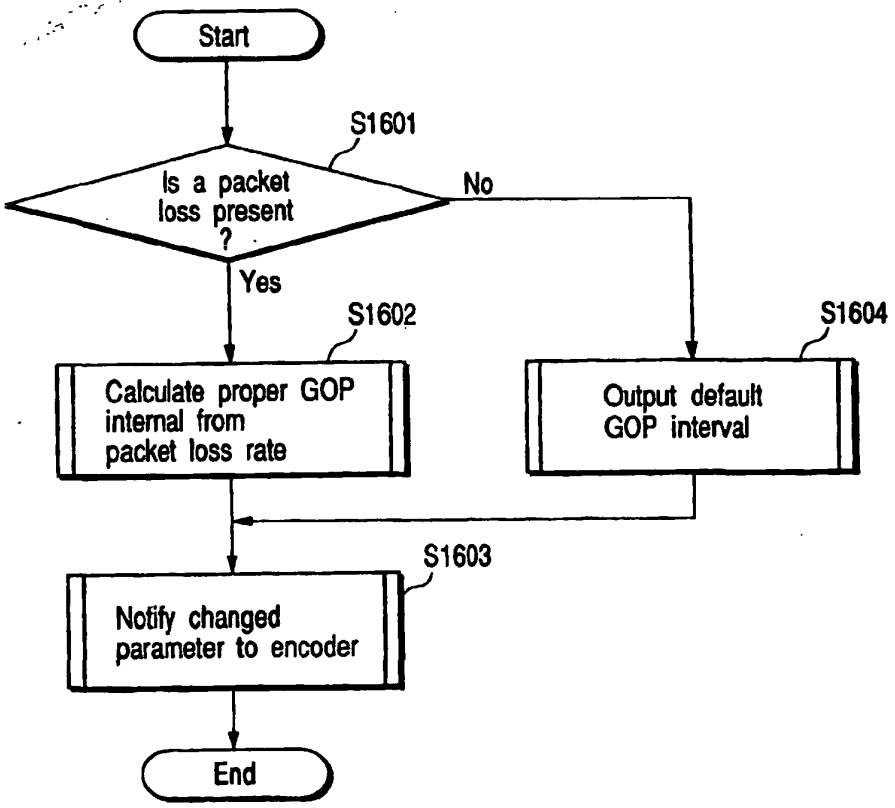


FIG. 14

fuboTV Media Inc.
Exhibit 1002
Page 425

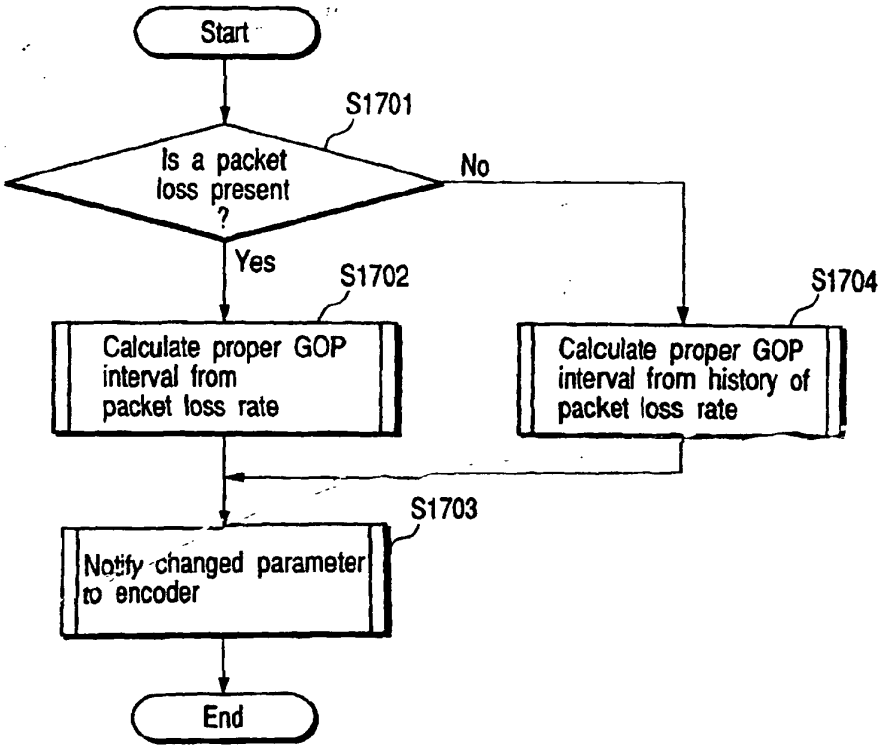


FIG. 15

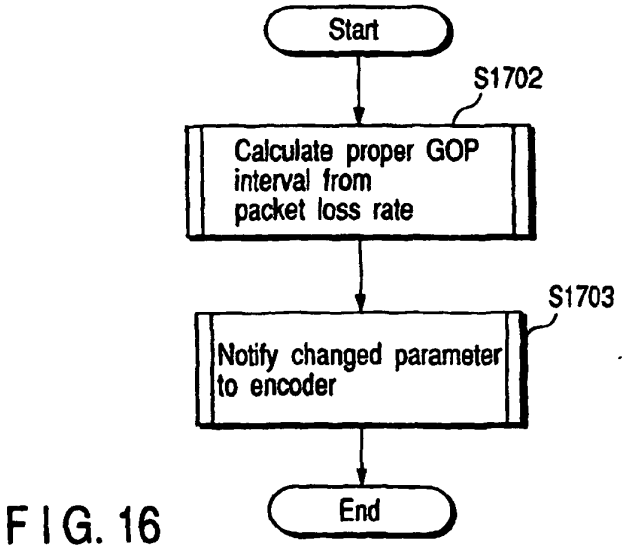


FIG. 16

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Exhibit 1002
Page 426

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KW LAW LLP (Dish Technologies L.L.C.)
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