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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/564,003	01/26/2016	9247311	D1-02359A.CON	5114

71897 7590 01/06/2016
KPPB LLP
2400 EAST KATELLA AVENUE
SUITE 1050
ANAHEIM, CA 92806

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

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 Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Michael George Kiefer, Lake Havasu City, AZ;
Sonic IP, Inc., San Diego, CA;
Eric William Grab, San Diego, CA;
Jason Braness, San Diego, CA;

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Receipt date: 08/27/2015

Receipt date: 08/27/2015

Doc Code: IDS

Doc description: Information Disclosure Statement (IDS) Field

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	14/564,003
	Filing Date	Dec 8, 2014
	First Named Inventor	Michael George Kiefer
	Art Unit	2434
	Examiner Name	Abiy Getachew
	Attorney Docket Number	D1-02359A.CON

		20110153785	A1	2011-06-23	Minborg, Per-Åke et al.	
		20110197237	A1	2011-08-11	Turner, Steven E.	
		20110225315	A1	2011-09-15	Wexler, Yosef et al.	
		20110225417	A1	2011-09-15	Maharajh, Kavi et al.	
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		20110246657	A1	2011-10-06	Glow, Andy	
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		20110302319	A1	2011-12-08	Ha, Ho-jin et al.	
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		20120023251	A1	2012-01-26	Pyle, Harry et al.	
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		20120170642	A1	2012-07-05	Braness, J et al.	
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		20120170906	A1	2012-07-05	Soroshian, K et al.	
		20120170915	A1	2012-07-05	Braness, J et al.	
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		20120179834	A1	2012-07-12	Van Der, S A., et al.	
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		20120260277	A1	2012-10-11	Kosciewicz, Pawel	
		20120278496	A1	2012-11-01	Hsu, James K.	
		20120307883	A1	2012-12-06	Graves, Hans W.	
		20120311094	A1	2012-12-06	Biderman, David et al.	
		20130019107		2013-01-17	Grab, E et al.	
		20130044821	A1	2013-02-21	Braness, Jason et al.	
		20130046902	A1	2013-02-21	Villegas Nuñez, Alvaro et al.	
		20130061040	A1	2013-03-07	Kiefer, Michael G., et al.	
		20130061045	A1	2013-03-07	Kiefer, Michael G., et al.	
		20130114944	A1	2013- 05-09	~~DivX, LLC~~ Soroshian et al.	
		20130166765	A1	2013-06-27	Kaufman, Matthew	
		20130166906	A1	2013-06-27	Swaminathan, Viswanathan et al.	
		20140037620	A1	2014-02-06	Ferree, Sean M., et al.	
		20140101722	A1	2014-04-10	Moore, Jonathan	
		20140189065	A1	2014-07-03	Schaar, Auke V., et al.	
		20140201382	A1	2014-07-17	Shivadas, Abhishek et al.	
		20140250473	A1	2014-09-04	Braness, Jason et al.	
		20140258714	A1	2014-09-11	Grab, Eric W.	

Change(s) applied
to document,
/S.R.R./
9/28/2015

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Field

PTO/SB/08a (01-10)

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	First Named Inventor	Michael George Kiefer
	Art Unit	2434
	Examiner Name	Abiy Getachew
	Attorney Docket Number	D1-02359A.CON

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
		5361332	A	1994-11-01	Yoshida, Masayuki et al.	
		5404436	A	1995-04-04	Hamilton, Robert H.	
		5479303		1995-12-26	Suzuki et al.	
		5502766	A	1996-03-26	Boebert, William et al.	
		5509070	A	1996-04-16	Schull, Jonathan	
		5715403	A	1998-02-03	Stefik, Mark	
		5717816		1998-02-10	Boyce et al.	
		5754648	A	1998- 05-19	Ryan, John et al	
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		5887110	A	1999-03-23	Sakamoto, Hideki et al.	
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		5999812	A	1999-12-07	Himsworth, Winston E.	
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		6018611		2000-06-25	Nogami et al.	
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		6449719	B1	2002-09-10	Baker, Brian	
		6466671	B1	2002-10-15	Maillard, Michel et al.	
		6466733		2002-10-15	Kim, Tae-eung	

Change(s) applied
to document,
/S.R.R./
9/28/2015

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF TRANSMISSION

I hereby certify that the enclosed Fee(s) Transmittal is being electronically filed with the United States Patent and Trademark Office on December 15, 2015 at or before 11:59 p.m. Pacific Time under the Rules of 37 CFR § 1.8.

/Katrina Lee/

Katrina Lee

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (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)

71897 7590 09/15/2015

KPPB LLP
2400 E. Katella Ave., Suite 1050
Anaheim, CA 92806

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.

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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 facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/564,003	December 8, 2014	Michael George Kiefer	D1-02359A.CON	5114

TITLE OF INVENTION:

Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information

APPL. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	undiscounted	\$960	\$0	\$0	\$960	December 15, 2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
Abiy Getachew	2434	713-160000

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/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form 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 KPPB 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 has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Sonic IP, Inc.

San Diego, California

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

4a. The following fee(s) are submitted:

- ☒ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 504407 (enclose an extra copy of this form).

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

☐ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see form PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

☐ Applicant asserting small entity status. See 37 CFR 1.27

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.

☐ Applicant changing to regular undiscounted fee 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: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /Jason D. Wolfe/

Date Dec. 15, 2015

Typed or printed name Jason D. Wolfe

Registration No. 71,327

This collection of information 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 12 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.

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Electronic Patent Application Fee Transmittal

Application Number:	14564003			
Filing Date:	08-Dec-2014			
Title of Invention:	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information			
First Named Inventor/Applicant Name:	Michael George Kiefer			
Filer:	Jason Daniel Wolfe/Katrina Lee			
Attorney Docket Number:	D1-02359A.CON			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	1501	1	960	960

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				960

Electronic Acknowledgement Receipt

EFS ID:	24372759
Application Number:	14564003
International Application Number:	
Confirmation Number:	5114
Title of Invention:	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information
First Named Inventor/Applicant Name:	Michael George Kiefer
Customer Number:	71897
Filer:	Jason Daniel Wolfe/Katrina Lee
Filer Authorized By:	Jason Daniel Wolfe
Attorney Docket Number:	D1-02359A.CON
Receipt Date:	15-DEC-2015
Filing Date:	08-DEC-2014
Time Stamp:	20:19:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$960
RAM confirmation Number	7427
Deposit Account	504407
Authorized User	BAILEY, DAVID

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

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IPR2020-00558

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	02359acondecxhtml.pdf	100404	no	1
			4f6f859a221b9303ecfdb1ee42f865bdd4611f6f		
Warnings:					
Information:					
2	Oath or Declaration filed	02359acondeclaration.pdf	1020176	no	3
			8e7ed744db349ef862d3e3a2b36032be3d52e5fb		
Warnings:					
Information:					
3	Issue Fee Payment (PTO-85B)	02359aconissuefeexhtml.pdf	1872415	no	3
			fc1cb379807a78874d6da5004c19727521600510		
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30903	no	2
			53f9a1770be99dbc00ab0ed68400fec6d28a61b6		
Warnings:					
Information:					
Total Files Size (in bytes):			3023898		

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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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being electronically filed with the United States Patent and Trademark Office on December 15, 2015 at or before 11:59 p.m. Pacific Time under the Rules of 37 C.F.R. 1.8.

/Katrina Lee/
Katrina Lee

Appl No. : 14/564,003 Confirmation No. 5114
Applicant : Sonic IP, Inc.
Filed : December 8, 2014
Title : Systems and Methods for Playing Back Alternative Streams of Protected
Content Protected Using Common Cryptographic Information
TC/A.U. : 2434
Examiner : Abiy Getachew
Docket No. : D1-02359A.CON
Customer No. : 71897

TRANSMITTAL OF INVENTOR DECLARATIONS

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

2400 E. Katella, Suite 1050
Anaheim, CA 92806
December 15, 2015

Commissioner:

Enclosed are the signed Declarations of the inventors listed in this case.

The Commissioner is authorized to charge any fee under 37 CFR 1.16 and 1.17 which may be required during the **entire pendency** of the application to Deposit Account No. 50-4407. Please show our docket number with any transaction to the Deposit Account.

Respectfully submitted,
KPPB LLP

By /Jason D. Wolfe/
Jason D. Wolfe
Registration No. 71,327
949.852.0000

JDW/kl

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of
Invention

SYSTEMS AND METHODS FOR PLAYING BACK ALTERNATIVE STREAMS OF PROTECTED CONTENT PROTECTED USING COMMON CRYPTOGRAPHIC INFORMATION

As the below named inventor, I hereby declare that:

This declaration
is directed to:

☐

The attached application, or

☒

United States application or PCT international application number 14/564,003
filed on December 8, 2014

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

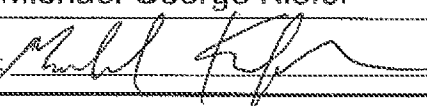
WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Michael George Kiefer

Date (Optional): 12/14/2015

Signature: 

Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional PTO/SB/AIA01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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.

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of
Invention

SYSTEMS AND METHODS FOR PLAYING BACK ALTERNATIVE STREAMS OF PROTECTED CONTENT PROTECTED USING COMMON CRYPTOGRAPHIC INFORMATION

As the below named inventor, I hereby declare that:

This declaration
is directed to:

☐

The attached application, or

☒

United States application or PCT international application number 14/564,003
filed on December 8, 2014

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

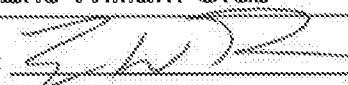
WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Eric William Grab

Date (Optional) : _____

Signature: 

Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional PTO/SB/AIA01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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-9198 and select option 2.

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.

**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN
APPLICATION DATA SHEET (37 CFR 1.76)****Title of
Invention****SYSTEMS AND METHODS FOR PLAYING BACK ALTERNATIVE STREAMS OF
PROTECTED CONTENT PROTECTED USING COMMON CRYPTOGRAPHIC
INFORMATION**

As the below named inventor, I hereby declare that:

This declaration
is directed to:

The attached application, or

United States application or PCT international application number 14/564,003filed on December 8, 2014

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001
by fine or imprisonment of not more than five (5) years, or both.**WARNING:**

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTORInventor: Jason Bransess

Date (Optional): _____

Signature: _____

Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form.
Use an additional PTO/BB/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is in the (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 1 minute 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.



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

NOTICE OF ALLOWANCE AND FEE(S) DUE

71897 7590 09/15/2015
KPPB LLP
2400 EAST KATELLA AVENUE
SUITE 1050
ANAHEIM, CA 92806

EXAMINER

GETACHEW, ABIY

ART UNIT

PAPER NUMBER

2434

DATE MAILED: 09/15/2015

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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14/564,003

12/08/2014

Michael George Kiefer

D1-02359A.CON

5114

TITLE OF INVENTION: Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	12/15/2015

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 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity 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 and an extra copy of the form should be submitted. 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: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax **(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)

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.

71897 7590 09/15/2015
KPPB LLP
2400 EAST KATELLA AVENUE
SUITE 1050
ANAHEIM, CA 92806

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 facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/564,003	12/08/2014	Michael George Kiefer	D1-02359A.CON	5114

TITLE OF INVENTION: Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	12/15/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
GETACHEW, ABIY	2434	713-160000

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/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form 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, 1 _____
- (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. 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 has been filed for recordation as set forth in 37 CFR 3.11. 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. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

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. _____



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.
14/564,003	12/08/2014	Michael George Kiefer	D1-02359A.CON	5114
71897	7590	09/15/2015	EXAMINER GETACHEW, ABIY	
KPPB LLP 2400 EAST KATELLA AVENUE SUITE 1050 ANAHEIM, CA 92806			ART UNIT 2434	PAPER NUMBER

DATE MAILED: 09/15/2015

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.

<i>Notice Requiring Inventor's Oath or Declaration</i>	Application No. 14/564,003	Applicant(s) Michael George Kiefer	
	Examiner GETACHEW, ABIY	Art Unit 2434	

This notice is an attachment to the Notice of Allowability (PTOL-37), or the Notice of Allowability For A Design Application (PTOL-37D).

An inventor's oath or declaration in compliance with 37 CFR 1.63 or 1.64 executed by or with respect to each inventor has not yet been submitted.

An oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each inventor (for any inventor for which a compliant oath, declaration, or substitute statement has not yet been submitted) **MUST** be filed no later than the date on which the issue fee is paid. See 35 U.S.C. 115(f). Failure to timely comply will result in ABANDONMENT of this application.

A properly executed inventor's oath to declaration has not been received for the following inventor(s):

If applicant previously filed one or more oaths, declarations, or substitute statements, applicant may have received an informational notice regarding deficiencies therein.

The following deficiencies are noted:

INFORMAL ACTION PROBLEMS

A new inventor's oath or declaration that identifies this application (e.g., by Application Number and filing date) is required. The inventor's oath or declaration does not comply with 37 CFR 1.63 in that it:

- does not state that the above-identified application was made or authorized to be made by the person executing the oath or declaration: **Michael George Kiefer, Eric William Grab, and Jason Braness.**

Questions relating to this Notice should be directed to the Application Assistance Unit at 571-272-4200.

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 12 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. 14/564,003	Applicant(s) KIEFER ET AL.	
	Examiner ABIY GETACHEW	Art Unit 2434	AIA (First Inventor to File) 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 08/17/2015.
☐ 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 1-6 and 8-20, but are renumbered as 1-19. 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) | 5. ☐ Examiner's Amendment/Comment |
| 2. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date <u>08/27/2015 and 08/27/2015</u> | 6. ☐ Examiner's Statement of Reasons for Allowance |
| 3. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 7. ☒ Other <u>Examiner's Statement</u> . |
| 4. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____. | |

/DANT SHAIFER HARRIMAN/
Primary Examiner, Art Unit 2434

DETAILED ACTION

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

Response to Arguments

2. Applicant's remarks filed on 08/17/2015 have been considered. See the office action below.

Double Patenting

3. Applicant's terminal disclaimer filed on 08/27/2015 was approved by the appropriate personnel on 09/01/2015; therefore, the non - statutory obvious type double patenting rejection on claims 1-20, is withdrawn.

Information Disclosure Statement

4. The information disclosure statement (IDS) submitted on 08/27/2015. Accordingly, the information disclosure statement is being considered by the examiner.

Allowable Subject Matter

5. Claims 1-6 and 8-20 are allowed, but are renumbered as 1 – 19.
6. Applicant's remarks and amendments submitted on 08/17/2015 for application 14/564,003 have been considered and are persuasive in light of the filed remarks and amendments. Therefore, the previously filed claim rejections have been withdrawn. **The record is clear; therefore, no reason for allowance is necessary.**

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ABIY GETACHEW whose telephone number is

Art Unit: 2434

(571)272-6932. The examiner can normally be reached on Monday to Friday 8Am to 4:30Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kambiz Zand can be reached on (571)272-3811. 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://pair-direct.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). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DANT SHAIFFER HARRIMAN/
Primary Examiner, Art Unit 2434
09/08/2015

/ABIY GETACHEW/
Examiner, Art Unit 2434

A.G.
September 2, 2015

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Field

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	14/564,003
	Filing Date	Dec 8, 2014
	First Named Inventor	Michael George Kiefer
	Art Unit	2434
	Examiner Name	Abiy Getachew
	Attorney Docket Number	D1-02359A.CON

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
		5361332	A	1994-11-01	Yoshida, Masayuki et al.	
		5404436	A	1995-04-04	Hamilton, Robert H.	
		5479303		1995-12-26	Suzuki et al.	
		5502766	A	1996-03-26	Boebert, William et al.	
		5509070	A	1996-04-16	Schull, Jonathan	
		5715403	A	1998-02-03	Stefik, Mark	
		5717816		1998-02-10	Boyce et al.	
		5754648	A	1998- 05-19	Ryan, John et al	
		5805700	A	1998-09-08	Nardone, Joseph et al.	
		5867625	A	1999-02-02	McLaren, David	
		5887110	A	1999-03-23	Sakamoto, Hideki et al.	
		5892900	A	1999-04-06	Ginter, Karl et al.	
		5946446		1999-08-31	Yanagihara, Naofumi	
		5999812	A	1999-12-07	Himsworth, Winston E.	
		6031622	A	2000-02-29	Ristow, Allan et al.	
		6044469	A	2000-03-28	Horstmann, Cay S.	
		6047100		2000-04-04	McLaren, David L.	
		6058240		2000- 05-02	McLaren, David L.	
		6018611		2000-06-25	Nogami et al.	
		6097877	A	2000-08-01	Katayama, Hironobu et al.	
		6141754	A	2000-10-31	Choy, David	
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Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	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
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Receipt date: 08/27/2015

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Doc Code: IDS

Doc description: Information Disclosure Statement (IDS) Field

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	14/564,003
	Filing Date	Dec 8, 2014
	First Named Inventor	Michael George Kiefer
	Art Unit	2434
	Examiner Name	Abiy Getachew
	Attorney Docket Number	D1-02359A.CON

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, page(s), volume-issue number(s), publisher, city and/or country where published.	T 5	
		European Search Report Application No. EP 08870152, Search Completed May 19, 2011, Mailed May 26, 2011, 10 pgs.		
		International Search Report for International Application No. PCT/US2008/87999, date completed February 7, 2009, date mailed March 19, 2009, 2 pgs.		
		Office Action for U.S. Application No. 13/223,210, dated April 30, 2015, 14 pgs.		
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	First Named Inventor	Michael George Kiefer
	Art Unit	2434
	Examiner Name	Abiy Getachew
	Attorney Docket Number	D1-02359A.CON

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EXAMINER SIGNATURE

Examiner Signature	/Abiy Getachew/ (09/02/2015)	Date Considered	09/02/2015
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*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.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	23	((access\$3 play\$1back playback) with (Common same identical\$5) with Key)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 16:12
L2	1	713/160.ccls. and ((access\$3 play\$1back playback) with (Common same identical\$5) with Key)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 16:13
L5	1	713/160.ccls. and ((access\$3 back playback) with (Common same identical\$5) with Key) and((access\$3 playback) with (common same identical\$5) with key)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 16:16
L7	1	713/160.ccls. and ((access\$3 back playback) with (Common same identical\$5) with Key) and((access\$3 playback) with (common same identical\$5) with key) and ((access\$3 play\$1back playback) with (common same identical\$5) with key)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 16:16
L29	54	((Michael) near2 (Kiefer)).INV.	USPAT	OR	OFF	2015/09/02 16:27
L30	15	((Eric) near2 (Grab)).INV.	USPAT	OR	OFF	2015/09/02 16:27
L31	18	((Jason) near2 (Braness)).INV.	USPAT	OR	OFF	2015/09/02 16:27
L32	1	5 AND ((H04L63/0428 OR H04L63/06 OR H04L63/061 OR H04L63/20 OR H04W12/02 OR H04W12/04 OR H04W76/02 OR H04W84/12 OR H04W88/08).CPC.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 16:28
L33	7	("20040202320" "20090132721" "20090328228").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 16:31
L34	1	5 AND ((H04L63/0428 OR H04L63/06 OR H04L63/061 OR H04L63/20 OR	US-PGPUB; USPAT;	OR	OFF	2015/09/02 16:41

		H04W12/02 OR H04W12/04 OR H04W76/02 OR H04W84/12 OR H04W88/08).CPC.)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
L35	51	713/160.ccls. and ((access\$3 play\$1back playback) and (identical\$5) with key)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 16:49
L38	41230	(((((access\$3 play\$1back playback) and (common identical\$5) with Key) or ((access\$1 playback) same (common identical\$5) with key) and ((access\$3 play\$1back playback) with (common same identifca\$5) with key)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 16:54
L44	1	5 AND ((H04L63/0428 OR H04L63/06 OR H04L63/061 OR H04L63/20 OR H04W12/02 OR H04W12/04 OR H04W76/02 OR H04W84/12 OR H04W88/08).CPC.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 16:56
L49	86	((plurality with streams) near20 (index\$3 list\$3 or index)) near20 (identify or identifying or identified) i same (plurality with alternative with streams)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 17:00
L51	3	((plurality with streams) with (encrypt\$3 adj key)) same (index\$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 17:01
L52	2	713/160.ccls. and (bitrate with stream\$4) same (alternative with streams) same (protected crypto\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 17:02
L61	9	713/160.ccls. and (((((access\$ play\$ play\$1back playback) with (Common "same" identical\$5) with Key) and((access\$ play\$ play\$1back playback) with (common "same" identical\$5) with key) and ((access\$ play\$1back playback) with (common "same" identical\$5 with key))))).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 17:07
L62	48	713/160.ccls. and (((((access\$ play\$ play\$1back playback) with (Common "same" identical\$5) with Key) and((access\$ play\$ play\$1back playback) with (common "same" identical\$5) with key) and ((access\$ play\$1back playback)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2015/09/02 17:08

		with (common "same" identical\$5 with key))))	IBM_TDB			
L64	107	("digital rights management" or "DRM") and (protect\$4 with frame with video)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 17:12
L65	2	713/160.ccls. and (((access\$ playS play\$1back playback) with (Common "same" identical\$5) with Key) and((access\$ playS play\$1back playback) with (common "same" identical\$5) with key) and ((access\$ play\$1back playback) with (common "same" identical\$5 with key)))) and ("digital rights management" or "DRM") and (protect\$4 with frame with video)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 17:13
S3	1515	713/160.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 15:56
S8	0	(((((access\$3 play\$1back playback) with (Common same identical\$5) with Key) and((access\$1 playback) with (common same identical\$5) with key) and ((access\$3 play\$1back playback) with (common same identifca\$5) with key).ab.))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/02 16:07

EAST Search History (I nterference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L13	4	((access\$3 back playback) with (Common same identical\$5) with Key) and((access\$3 playback) with (common same identical\$5) with key) and ((access\$3 play\$1back playback) with (common same identical\$5) with key).clm.	USPAT; UPAD	OR	OFF	2015/09/02 16:18
L19	1	713/\$.ccls. and ((access\$3 playback) same (Common and identical\$5) with Key) and((access\$3 playback) with (common and identical\$5) with key)and (common same identical\$5) with key.clm.	USPAT; UPAD	OR	OFF	2015/09/02 16:22
L20	1	713/\$.ccls. and (access\$3 playback) and((access\$3 playback) with (common and identical\$5) with key)and (common same identical\$5) with key.clm.	USPAT; UPAD	OR	OFF	2015/09/02 16:22
L25	1	713/160.ccls. and ((common and identical\$5) with key).clm.	USPAT; UPAD	OR	OFF	2015/09/02 16:25
L27	2	713/160.ccls. and ((access\$3 play\$1back playback) and (identical\$5) with key).clm.	USPAT; UPAD	OR	OFF	2015/09/02 16:25
L28	1	13 AND ((G06F21/10 OR H04L2463/101 OR H04L63/0442 OR H04L63/065 OR H04L63/10 OR H04N21/2347 OR H04N21/2585 OR H04N21/4181 OR H04N21/4623 OR	USPAT; UPAD	OR	OFF	2015/09/02 16:26

		H04N7/1675).CPC.)				
L59	9	713/160.ccls. and (((access\$ playS play\$1back playback) with (Common "same" identical\$5) with Key) and((access\$ playS play\$1back playback) with (common "same" identical\$5) with key) and ((access\$ play\$1back playback) with (common "same" identical\$5 with key))))).clm.	USPAT; UPAD	OR	OFF	2015/09/02 17:06
L60	9	59 AND ((H04L63/0428 OR H04L2209/16 OR H04L2209/60 OR H04L2209/603 OR H04L2209/80 OR H04L2463/101 OR H04L63/061 OR H04L63/065 OR H04L63/123 OR H04L67/1097 OR H04L9/0819 OR H04L9/0833 OR H04L9/0838 OR H04L9/16 OR H04L9/32 OR H04L9/3242 OR G06F17/30156 OR G06F21/54 OR G06F21/606 OR G06F21/6209 OR G06F2211/007 OR H04N21/23895 OR H04N21/47202 OR H04N21/6408 OR H04N21/64715 OR H04N7/1675 OR H04N7/17318 OR H04W12/04 OR H04W4/08).CPC.)	USPAT; UPAD	OR	OFF	2015/09/02 17:07

9/ 2/ 2015 5:16:33 PM
C:\ Users\ agetachew\ Documents\ EAST\ Workspaces\ 14564003.wsp

CPC Issue Classification - Application Number: 14564003

Examiner: Abiy Getachew **Date Created:** Sep 2, 2015 5:15 PM

Family ID: 47754059

US App. No. (3) & Documents (5): 14/564003 (20150139419 A1), 13/341265 (20130061040 A1, 8918636 B2), 13/340623 (20130061045 A1, 8909922 B2)

Foreign Documents (2): WO2013032518A3, WO2013032518A2

Allocations (4)

No.	Symbol	Type			Endorsed By	CPC Version
1	H04N 21/64715	F			US	2013-01-01
2	H04L 9/32	I			US	2013-01-01
3	H04L 9/0819	I			US, EP	2013-01-01
4	H04L2209/603	A			EP, US	2013-01-01

Combination Sets (0)

No.	Symbol	Type	Set	Rank	Endorsed By	CPC Version
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Search Notes 	Application/Control No. 14564003	Applicant(s)/Patent Under Reexamination KIEFER ET AL.
	Examiner ABIY GETACHEW	Art Unit 2434

CPC- SEARCHED		
Symbol	Date	Examiner
H04L63/0428 OR H04L2209/16 OR H04L2209/60 OR H04L2209/603 OR H04L2209/80 OR H04L2463/101 OR H04L63/061 OR H04L63/065 OR H04L63/123 OR H04L67/1097 OR H04L9/0819 OR H04L9/0833 OR H04L9/0838 OR H04L9/16	09/02/2015	A.G.
H04L9/32 H04L9/3242 G06F17/30156 G06F21/54 G06F21/606 G06F21/6209 G06F2211/007 H04N21/23895 H04N21/47202 H04N21/6408 H04N21/64715 H04N7/1675 H04N7/17318 H04W12/04 H04W4/08	09/02/2015	A.G.

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
713	160	09/02/2015	A.G.

SEARCH NOTES		
Search Notes	Date	Examiner
Class/subclass, Text search and NPL search.	09/02/2015	A.G.

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
713	160	09/02/2015	A.G.

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INTERFERENCE SEARCH

US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
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	(H04L63/0428 OR H04L2209/16 OR H04L2209/60 OR H04L2209/603 OR H04L2209/80 OR H04L2463/101 OR H04L63/061 OR H04L63/065 OR H04L63/123 OR H04L67/1097 OR H04L9/0819 OR H04L9/0833 OR H04L9/0838 OR H04L9/16 OR H04L9/32 H04L9/3242 G06F17/30156 G06F21/54 G06F21/606 G06F21/6209 G06F2211/007 H04N21/23895 H04N21/47202 H04N21/6408 H04N21/64715 H04N7/1675 H04N7/17318 H04W12/04 H04W4/08).cpc.	09/02/2015	A.G.

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Issue Classification 	Application/Control No. 14564003	Applicant(s)/Patent Under Reexamination KIEFER ET AL.	
	Examiner ABIY GETACHEW	Art Unit 2434	

CPC						
Symbol					Type	Version
H04N		21	/	64715	F	2013-01-01
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CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

/ABIY GETACHEW/ Examiner.Art Unit 2434 (Assistant Examiner)	09/02/2015 (Date)	Total Claims Allowed: 19	
/DANT SHAIKER HARRIMAN/ Primary Examiner.Art Unit 2434 (Primary Examiner)	09/08/2015 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 6

Issue Classification 	Application/Control No. 14564003	Applicant(s)/Patent Under Reexamination KIEFER ET AL.
	Examiner ABIY GETACHEW	Art Unit 2434

☐ Claims renumbered in the same order as presented by applicant								☐ CPA		☒ T.D.		☐ R.1.47			
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	16	17												
2	2	17	18												
3	3	18	19												
4	4	19	20												
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10	11														
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12	13														
13	14														
14	15														
15	16														

/ABIY GETACHEW/ Examiner.Art Unit 2434 (Assistant Examiner)	09/02/2015 (Date)	Total Claims Allowed: 19	
/DANT SHAFER HARRIMAN/ Primary Examiner.Art Unit 2434 (Primary Examiner)	09/08/2015 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 6

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		0165762	WO	A2	2001-09-07	Platt, David et al.		
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		2012/094189	WO	A1	2012-07-12	Braness, J et al.		
		2012094171	WO	A1	2012-07-12	Braness, Jason et al.		
		2013032518	WO	A2	2013-03-07	Kiefer, Michael et al.		
		2013032518	WO	A3	2013-09-06	Kiefer, Michael et al.		

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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, page(s), volume-issue number(s), publisher, city and/or country where published.	T 5
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14/564,003
	Filing Date	Dec 8, 2014
	First Named Inventor	Michael George Kiefer
	Art Unit	2434
	Examiner Name	Abiy Getachew
	Attorney Docket Number	D1-02359A.CON

	International Search Report and Written Opinion for International Application No. PCT/US2010/56733, International Filing Date November 15, 2010, Search Completed January 3, 2011, Mailed January 14, 2011, 9 pgs.	
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	Examiner Name	Abiy Getachew
	Attorney Docket Number	D1-02359A.CON

EXAMINER SIGNATURE			
Examiner Signature	/Abiy Getachew/ (09/02/2015)	Date Considered	09/02/2015
*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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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/564,003	12/08/2014	Michael George Kiefer	D1-02359A.CON

CONFIRMATION NO. 5114

POA ACCEPTANCE LETTER

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Date Mailed: 09/08/2015

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/27/2015.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth 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.

/dtdinh/

Application Number 	Application/Control No. 14/564,003	Applicant(s)/Patent under Reexamination KIEFER ET AL.	
Document Code - DISQ		Internal Document – DO NOT MAIL	

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 8/27/15	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:

Lawana Hixon

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14/564,003
	Filing Date	Dec 8, 2014
	First Named Inventor	Michael George Kiefer
	Art Unit	2434
	Examiner Name	Abiy Getachew
	Attorney Docket Number	D1-02359A.CON

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14/564,003
	Filing Date	Dec 8, 2014
	First Named Inventor	Michael George Kiefer
	Art Unit	2434
	Examiner Name	Abiy Getachew
	Attorney Docket Number	D1-02359A.CON

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.			

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Application Number	14/564,003
Filing Date	December 8, 2014
First Named Inventor	Michael George Kiefer
Title	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information
Art Unit	2434
Examiner Name	Abiy Getachew
Attorney Docket Number	D1-02359A.CON

SIGNATURE of Applicant or Patent Practitioner

Signature	/Jason D. Wolfe/	Date (Optional)	August 27, 2015
Name	Jason D. Wolfe	Registration Number	71,327
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

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



*Total of 1 forms are submitted.

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**TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING
REJECTION OVER A "PRIOR" PATENT**

Docket Number (Optional)

D1-02359A.CON

In re Application of: Sonic IP, Inc.

Application No.: 14/564,003

Filed: December 8, 2014

For: Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information

The applicant, Sonic IP, Inc., owner of 100 percent interest 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** No. 8,909,922 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant 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 applicant 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.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 71,327

/Jason D. Wolfe/

Signature

August 27, 2015

Date

Jason D. Wolfe

Typed or printed name

Attorney of Record

Title

949.852.0000

Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

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This collection of information is required by 37 CFR 1.321. 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 12 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.

Electronic Patent Application Fee Transmittal

Application Number:	14564003			
Filing Date:	08-Dec-2014			
Title of Invention:	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information			
First Named Inventor/Applicant Name:	Michael George Kiefer			
Filer:	Jason Daniel Wolfe/Katrina Lee			
Attorney Docket Number:	D1-02359A.CON			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
Statutory or Terminal Disclaimer	1814	1	160	160
Total in USD (\$)				340

Electronic Acknowledgement Receipt

EFS ID:	23336714
Application Number:	14564003
International Application Number:	
Confirmation Number:	5114
Title of Invention:	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information
First Named Inventor/Applicant Name:	Michael George Kiefer
Customer Number:	71897
Filer:	Jason Daniel Wolfe/Katrina Lee
Filer Authorized By:	Jason Daniel Wolfe
Attorney Docket Number:	D1-02359A.CON
Receipt Date:	27-AUG-2015
Filing Date:	08-DEC-2014
Time Stamp:	21:53:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 340
RAM confirmation Number	8251
Deposit Account	504407
Authorized User	BAILEY, DAVID

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Page 2003 - 65

IPR2020-00558

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	02359aconidsxml.pdf	103705	no	2
			6a06a6c712412259f09539c056711d4aa00ec79b		

Warnings:

Information:

2	Information Disclosure Statement (IDS) Form (SB08)	02359aconid1449.pdf	146897	no	8
			2c808fb7ea5a58e6e76eff2c364f118e311ad865		

Warnings:

Information:

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3		02359aconpowerofattorney.pdf	328252	yes	2
			e3843ea41cc1728155a187a00d3eb4c4a24221c4		

Multipart Description/PDF files in .zip description

	Document Description	Start	End
	Transmittal Letter	1	1
	Power of Attorney	2	2

Warnings:

Information:

4	Terminal Disclaimer Filed	02359aconterminaldisclaimer.pdf	103498	no	1
			db411f6558009bee557aa12ed9ac64e90746b155		

Warnings:

Information:

5	Fee Worksheet (SB06)	fee-info.pdf	32323	no	2
			a845343cf5fd7783a579c04bc7c796f3d71f377d		

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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

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF MAILING

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/Katrina Lee/
Katrina Lee

Appl No. : 14/564,003 Confirmation No. 5114
Applicant : Sonic IP, Inc.
Filed : December 8, 2014
Title : Systems and Methods for Playing Back Alternative Streams of
Protected Content Protected Using Common Cryptographic
Information
TC/A.U. : 2434
Examiner : Abiy Getachew
Docket No. : D1-02359A.CON
Customer No. : 71897

INFORMATION DISCLOSURE STATEMENT § 1.97(c)

MAIL STOP AMENDMENT

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

2400 E. Katella, Suite 1050
Anaheim, CA 92806
August 27, 2015

Commissioner

In compliance with the duty of disclosure under 37 C.F.R. §§ 1.56, 1.97 and 1.98, and in accordance with the provisions in the MPEP §§ 609 and 707.05(b), enclosed is FORM PTO/SB/08A/B with a listing of references that are known to applicant. Copies of each of the references listed under "Foreign Patent Documents" and "Non-Patent Literature Documents" are not enclosed as they are of record in the parent case, Patent No. 8,909,922, issued December 9, 2014.

APPLICATION No. 14/564,003
INFORMATION DISCLOSURE STATEMENT

It is respectfully requested that these references be considered in the examination of this application and identified on the list of references cited on the patent issuing on this application. Applicant also requests that an initialed copy of said FORM PTO/SB/08A/B be entered in the application file, and returned to the Applicant with the next official communication from the Office in accordance with MPEP § 609.

The \$180 processing fee will be paid via credit card. If there are any other fees due in connection with this filing, the Commissioner is authorized to charge Deposit Account 50-4407. Please show our docket number with any charge to the Deposit Account.

Respectfully submitted,

KPPB LLP

/Jason D. Wolfe/

Jason D. Wolfe

Registration No. 71,327

949.852.0000

JDW/kl

Enclosure(s)

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
14/564,003	December 8, 2014

(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:

71897

OR

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☒ The address associated with the above-mentioned Customer Number

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OR

Firm or Individual Name				
Address				
City	State	Zip		
Country				
Telephone	Email			

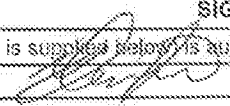
I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Sonic IP, Inc.

- ☐ 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		Date (Optional)	
Name	Trevor Renfield		
Title	Chief Financial Officer		

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.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14/564,003
	Filing Date	Dec 8, 2014
	First Named Inventor	Michael George Kiefer
	Art Unit	2434
	Examiner Name	Abiy Getachew
	Attorney Docket Number	D1-02359A.CON

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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		5404436	A	1995-04-04	Hamilton, Robert H.	
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		6155840	A	2000-12-05	Sallette, Alfred V.	
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		6195388	B1	2001-02-27	Choi, Jae G., et al.	
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		6282653	B1	2001-08-28	Berstis, Viktors et al.	
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		6449719	B1	2002-09-10	Baker, Brian	
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		6466733		2002-10-15	Kim, Tae-eung	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14/564,003
	Filing Date	Dec 8, 2014
	First Named Inventor	Michael George Kiefer
	Art Unit	2434
	Examiner Name	Abiy Getachew
	Attorney Docket Number	D1-02359A.CON

		6510513	B1	2003-01-21	Danieli, Damon V.	
		6510554	B1	2003-01-21	Gordon, Donald F., et al.	
		6621979	B1	2003-09-16	Eerenberg, O. et al.	
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		6807306	B1	2004-10-19	Girgensohn, Andreas et al.	
		6810389	B1	2004-10-26	Meyer, Marc A.	
		6859496	B1	2005-02-22	Boroczky, Lilla et al.	
		6956901	B2	2005-10-18	Boroczky, Lilla et al.	
		6965724		2005-11-15	Boccon-Gibod et al.	
		6965993	B2	2005-11-15	Baker, Brian	
		7007170	B2	2006-02-28	Morten, Glenn	
		7023924		2006-04-04	Keller et al.	
		7043473	B1	2006- 05-09	Rassool, Reza et al.	
		7150045	B2	2006-12-12	Koelle, Katharina et al.	
		7151832	B1	2006-12-19	Fetkovich, John et al.	
		7151833	B2	2006-12-19	Candelore, Brant et al.	
		7165175	B1	2007-01-16	Kollmyer, Brad et al.	
		7185363	B1	2007-02-27	Narin, Attila et al.	
		7231132		2007-06-12	Davenport, William	
		7242772	B1	2007-07-10	Tehranchi, Babak	
		7328345	B2	2008-02-05	Morten, Glenn et al	
		7349886	B2	2008-03-25	Morten, Glenn et al.	
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		7376831	B2	2008- 05-20	Kollmyer, Brad et al.	
		7406174	B2	2008-07-29	Palmer, Tomas	
		7472280	B2	2008-12-30	Giobbi, John J.	
		7478325	B2	2009-01-13	Foehr, Oliver H.	
		7484103	B2	2009-01-27	Woo, Je-Hak et al.	
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		7991156	B1	2011-08-02	Miller, Eric	
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		8054880	B2	2011-11-08	Yu, Guoyao et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14/564,003
	Filing Date	Dec 8, 2014
	First Named Inventor	Michael George Kiefer
	Art Unit	2434
	Examiner Name	Abiy Getachew
	Attorney Docket Number	D1-02359A.CON

		8065708	B1	2011-11-22	Smyth, Aidan J., et al.	
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	Examiner Name	Abiy Getachew
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EXAMINER SIGNATURE

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*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.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference D1.01221.PCT	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/US 08/87999	International filing date (day/month/year) 22 December 2008 (22.12.2008)	(Earliest) Priority Date (day/month/year) 02 January 2008 (02.01.2008)
Applicant DIVX, INC.		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of:

- ☒ the international application in the language in which it was filed.
☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. ☐ This international search report has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (see Box No. II).

3. ☐ Unity of invention is lacking (see Box No. III).

4. With regard to the title,

- ☒ the text is approved as submitted by the applicant.
☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

- ☒ the text is approved as submitted by the applicant.
☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

- a. the figure of the drawings to be published with the abstract is Figure No. 1
☒ as suggested by the applicant.
☐ as selected by this Authority, because the applicant failed to suggest a figure.
☐ as selected by this Authority, because this figure better characterizes the invention.
- b. ☐ none of the figures is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (April 2007)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 08/87999

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - H04N 7/12 (2009.01) USPC - 348/390.1 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) USPC - 348/390.1 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched USPC - 348/384.1; 726/87 (see search terms below) Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PubWest(PGPP,USPT,EPAB,JPAB), Google Scholar, USPTO (Search Terms: video, media, compression, encoding, resolution, frame rate, sub sample, enhancement, key frame)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ----- Y	US 2007/0234391 A1 (Hunter et al.) 04 October 2007 (04.10.2007) entire document especially para [0012], para [0153-0154], para [0152], para [0154] and [0176], para [0058], para [0059], para [0091]	1-3, 7, 9-12, 16-21 ----- 4-6, 8, 13-15, 22, and 23
Y	US 2002/0136298 A1 (Anantharamu et al.) 26 September 2002 (26.09.2002) entire document especially para [0019], para [0030], para [0022], para [0035]	4-6, 8, 13-15, 22, and 23
☐ Further documents are listed in the continuation of Box C. ☐		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "Z" document member of the same patent family		
Date of the actual completion of the international search 07 February 2009 (07.02.2009)		Date of mailing of the international search report 19 MAR 2009
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201		Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (April 2007)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
DAVID J. BAILEY
KAUTH, POMEROY, PECK & BAILEY LLP
P.O. BOX 19152
IRVINE, CA 92623

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing
(day/month/year) **19 MAR 2009**

Applicant's or agent's file reference
D1:01221.PCT

FOR FURTHER ACTION

See paragraph 2 below

International application No.
PCT/US 08/87999

International filing date (day/month/year)
22 December 2008 (22.12.2008)

Priority date (day/month/year)
02 January 2008 (02.01.2008)

International Patent Classification (IPC) or both national classification and IPC
IPC(8) - H04N 7/12 (2009.01)
USPC - 348/390.1

Applicant **DIVX, INC.**

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1490, Alexandria, Virginia 22313-1490
Facsimile No. 571-273-3201

Date of completion of this opinion
07 February 2009 (07.02.2009)

Authorized officer:
Lee W. Young

PCT Helpdesk: 571-272-4300
PCT USP: 571-272-7774

Form PCT/ISA/237 (cover sheet) (April 2007)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US 08/87999

Box No. 1 Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of:
☒ the international application in the language in which it was filed.
☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. ☐ This opinion has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a)).
3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, this opinion has been established on the basis of:
 - a. type of material
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material
☐ on paper
☐ in electronic form
 - c. time of filing/furnishing
☐ contained in the international application as filed
☐ filed together with the international application in electronic form
☐ furnished subsequently to this Authority for the purposes of search
4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 08/7999

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	4-8, 8, 12-15, 19, 22, and 23	YES
	Claims	1-3, 7, 9-11, 16-18, 20, and 21	NO
Inventive step (IS)	Claims	None	YES
	Claims	1-23	NO
Industrial applicability (IA)	Claims	1-23	YES
	Claims	None	NO

2. Citations and explanations:

Claims 1-3, 7, 9-11, 16-18, 20, and 21 lack novelty under PCT Article 33(2) as being anticipated by US 2007/0234391 A1 to Hunter et al. (hereinafter "Hunter").

As per claim 1, Hunter discloses a method of encoding a media file for playing back, comprising: extracting a video track from an original media file, where content is encoded in the video track (para [0012]); using the encoded content to encode an application enhancement track, where encoding the application enhancement track includes discarding at least some of the content (para [0153-0154]); and creating a media file including the content from the original media file encoded in a video track and an accompanying application enhancement track (para [0154]).

As per claim 2, Hunter further discloses information is discarded from the content by sub-sampling the content (para [0153]).

As per claim 3, Hunter further discloses sub-sampling the content further comprises reducing a resolution scale of the content by a particular factor to generate the application enhancement track (para [0152]).

As per claim 7, Hunter further discloses the application enhancement track contains only video (para [0154]).

As per claim 9, Hunter further discloses creating a media file including the content from the original media file and the accompanying application enhancement track further comprises: re-encoding the content to maximize compression regardless of a size or frequency of time periods between key frames to create a compressed video track possessing the same resolution and frame rate as the video track (para [0012] Note: desired resolution); and creating a media file including the compressed video track and the accompanying application enhancement track (para [0154]); wherein the media file including the compressed video track and the application enhancement track is smaller than the original media file (para [0152]).

As per claim 10, Hunter further discloses the content is compressed content (para [0154]).

As per claim 11, Hunter further discloses a method of decoding a media file for playing back, comprising: obtaining a media file containing compressed content and an accompanying application enhancement track which is a subset of the compressed content (para [0153] - [0154]); playing back the compressed content (para [0154]); and decoding frames of the application enhancement track at a rate proportional to a visual-search speed and from a location determined by the portion of the compressed content most recently played back (para [0154] and [0176]).

As per claim 16, Hunter further discloses the application enhancement track is part of the media file and is the compressed content at a reduced frame rate and at a reduced resolution (para [0152]).

As per claim 17, Hunter further discloses a system for playback of a media file, comprising: a media server configured to generate at least one application enhancement track from an original media file, the at least one application enhancement track having at least one frame in common with the original media file and being substantially smaller in file size than the original media file (para [0152]); and a client processor in network communication with the media server and configured to send requests for the original media file to the media server, the media server configured to transmit the requested original media file along with the at least one application enhancement track (para [0154]).

As per claim 18, Hunter further discloses the client processor further comprises a playback engine configured to decode the application enhancement track and to determine portions of the application enhancement track required to comply with user playback instructions (para [0154]).

As per claim 20, A media player comprising: a user interface configured to receive user instructions (para [0056]), and a playback engine configured to decode a media file containing content and an accompanying application enhancement track, which is a subset of the content (para [0153]); wherein the playback engine is configured to commence playback of the content in response to a user instruction received via the user interface (para [0059]); wherein the playback engine is configured to select portions of the application enhancement track to decode and playback in response to receipt of a user instruction received via the user interface and the portion of the content most recently played back by the playback engine (para [0091]).

--- Please see continuation sheet ---

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP 08/67989

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Box No. V.2. Citations and explanations:

As per claim 21, Hunter further discloses the playback engine is configured to commence playback of the content in response to receipt of a user instruction received via the user interface and from a location determined based upon the portion of the application enhancement track most recently played back by the playback engine (para [0154] and [0178]).

Claims 12, and 19 lack an inventive step under PCT Article 33(3) as being obvious over Hunter.

As per claim 12, Hunter does not specifically disclose the application enhancement track includes only key-frames. However Hunter does disclose an enhancement track that contains only a library of video patterns (para [0154]). It would have been obvious to one of ordinary skill in the art to combine the key frames with the video patterns taught by Hunter as a matter of routine design since this would include more key data for the enhancement track.

As per claim 19, Hunter does not specifically disclose the application enhancement track contains only key frames. However Hunter does disclose an enhancement track that contains only a library of video patterns (para [0154]). It would have been obvious to one of ordinary skill in the art to combine the key frames with the video patterns taught by Hunter as a matter of routine design since this would include more key data for the enhancement track.

Claims 4-6, 8, 13-15, 22, and 23 lack an inventive step under PCT Article 33(3) as being obvious over Hunter in view of US 2002/0136298 A1 to Anantharamu et al. (hereinafter 'Anantharamu').

As per claim 4, Hunter does not disclose sub-sampling the content further comprises reducing a frame rate of the content by a particular factor to generate the application enhancement track. However in an analogous art Anantharamu discloses sub-sampling the content further comprises reducing a frame rate of the content by a particular factor to generate the application enhancement track (para [0019]). It would have been obvious to one of ordinary skill in the art to combine the video encoding method of Hunter with the frame rate manipulation taught by Anantharamu since this would further compress the data of the video being encoded.

As per claim 5, Hunter further discloses creating the media file further comprises embedding portions of the accompanying application enhancement track throughout the video track encoding the content (para [0154]).

As per claim 6, Hunter further discloses creating the media file further comprises incorporating the accompanying application enhancement track as a block within the media file (para [0154]).

As per claim 8, Anantharamu further discloses the application enhancement track contains key frames spaced at specific time intervals between each key-frame (para [0030]).

As per claim 13, Hunter does not specifically disclose further comprising at least one delta frame placed within a constant time difference to adjacent frames. However in an analogous art Anantharamu does disclose further comprising at least one delta frame placed within a constant time difference to adjacent frames (para [0022]). It would have been obvious to one of ordinary skill in the art to combine the video encoding method of Hunter with the frame rate manipulation taught by Anantharamu since this would further compress the data of the video being encoded.

As per claim 14, Anantharamu further discloses only key-frames are decoded when a predetermined visual-search speed is exceeded (para [0035]).

As per claim 15, Anantharamu further discloses a select number of key-frames are skipped along with any associated delta frames when a predetermined visual-search speed is exceeded (para [0035]).

As per claim 22, Hunter does not disclose the application enhancement track is part of the media file and is a sequence of key frames time stamped with the time stamps of the corresponding frames of the content. However in an analogous art Anantharamu does disclose the application enhancement track is part of the media file and is a sequence of key frames time stamped with the time stamps of the corresponding frames of the content (para [0022] Note: Table). It would have been obvious to one of ordinary skill in the art to combine the video encoding method of Hunter with the frame rate manipulation taught by Anantharamu since this would further compress the data of the video being encoded.

As per claim 23, Hunter further discloses the key frames are lower resolution relative to a resolution of the corresponding frames of the content (para [00153]).

Claims 1-23 have industrial application as defined by PCT Article 33(4), because the subject matter can be made or used in industry.

Electronic Patent Application Fee Transmittal

Application Number:	14564003			
Filing Date:	08-Dec-2014			
Title of Invention:	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information			
First Named Inventor/Applicant Name:	Michael George Kiefer			
Filer:	Jason Daniel Wolfe/Katrina Lee			
Attorney Docket Number:	D1-02359A.CON			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
Total in USD (\$)				180

Electronic Acknowledgement Receipt

EFS ID:	23336809
Application Number:	14564003
International Application Number:	
Confirmation Number:	5114
Title of Invention:	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information
First Named Inventor/Applicant Name:	Michael George Kiefer
Customer Number:	71897
Filer:	Jason Daniel Wolfe/Katrina Lee
Filer Authorized By:	Jason Daniel Wolfe
Attorney Docket Number:	D1-02359A.CON
Receipt Date:	27-AUG-2015
Filing Date:	08-DEC-2014
Time Stamp:	22:19:00
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 180
RAM confirmation Number	8312
Deposit Account	504407
Authorized User	BAILEY, DAVID

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

DNX EXHIB 2003

Page 2003 - 89

IPR2020-00558

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	02359aconidsxtmlpart2.pdf	91791	no	2
			13c08d2a57917751c1b9b500dc32fec09399ff0		
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	02359aconids1449part2.pdf	182012	no	10
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Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Foreign Reference	JP8111842A.pdf	16098290	no	14
			499c3d1cb29661a10a45430cf5c8786d2eb70b78		
Warnings:					
Information:					
4	Foreign Reference	WO1996013121A1.pdf	16538282	no	31
			563289b6d382789abcc3e81add9da52d79e77edf		
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Information:					
5	Foreign Reference	JP09037225A.pdf	10066334	no	9
			51660ec592574e093fc4f7e9355ac71cf342897		
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6	Foreign Reference	CN1169229A.pdf	9722002	no	26
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7	Foreign Reference	wo9965239.pdf	9187804	no	66
			a0b47539063e36ef0a7792a6e86f64b2013206ee		
Warnings:					
Information:					

8	Foreign Reference	WO0235832A2.pdf	17977194	no	19
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9	Foreign Reference	jp2002518898.pdf	4424400	no	86
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10	Foreign Reference	jp2004515941.pdf	25155500	no	37
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11	Foreign Reference	EP1553779A1.pdf	19982904	no	29
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12	Foreign Reference	kr669616.pdf	1152054	no	10
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13	Foreign Reference	jp2007235690.pdf	9102025	no	60
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14	Foreign Reference	WO2008010275A1.pdf	6761737	no	56
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15	Foreign Reference	JP2008235999A.pdf	25314321	no	38
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16	Foreign Reference	ep2507995.pdf	3979299	no	34
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Information:					

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Page 2002 of 91

17	Other Reference-Patent/App/Search documents	esr08870152.pdf	9074961	no	10
			b46b462dd4f8cb01f41bd0d9f284784ea7b5c9db		
Warnings:					
Information:					
18	Other Reference-Patent/App/Search documents	intlsearchreport87999.pdf	172017	no	2
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Warnings:					
Information:					
19	Non Patent Literature	officeaction13223210.pdf	13044491	no	14
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20	Non Patent Literature	officeaction14564003.pdf	4929727	no	28
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21	Other Reference-Patent/App/Search documents	intlwrittenopinion87999.pdf	374361	no	4
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22	Non Patent Literature	bluraydiscwiki.pdf	5108190	no	11
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23	Non Patent Literature	bluraybitrateshere.pdf	3396761	no	6
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24	Non Patent Literature	oreilly80211wireless.pdf	871755	no	2
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Warnings:					
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25	Non Patent Literature	turbocharge.pdf	99358	no	1
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Warnings:					
Information:					

DivX Exhibit 2003
Page 2003 - 92

26	Non Patent Literature	whenis54notequal.pdf	2509038	no	4
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Information:					
27	Non Patent Literature	broadcomthenewmain.pdf	8349980	no	12
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Warnings:					
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28	Non Patent Literature	garganexperi.pdf	3927185	no	6
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Warnings:					
Information:					
29	Non Patent Literature	kozintsevimprovin.pdf	4227940	no	10
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31	Non Patent Literature	tanvideotranscoding.pdf	609657	no	4
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32	Non Patent Literature	wangimagequality.pdf	12285194	no	13
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Warnings:					
Information:					
33	Fee Worksheet (SB06)	fee-info.pdf	30908	no	2
			6ce53bf321831cd9f102633eaaffbae1d7817d2d		
Warnings:					
Information:					
Total Files Size (in bytes):			250297334		

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.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being electronically filed with the United States Patent and Trademark Office on August 27, 2015 at or before 11:59 p.m. Pacific Time under the Rules of 37 C.F.R. 1.8.

/Katrina Lee/
Katrina Lee

Appl No. : 14/564,003 Confirmation No. 5114
Applicant : Sonic IP, Inc.
Filed : December 8, 2014
Title : Systems and Methods for Playing Back Alternative Streams of
Protected Content Protected Using Common Cryptographic
Information
TC/A.U. : 2434
Examiner : Abiy Getachew
Docket No. : D1-02359A.CON
Customer No. : 71897

INFORMATION DISCLOSURE STATEMENT § 1.97(c)

MAIL STOP AMENDMENT

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

2400 E. Katella, Suite 1050
Anaheim, CA 92806
August 27, 2015

Commissioner

In compliance with the duty of disclosure under 37 C.F.R. §§ 1.56, 1.97 and 1.98, and in accordance with the provisions in the MPEP §§ 609 and 707.05(b), enclosed is FORM PTO/SB/08A/B with a listing of references that are known to applicant. Copies of each of the references listed under "Foreign Patent Documents" and "Non-Patent Literature Documents" are enclosed.

It is respectfully requested that these references be considered in the examination of this application and identified on the list of references cited on the patent issuing on this application. Applicant also requests that an initialed copy of said FORM PTO/SB/08A/B be entered in the application file, and returned to the Applicant with the next official communication from the Office in accordance with MPEP § 609.

APPLICATION No. 14/564,003
INFORMATION DISCLOSURE STATEMENT

The \$180 processing fee will be paid via credit card. If there are any other fees due in connection with this filing, the Commissioner is authorized to charge Deposit Account 50-4407. Please show our docket number with any charge to the Deposit Account.

Respectfully submitted,

KPPB LLP

/Jason D. Wolfe/

Jason D. Wolfe

Registration No. 71,327

949.852.0000

JDW/kl

Enclosure(s)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being electronically filed with the United States Patent and Trademark Office on August 17, 2015 at or before 11:59 p.m. Pacific Time under the Rules of 37 CFR § 1.8.

/Katrina Lee/
Katrina Lee

Appl No. : 14/564,003 Confirmation No. 5114
Applicant : Sonic IP, Inc.
Filed : December 8, 2014
Title : Systems and Methods for Playing Back Alternative Streams of
Protected Content Protected Using Common Cryptographic
Information
TC/A.U. : 2434
Examiner : Abiy Getachew
Docket No. : D1-02359A.CON
Customer No. : 71897

AMENDMENT AND RESPONSE

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
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August 17, 2015

Commissioner:

In response to the Office action mailed April 17, 2015, Applicant submits this amendment and response. Please consider the following:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 10 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A source encoder ~~playback device~~, comprising:
 - a processor;
 - a non-volatile storage memory containing an encoding ~~a client~~ application;
 - wherein the ~~client~~ encoding application directs ~~configures~~ the processor to:
 - receive a stream of video;
 - encode the stream of video as ~~request a top level index file identifying a~~ plurality of alternative streams according to encoding parameters associated with each ~~of the alternative streams~~ of protected content, where each of the alternative streams comprises a plurality of encoded video frames ~~of protected content are encrypted using~~ common cryptographic information;
 - obtain ~~[[the]]~~ a common set of frame keys ~~cryptographic information;~~
 - encrypt portions of several encoded video frames from each alternative stream using keys from the same common set of frame keys;
 - after encrypting the portions of encoded video frames, (1) write the encoded video frames of each alternative stream to a separate container file from a plurality of container files and (2) write DRM information to each separate container file that identifies the encrypted portions of several encoded video frames written to the separate container file;
 - request portions of content from at least the plurality of alternative streams ~~of protected content;~~
 - store a copy of ~~access the protected content using the common~~ set of frame keys in each container file ~~cryptographic information;~~ and

upload the container files to a content distribution server for distribution to playback the content devices using adaptive bitrate streaming.

2. (Currently Amended) The source encoder ~~playback device~~ of claim 1, wherein~~[[:]]~~ the alternative streams of ~~protected content~~ are alternative streams of protected video;

~~each of the alternative streams of protected video includes DRM information indicating portions of frames of video that are encrypted and identifying at least a portion of the common cryptographic information used to access the encrypted portions of the frames of video; and~~

~~the client application configures the processor to:
obtain a protected frame of video from one of the alternative streams of protected video;~~

~~obtain DRM information indicating a portion of the protected frame of video that is encrypted;~~

~~identify at least a portion of the common cryptographic information that is used to access the encrypted portion of the protected frame using the DRM information;~~

~~decrypt the encrypted portion of the protected frame of video using the identified portion of the common cryptographic information; and
decode the frame of video.~~

3. (Currently Amended) The source encoder ~~playback device~~ of claim 1, wherein the encoding application further directs the processor to:

~~each of the alternative streams of protected content is contained within a separate container file; and~~

~~provide a [[the]] top level index file that identifies a container file containing each of the alternative streams.~~

4. (Currently Amended) The source encoder ~~playback device~~ of claim 3, wherein:
the container files containing each of the alternative streams of ~~protected content~~
comprise at least one header including the common set of frame keys ~~cryptographic~~
~~information~~ and information that describes the encoding of the stream of ~~protected~~
~~content~~; and
the top level index file identifies the location of the at least one header within
each container file.
5. (Currently Amended) The source encoder ~~playback device~~ of claim 4, wherein
the ~~common cryptographic information is a set of encryption~~ frame keys comprises a
plurality of frame keys.
6. (Currently Amended) The source encoder ~~playback device~~ of claim 1[[5]],
wherein the encoding application further directs the processor to:
encrypt the common set of frame keys prior to storing the copy of the common
set of frame keys in each container file ~~encryption keys is encrypted~~; and
~~the client application configures the processor to securely receive cryptographic~~
~~information used to unencrypt the common set of encryption keys.~~
7. (Canceled)
8. (Currently Amended) The source encoder ~~playback device~~ of claim 1[[7]],
wherein:
each container file containing one of the alternative streams of ~~protected content~~
further comprises an index[[: and]]
~~the client application configures the processor to request a portion of content~~
~~from one of the container files by configuring the processor to:~~
~~request at least a portion of an index from the container file;~~
~~identify the portion of the container file containing a specific portion of content~~
~~using the index; and~~

~~request the identified portion of the container file.~~

9. (Currently Amended) The ~~source encoder-playback device~~ of claim 1[[4]], wherein the container files are Matroska container files.

10. (Currently Amended) The ~~source encoder-playback device~~ of claim 9, wherein the common ~~set of frame keys cryptographic information~~ is stored in a common DRM Header element contained within a Tracks element within each of the Matroska container files containing the alternative streams ~~of protected content~~.

11. (Currently Amended) The ~~source encoder-playback device~~ of claim 10, wherein:
the common ~~set of frame keys cryptographic information~~ is a set of encryption keys; and
the set of encryption keys is encrypted and stored within the DRM Header element.

12. (Currently Amended) The ~~source encoder-playback device~~ of claim 11, wherein the ~~encoding client~~ application configures the processor to:
~~obtain~~ provide, to a playback device, [[the]] cryptographic information that can be used to unencrypt the set of encryption keys stored within the DRM Header element; and
~~unencrypt the set of encryption keys stored within the DRM Header element using the obtained cryptographic information.~~

13. (Currently Amended) The ~~source encoder-playback device~~ of claim 10, wherein the ~~encoding client~~ application configures the processor to ~~obtain~~ provide the DRM Header element to a playback device in response to a request for ~~by requesting a Tracks element from one of the Matroska container files identified in the top-level index file.~~

14. (Currently Amended) The source encoder ~~playback device~~ of claim 1[[13]], wherein:

each ~~Matroska~~ container file containing an alternative stream of ~~protected content~~ further comprises an index contained within a Cues element[[]; and]]

~~the client application configures the processor to request a portion of content from one of the Matroska container files by configuring the processor to:~~

~~request at least a portion of a Cues element from a Matroska container file containing one of the alternative streams of protected content;~~

~~identify a portion of the Matroska container file containing a specific portion of content using at least one CueTrackPosition element within the Cues element; and~~

~~request the portion of the Matroska container file identified by the at least one CueTrackPosition element.~~

15. (Currently Amended) The source encoder ~~playback device~~ of claim 14, wherein the index comprises a plurality of CueTrackPosition elements that identify the location of a plurality of Cluster elements within the ~~Matroska~~ container file.

16. (Currently Amended) The source encoder ~~playback device~~ of claim 15, wherein:

each Cluster element contains a plurality of BlockGroup elements including encoded portions of content;

a CueTrack Position element indexes each Cluster element; and

each CueTrackPosition element includes the size of the Cluster element that it indexes.

17. (Currently Amended) The source encoder ~~playback device~~ of claim 1[[14]], wherein:

the alternative streams of ~~protected content~~ are alternative streams of protected video;

each of the ~~Matroska~~ container files containing an alternative stream of protected video includes a DRMInfo element in a BlockGroup element containing a protected

frame of video, where the DRMInfo element indicates at least a portion of the protected frames of video that is encrypted and identifies at least a portion of the common set of frame keys cryptographic information used to access the at least one encrypted portion of the protected frame of video[[]; and]]

~~the client application configures the processor to access video frames in a stream of protected video using the common cryptographic information by configuring the processor to:~~

~~obtain a BlockGroup containing a protected frame of video;~~

~~parse the BlockGroup element to obtain a DRMInfo element indicating at least a portion of the protected frame of video that is encrypted using an encryption key from the set of encryption keys;~~

~~decrypt the at least one encrypted portion of the protected frame of video using the identified encryption key; and~~

~~decode the frame of video.~~

18. (Currently Amended) A method of encoding streams of video for performing adaptive bitrate streaming using a source encoder ~~plurality of alternative streams of protected content, where each of the streams of protected content is protected using common cryptographic information~~, the method comprising:

receiving a stream of video using a source encoder;

encoding the stream of video as requesting a top level index file identifying a plurality of alternative streams according to encoding parameters associated with each of the alternative streams of protected content using a playback device the source encoder, where each of the alternative streams comprises a plurality of encoded video frames ~~of protected content are encrypted using common cryptographic information;~~

obtaining [[the]]a common set of frame keys cryptographic information using the source encoder ~~playback device;~~

encrypting portions of several encoded video frames from each alternative stream using keys from the same common set of frame keys using the source encoder;

after encrypting the portions of encoded video frames, (1) writing the encoded video frames of each alternative stream to a separate container file from a plurality of container files and (2) writing DRM information to each separate container file that identifies the encrypted portions of several encoded video frames written to the separate container file using the source encoder;

~~requesting portions of content from at least the plurality of alternative streams of protected content using the playback device;~~

~~storing a copy of accessing the protected content using the playback device and the common set of frame keys in each container file and using the source encoder cryptographic information; and~~

~~uploading the container files to a content distribution server for distribution to playing back the content using the playback device devices using the source encoder.~~

19. (Currently Amended) The method of claim 18, wherein[[:]]

~~the alternative streams of protected content are alternative streams of protected video;~~

~~each of the alternative streams of protected video includes DRM information indicating portions of frames of video that are encrypted and identifying at least a portion of the common cryptographic information used to access the encrypted portions of the frames of video; and~~

~~the method further comprises:~~

~~obtaining a protected frame of video from one of the alternative streams of protected video using the playback device;~~

~~obtaining DRM information indicating a portion of the protected frame of video that is encrypted using the playback device;~~

~~identify at least a portion of the common cryptographic information that is used to access the encrypted portion of the protected frame using the playback device and the DRM information;~~

~~decrypting the encrypted portion of the protected frame of video using the playback device and the identified portion of the common cryptographic information; and~~

~~decoding the frame of video using the playback device.~~

20. (Currently Amended) The method of claim 18, ~~wherein:~~ further comprising providing a

~~each of the alternative streams of protected content is contained within a separate container file; and~~

~~the top level index file~~ that identifies a container file containing each of the alternative streams using the source encoder.

REMARKS/ARGUMENTS

Summary of the Amendments

Claims 1-6 and 8-20 are amended. Claim 7 is canceled. After entry of these amendments, claims 1-6 and 8-20 will be pending. Support for these amendments can be found in Figures 5A and 5B and their associated paragraphs [0076]-[0082]. Support for all the amendments can be found throughout the specification, including in ¶ [00138] to ¶ [00144].

Summary of the Office action

The Office action dated April 17, 2015 contained the following rejections and objections:

- claims 1-20 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims of U.S. Patent No. 8,909,922;
- claims 1, 13, and 18 are rejected under pre-AIA 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent Publication No. 2009/0290706 to Amini et al. (the Amini publication) in view of PCT Patent Publication No. 2011/103364 to Thorwirth (the Thorwirth publication);
- claims 2, 4-8, 19-20 are rejected under pre-AIA 35 U.S.C. § 103(a) as allegedly being unpatentable over the Amini et al. publication in view of the Thorwirth publication and further in view of U.S. Patent Publication No. 2009/0328228 to Schnell (the Schnell publication); and
- claims 9-17 are rejected under pre-AIA 35 U.S.C. § 103(a) as allegedly being unpatentable over the Amini et al. publication in view of the Thorwirth publication and further in view of the Schnell publication and further in view of U.S. Patent Publication No. 2009/0132721 to Soroushian et al. (the Soroushian publication).

Double Patenting Rejection

Claims 1-20 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims of U.S. Patent No. 8,909,922. Applicant has added a number of features to the claims in the included claim amendments. Specifically, Applicant has amended independent claims 1, 13, and 18 to include the following critical features: (1) receiving a stream of video and uploading the container files containing the encrypted portions of encoded video frames and DRM information to a content distribution server for distribution to playback devices using adaptive bitrate streaming, and (2) writing the encoded video frames of each alternative stream to a separate container file from a plurality of container files and writing DRM information to each separate container file that identifies the encrypted portions of several encoded video frames written to the separate container file. Applicant respectfully submits that with these features, independent claims 1 and 18 of the instant application are distinct and patentable over the claims of U.S. Patent No. 8,909,922. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1-20 over the claims of U.S. Patent No. 8,909,922.

The Amini Publication

The Amini publication generally describes “[t]echniques for securely and adaptively delivering multimedia content are disclosed in which a set of alternate access units for each time slot is obtained” (Amini publication [abstract]). As illustrated in Figure 2 of the Amini publication, “data processing system 200 of FIG. 2 generates a stream that offers a choice from multiple access units for a single time slot within which the access units are to be encrypted” (Amini publication, ¶ [0030]). “Multimedia stream source 210 offers unencoded access units (e.g., frames) to a multi-encoder platform 220” (Amini publication, ¶ [0031]). “Platform 220 generates multiple encoded access units for each offered unencoded access unit and passes off the multiple encoded access units to a stream thinner 230” (Amini publication, ¶ [0031]). “The thinned access unit streams are input into encryptor 240, where they are encrypted. The output of encryptor 240 is finally sent to an output device 250, such as a network protocol

formatter or a file writer” (Amini publication, ¶ [0032]). As explained in the Amini publication, “the problem of encrypting a multimedia stream that may have multiple access units for each time slot is overcome by selecting the encryption index for each access unit such that the encryption index always increases, regardless of which access unit the delivery system (e.g., server) selects for transmission” (Amini publication, ¶ [0043]). The Amini publication describes three methods to overcome its stated problem, “Method 1: Each Stream has a Different Key”, “Method 2: Each Stream Uses the Same Key”, and “Method 3: One Stream may not have Index Gaps” (Amini publication, pages 4 and 5).

Patentability of Claim 1

In the Office action dated April 17, 2015, claim 1 is rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over the Amini publication in view of the Thorwirth publication. Applicant respectfully disagrees with this rejection. However, in order to advance prosecution, Applicant has amended claim 1. Applicant respectfully submits that claim 1 as amended is not disclosed or taught by the combination of the cited references.

The Amini publication generally describes “[t]echniques for securely and adaptively delivering multimedia content are disclosed in which a set of alternate access units for each time slot is obtained” (Amini publication [abstract]). As explained in the Amini publication, “the problem of encrypting a multimedia stream that may have multiple access units for each time slot is overcome by selecting the encryption index for each access unit such that the encryption index always increases, regardless of which access unit the delivery system (e.g., server) selects for transmission” (Amini publication, ¶ [0043]). The Amini publication describes three methods to overcome its stated problem, “Method 1: Each Stream has a Different Key”, “Method 2: Each Stream Uses the Same Key”, and “Method 3: One Stream may not have Index Gaps”. The Office action specifically cites paragraph 0054 of the Amini publication which states that, per Method 2, “In case a very simple key management system is used that allows only a

single key per stream, then all alternate streams must use the same key. In that situation, the same index should not be used more than once ...”.

As far as Applicant can tell from reviewing the Amini publication, Amini only describes the three methods of using keys for streams listed above (see Method 1, Method 2, and Method 3). Method 1 of the Amini publication uses a different key for each stream, whereas amended claim 1 recites “encrypt portions of several encoded video frames from each alternative stream using keys from the same common set of frame keys” (i.e., the same common set of frame keys is used for each alternative stream). Method 2 of the Amini publication has each stream use the same key, whereas amended claim 1 recites “a common set of frame keys” (i.e., several keys). Method 3 of the Amini publication relates to “where a multimedia stream is self-contained, is delivered in a loss free environment (e.g., downloaded), and played back as is. An example of such a case is an MP3 audio file” (Amini publication, ¶ [0060]). Similarly to Method 1 and Method 2 of the Amini publication, Method 3 fails to disclose the above recited aspects of amended claim 1.

In addition, Applicant could find no mention within the Amini publication of an operation involving “after encrypting the portions of encoded video frames, (1) write the encoded video frames of each alternative stream to a separate container file from a plurality of container files and (2) write DRM information to each separate container file that identifies the encrypted portions of several encoded video frames written to the separate container file”. In another key difference between the Amini publication and amended claim 1, amended claim 1 recites “upload the container files to a content distribution server for distribution to playback devices using adaptive bitrate streaming”. This further feature allows for direct uploading of the received and containerized stream of video. Furthermore, Applicant respectfully submits that the other cited references (e.g., the Thorwirth publication, the Schnell publication, and the Soroushian publication) do not satisfy these deficiencies. For at least the reasons discussed above, Applicant respectfully submits that claim 1 is allowable over the cited art of record and requests reconsideration and withdrawal of the rejection.

Patentability of Claims 2-12

Claims 2-12 depend from claim 1. Applicant respectfully submits that claims 2-12 are allowable for at least the reasons provided above with respect to claim 1.

Patentability of Claim 13

The Office action rejects claim 13 based upon the same combination of references as cited with respect to claim 1. For reasons similar to those outlined above with respect to claim 1, Applicant respectfully submits that the prior art of record does not disclose or suggest the features of amended claim 13. Accordingly, Applicant respectfully submits that claim 13 is allowable over the cited art of record and requests reconsideration and withdrawal of the rejection.

Patentability of Claims 14-17

Claims 14-17 depend from claim 13. Applicant respectfully submits that claims 14-17 are allowable for at least the reasons provided above with respect to claim 13.

Patentability of Claim 18

The Office action rejects claim 18 based upon the same combination of references as cited with respect to claim 1. For reasons similar to those outlined above with respect to claim 1, Applicant respectfully submits that the prior art of record does not disclose or suggest amended claim 18. Accordingly, Applicant respectfully submits that claim 18 is allowable over the cited art of record and requests reconsideration and withdrawal of the rejection.

Patentability of Claims 19-21

Claims 19-21 depend from claim 18. Applicant respectfully submits that claims 19-21 are allowable for at least the reasons provided above with respect to claim 18.

CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that this application is in condition for allowance. Accordingly, reconsideration of the application and allowance of the claims are respectfully requested. Although the present paper may include a combination of alterations to the application or claims, or characterizations of claim scope or referenced art, Applicants are not conceding that previously pending claims in this application are not patentable over the cited references. Rather, any alterations and/or characterizations are made to strictly facilitate prosecution of this application. As such, reviewers of this or any parent, child, or related prosecution history shall not reasonably infer that Applicants have made any disclaimers or disavowals of any subject matter supported by the present application.

Applicants have submitted amendments and arguments believed to be sufficient to overcome all of the outstanding rejections. Consequently, Applicants have not advanced every argument for the allowability of the claims over the references of record. As such, Applicants do not acquiesce to any of the Examiner's statements or characterizations not specifically traversed. If the Examiner should have any remaining questions or objections, a telephone interview to discuss and resolve these issues is respectfully requested.

The Commissioner is authorized to charge any fee under 37 CFR 1.16 and 1.17 which may be required during the **entire pendency** of the application to Deposit Account No. 50-4407. Please show our docket number with any transaction to the Deposit Account.

Respectfully submitted,
KPPB LLP

By /Jason D. Wolfe/
Jason D. Wolfe
Registration No. 71,327
949.852.0000

JDW/kl

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.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)		Docket Number (Optional) D1-02359A.CON
Application Number 14/564,003	Filed December 8, 2014	
For Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information		
Art Unit 2434	Examiner Abiy Getachew	
This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application. The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):		
	<u>Fee</u>	<u>Small Entity Fee</u>
☒ One month (37 CFR 1.17(a)(1))	\$200	\$100
☐ Two months (37 CFR 1.17(a)(2))	\$600	\$300
☐ Three months (37 CFR 1.17(a)(3))	\$1,400	\$700
☐ Four months (37 CFR 1.17(a)(4))	\$2,200	\$1,100
☐ Five months (37 CFR 1.17(a)(5))	\$3,000	\$1,500
☐ Applicant asserts small entity status. See 37 CFR 1.27. ☐ Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously. ☐ A check in the amount of the fee is enclosed. ☐ Payment by credit card. Form PTO-2038 is attached. ☐ The Director has already been authorized to charge fees in this application to a Deposit Account. ☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number <u>504407</u> ☒ Payment made via EFS-Web.		
WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.		
I am the		
☐ applicant/inventor. ☐ assignee of record of the entire interest. See 37 CFR 3.71. 37 CFR 3.73(b) statement is enclosed (Form PTO/SB/96). ☐ attorney or agent of record. Registration number _____ ☒ attorney or agent acting under 37 CFR 1.34. Registration number <u>71,327</u>		
<u>/Jason D. Wolfe/</u> Signature	<u>August 17, 2015</u> Date	
<u>Jason D. Wolfe</u> Typed or printed name	<u>949.852.0000</u> Telephone Number	
NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.		
☒ * Total of <u>1</u> forms are submitted.		

This collection of information is required by 37 CFR 1.136(a). 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 6 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.

Electronic Patent Application Fee Transmittal

Application Number:	14564003			
Filing Date:	08-Dec-2014			
Title of Invention:	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information			
First Named Inventor/Applicant Name:	Michael George Kiefer			
Filer:	Jason Daniel Wolfe/Katrina Lee			
Attorney Docket Number:	D1-02359A.CON			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension - 1 month with \$0 paid	1251	1	200	200
Miscellaneous:				
Total in USD (\$)				200

Electronic Acknowledgement Receipt

EFS ID:	23231739
Application Number:	14564003
International Application Number:	
Confirmation Number:	5114
Title of Invention:	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information
First Named Inventor/Applicant Name:	Michael George Kiefer
Customer Number:	71897
Filer:	Jason Daniel Wolfe/Katrina Lee
Filer Authorized By:	Jason Daniel Wolfe
Attorney Docket Number:	D1-02359A.CON
Receipt Date:	17-AUG-2015
Filing Date:	08-DEC-2014
Time Stamp:	21:04:48
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 200
RAM confirmation Number	7715
Deposit Account	504407
Authorized User	BAILEY, DAVID

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

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IPR2020-00558

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		02359aconamendment.pdf	141603	yes	15
			8f31d1259bc3788891f4cf8457621bde63a5610a		
	Multipart Description/PDF files in .zip description				
	Document Description	Start	End		
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1		
	Claims	2	9		
	Applicant Arguments/Remarks Made in an Amendment	10	15		
Warnings:					
Information:					
2	Extension of Time	02359aconextoftime.pdf	127173	no	1
			d99c8d256bfd4fa127880cfb7d13b90040359635		
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	31035	no	2
			7942dd6edeae2ffc652ae69c4d3776d40ef1deca		
Warnings:					
Information:					
Total Files Size (in bytes):			299811		

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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/564,003	Filing Date 12/08/2014	☐ To be Mailed
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 ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

(Column 1)

(Column 2)

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
☐ 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).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

(Column 1)

(Column 2)

(Column 3)

AMENDMENT	08/17/2015	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 19	Minus	** 20	= 0	x \$80 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0	x \$420 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
TOTAL ADD'L FEE						0	

(Column 1)

(Column 2)

(Column 3)

AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =
	☐ Application Size Fee (37 CFR 1.16(s))					
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
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 number found in the appropriate box in column 1.

 LIE
 /STELLA LITTLE/

This collection of information is required by 37 CFR 1.16. 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 12 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.**

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/564,003	12/08/2014	Michael George Kiefer	D1-02359A.CON

CONFIRMATION NO. 5114

PUBLICATION NOTICE



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71897
KPPB LLP
2400 EAST KATELLA AVENUE
SUITE 1050
ANAHEIM, CA 92806

Title: Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information

Publication No. US-2015-0139419-A1

Publication Date: 05/21/2015

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.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/564,003	12/08/2014	Michael George Kiefer	D1-02359A.CON	5114
71897 KPPB LLP 2400 EAST KATELLA AVENUE SUITE 1050 ANAHEIM, CA 92806	7590 04/17/2015		EXAMINER GETACHEW, ABIY	
			ART UNIT 2434	PAPER NUMBER
			NOTIFICATION DATE 04/17/2015	DELIVERY MODE 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):

docketing@cpaglobal.com
PAIR@KPPB.COM

Office Action Summary	Application No. 14/564,003	Applicant(s) KIEFER ET AL.	
	Examiner ABIY GETACHEW	Art Unit 2434	AIA (First Inventor to File) Status No

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/08/2014.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ 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.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

- 5) ☒ Claim(s) 1-20 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) _____ is/are allowed.
- 7) ☒ Claim(s) 1-20 is/are rejected.
- 8) ☐ Claim(s) _____ is/are objected to.
- 9) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, 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.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 12/08/2014 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

- 12) ☐ 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)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) ☒ Notice of References Cited (PTO-892) | 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date _____ | 4) ☐ Other: _____ |

DETAILED ACTION

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

2. This is a Non-Final Office Action in response to the communication filed on December 08, 2014.

- Claims 1-20 have been examined.

Drawings

3. The drawings filed on September 08, 2014 are acceptable for examination proceedings.

Specification

4. The specification filed on September 08, 2014 is also accepted.

Double Patenting

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. **Claims 1-20** is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over **claims 1** of U.S. Patent No. 8,909,922

(hereinafter refereed as '922 Patent) Although the conflicting claims are not identical, they are not patentably distinct from each other.

The following is referring to the independent claim

- **As per independent claim1.**

Independent claim 1 of the instant application and **claim 1** of the '922 patent recite similar limitation. The above independent claims, namely **claim 1** of the instant/present application would have been obvious over independent claim **1**, of the '922 patent **because each and every element of the above independent claim1 of the present application is anticipated by the corresponding independent claim 1 of the '922 patent.**

As per independent claim1.

Independent claim 18 of the instant application and **claim 18** of the '922 patent recite similar limitation. The above independent claims, namely **claim 18** of the instant/present application would have been obvious over independent claim **15**, of the '922 patent **because each and every element of the above independent claim1 of the present application is anticipated by the corresponding independent claim 15 of the '922 patent.**

The following is referring to the dependent claims

- **Referring to dependent claims 2-17 and 19-20.**

Claims 2-17 and 19-20 of the instant application is also anticipated by claims 2,3,4,5,6,7,8,9,10,11,12,13,14,15 and 17 of the '922 US patent since the corresponding claims further recite similar/same limitation of the same subject matter.

Instant Application	Copending Patent No. 8,909,922
1. A playback device, comprising: a processor; memory containing a client application; wherein the client application configures the processor to: request a top level index file identifying a plurality of alternative streams of protected content, where each of the alternative streams of protected content are encrypted using common cryptographic information; obtain the common cryptographic information; request portions of content from at least the plurality of alternative streams of protected content; access the protected content using the common cryptographic information; and playback the content.	1. A playback device, comprising: a processor; memory containing a client application; wherein the client application configures the processor to: obtain a top level index file identifying a plurality of separate container files each containing one of a plurality of alternative streams of protected video, wherein each of the alternative streams of protected video includes video frames that are encrypted using a common <u>set of frame keys comprising a plurality of different frame keys, wherein each of the container files containing the alternative streams of protected video comprises (i) an encrypted copy of the common set of frame keys and (ii) a set of DRM information that identifies encrypted portions of the video frames and frame keys to utilize in accessing the encrypted portions of the video frames, and wherein the set of DRM information in each of the plurality of alternative streams of protected video references the same common set of frame keys; obtain an encrypted copy of the common set of frame keys from a given container file and decrypt the encrypted copy of the common set of frame keys using a content key; obtain a set of DRM information from the given container file; obtain portions of protected video from the given container file containing one of the plurality of alternative streams of protected video; decrypt encrypted video frames from the obtained portions of video using the decrypted copy of the common set of frame keys according to the obtained set of DRM information; and playback the obtained portions of video.</u>
2. The playback device of claim 1, wherein: the alternative streams of	2. The playback device of claim 1, wherein: the alternative streams of

protected content are alternative streams of protected video; each of the alternative streams of protected video includes DRM information indicating portions of frames of video that are encrypted and identifying at least a portion of the common cryptographic information used to access the encrypted portions of the frames of video; and the client application configures the processor to: obtain a protected frame of video from one of the alternative streams of protected video; obtain DRM information indicating a portion of the protected frame of video that is encrypted; identify at least a portion of the common cryptographic information that is used to access the encrypted portion of the protected frame using the DRM information; decrypt the encrypted portion of the protected frame of video using the identified portion of the common cryptographic information; and decode the frame of video.	protected video are encoded at different maximum bitrates using different sets of according parameters and the client application <u>further configures the processor to decode the encoded frames of video prior to playback of the obtained portions of video.</u>
3. The playback device of claim 1, wherein: each of the alternative streams of protected content is contained within a separate container file; and the top level index file identifies a container file containing each of the alternative streams.	3. The playback device of claim 1, wherein: the container files containing each of the alternative streams of <u>protected video comprise at least one header that includes information that describes the encoding of the stream of protected video; and the top level index file identifies the location of the at least one header within each container file.</u>
4. The playback device of claim 3, wherein: the container files containing each of the alternative streams of protected content comprise at least one header including the common cryptographic information and information that describes the encoding of the stream of protected content; and the top level index file identifies the location of the at least one header within each container file.	3. The playback device of claim 1, wherein: the container files containing each of the alternative streams of protected video comprise at least one header that includes information that <u>describes the encoding of the stream of protected video; and the top level index file identifies the location of the at least one header within each container file.</u>
5. The playback device of claim 4, wherein	4. The playback device of claim 1, wherein

the common cryptographic information is a set of encryption keys.	the common set of frame keys <u>is part of a frame key table that is common to each of the plurality of alternative streams.</u>
6. The playback device of claim 5, wherein: the common set of encryption keys is encrypted; and the client application configures the processor to securely receive cryptographic information used to unencrypt the common set of encryption keys.	5. The playback device of claim 1, wherein: the client application further configures the processor to securely receive <u>the content key.</u>
7. The playback device of claim 4, wherein the client application configures the processor to obtain the common cryptographic information by requesting at least one header of a container file identified in the top level index file.	18. The method of claim 17, further comprising obtaining <u>an encrypted copy of the common set of frame keys</u> by requesting at least one header of a container file identified in the top level index file <u>using the playback device.</u>
8. The playback device of claim 7, wherein: each container file containing one of the alternative streams of protected content further comprises an index; and the client application configures the processor to request a portion of content from one of the container files by configuring the processor to: request at least a portion of an index from the container file; identify the portion of the container file containing a specific portion of content using the index; and request the identified portion of the container file.	6. The playback device of claim 1, wherein: each container file containing one of the alternative streams of protected video further comprises an index; and the client application further configures the processor to request at least a portion of an index from the given container file; identify the portion of the given container file containing a specific portion of <u>video using the index</u> ; and request the identified portion of the given container file.
9. The playback device of claim 4, wherein the container files are Matroska container files.	7. The playback device of claim 1, wherein the container files are Matroska container files.
10. The playback device of claim 9, wherein the common cryptographic information is stored in a common DRM Header element contained within a Tracks element within each of the Matroska container files containing the alternative streams of protected content.	8. The playback device of claim 9, wherein the <u>encrypted copy of the common set of frame keys</u> is stored in a common DRM Header element contained within a Tracks element within each of the Matroska container files containing the alternative <u>streams of protected video.</u>

11. The playback device of claim 10, wherein: the common cryptographic information is a set of encryption keys; and the set of encryption keys is encrypted and stored within the DRM Header element.	8. The playback device of claim 7, wherein the encrypted copy of the common set of frame keys is stored in a common DRM Header element <u>contained within a Tracks element within each of the Matroska container files containing the alternative streams of protected video.</u>
12. The playback device of claim 11, wherein the client application configures the processor to: obtain cryptographic information that can be used to unencrypt the set of encryption keys stored within the DRM Header element; and unencrypt the set of encryption keys stored within the DRM Header element using the obtained cryptographic information.	9. The playback device of claim 10, wherein the client application <u>further</u> configures the processor to: obtain <u>the content key</u> that can be used to <u>decrypt the encrypted copy of the set of frame keys</u> stored within the <u>common</u> DRM Header element; and <u>decrypt the encrypted copy of the set of frame keys</u> stored within the <u>common</u> DRM Header element using the obtained <u>content key</u>.
13. The playback device of claim 10, wherein the client application configures the processor to obtain the DRM Header element by requesting a Tracks element from one of the Matroska container files identified in the top level index file.	10. The playback device of claim 10, wherein the client application configures the processor to obtain the <u>common</u> DRM Header element by requesting a Tracks element from one of the Matroska container files identified in the top level index file.
14. The playback device of claim 13, wherein: each Mastroska container file containing an alternative stream of protected content further comprises an index contained within a Cues element; and the client application configures the processor to request a portion of content from one of the Matroska container files by configuring the processor to: request at least a portion of a Cues element from a Matroska container file containing one of the alternative streams of protected content; identify a portion of the Matroska container file containing a specific portion of content using at least one CueTrackPosition element within the Cues element; and request the portion of the	11. The playback device of claim 13, wherein: each Mastroska container file containing an alternative stream of protected video further comprises an index contained within a Cues element; and the client application <u>further configures the processor to request a portion of video from one of the Matroska container files by configuring the processor to: request at least a portion of a Cues element from a Matroska container file containing one of the alternative <u>streams of protected video</u>; identify a portion of the Matroska container file containing a specific portion of video using at least one CueTrackPosition element within the Cues element; and request the portion of the</u>

Matroska container file identified by the at least one CueTrackPosition element.	Matroska container file identified by the at least one CueTrackPosition element.
15. The playback device of claim 14, wherein the index comprises a plurality of CueTrackPosition elements that identify the location of a plurality of Cluster elements within the Matroska container file.	12. The playback device of claim 14, wherein the index comprises a plurality of CueTrackPosition elements that identify the location of a plurality of Cluster elements within the Matroska container file.
16. The playback device of claim 15, wherein: each Cluster element contains a plurality of BlockGroup elements including encoded portions of content; a CueTrack Position element indexes each Cluster element; and each CueTrackPosition element includes the size of the Cluster element that it indexes.	14. The playback device of claim 12, wherein: each Cluster element contains a plurality of BlockGroup elements including encoded portions of video; a CueTrack Position element indexes each Cluster element; and each CueTrackPosition element includes the size of the Cluster element that it indexes.
17. The playback device of claim 14, wherein the alternative streams of protected content are alternative streams of protected video; each of the Matroska container files containing an alternative stream of protected video includes a DRMIInfo element in a BlockGroup element containing a protected frame of video, where the DRMIInfo element indicates at least a portion of the protected frames of video that is encrypted and identifies at least a portion of the common cryptographic information used to access the at least one encrypted portion of the protected frame of video; and the client application configures the processor to access video frames in a stream of protected video using the common cryptographic information by configuring the processor to: obtain a BlockGroup containing a protected frame of video; parse the BlockGroup element to obtain a DRMIInfo element indicating at least a	13. The playback device of claim 14, wherein each of the Matroska container files containing an alternative stream of protected video includes <u>a set of BlockGroup elements that each contain a DRMIInfo element and an encrypted frame of video, where the DRMIInfo element is a part of the set of DRM information for each of the Matroska container files</u> and the client application <u>further</u> configures the processor to decrypt encrypted video frames <u>of the obtained portions of video</u> using the <u>decrypted copy of the common set of frame keys</u> by configuring the processor to: obtain a BlockGroup containing <u>an encrypted</u> frame of video; parse the BlockGroup element to obtain a DRMIInfo element indicating at least a portion of the <u>encrypted</u> frame of video that is encrypted using a frame key from the <u>common</u> set of frame keys; decrypt the at least one encrypted portion of the <u>encrypted</u> frame of video using the

portion of the protected frame of video that is encrypted using an encryption key from the set of encryption keys; decrypt the at least one encrypted portion of the protected frame of video using the identified encryption key; and decode the frame of video.	identified frame key; and decode the frame of video.
18. A method of performing adaptive bitrate streaming using a plurality of alternative streams of protected content, where each of the streams of protected content is protected using common cryptographic information, the method comprising: requesting a top level index file identifying a plurality of alternative streams of protected content using a playback device, where each of the alternative streams of protected content are encrypted using common cryptographic information; obtaining the common cryptographic information using the playback device; requesting portions of content from at least the plurality of alternative streams of protected content using the playback device; accessing the protected content using the playback device and the common cryptographic information; and playing back the content using the playback device.	15. A method of performing adaptive bitrate streaming using a plurality of alternative streams of protected video the method comprising: <u>obtaining a top level index file identifying a plurality of separate container files each containing one of a plurality of alternative streams of protected using a playback device, where wherein each of the alternative streams of protected include video frames that are encrypted using a common set of frame keys comprising a plurality of different frame keys and wherein each of the container files containing the alternative streams of protected video comprises (i) an encrypted copy of the common set of frame keys and (ii) a set of DRM information that identifies encrypted portions of the video frames and frame keys to utilize in accessing the encrypted portions of the video frames, and wherein the set of DRM information in each of the plurality of alternative streams of protected video references the same common set of frame keys; obtaining an encrypted copy of the common set of frame keys from a ,given container file and decrypting the encrypted copy of the common set of frame keys using a content key using the playback device; obtaining a set of DRM information from the given container file using the playback device; obtaining portions of video from the ,given container file containing one of the plurality of alternative streams of protected using the playback device; decrypting encrypted video frames from the obtained portions of</u>

	video using the playback device and the <u>decrypted copy of the common set of frame keys according to the obtained set of DRM information</u> and playing back the <u>obtained portions of</u> using the playback device.
19. The method of claim 18, wherein: the alternative streams of protected content are alternative streams of protected video; each of the alternative streams of protected video includes DRM information indicating portions of frames of video that are encrypted and identifying at least a portion of the common cryptographic information used to access the encrypted portions of the frames of video; and the method further comprises: obtaining a protected frame of video from one of the alternative streams of protected video using the playback device; obtaining DRM information indicating a portion of the protected frame of video that is encrypted using the playback device; identify at least a portion of the common cryptographic information that is used to access the encrypted portion of the protected frame using the playback device and the DRM information; decrypting the encrypted portion of the protected frame of video using the playback device and the identified portion of the common cryptographic information; and decoding the frame of video using the playback device.	15. A method of performing adaptive bitrate streaming using a plurality of alternative streams of protected video, the method comprising: obtaining a top level index file identifying a plurality of separate container files each containing one of a plurality of alternative streams of protected video using a playback device, wherein each of the alternative streams of protected video include video frames that are encrypted using a common set of frame keys comprising a plurality of different frame keys, and wherein each of the container files containing the alternative streams of protected video comprises (i) an encrypted copy of the common set of frame keys and (ii) a set of DRM information that identifies encrypted portions of the video frames and frame keys to utilize in accessing the encrypted portions of the video frames, and wherein the set of DRM information in each of the plurality of alternative streams of protected video references the same common set of frame keys; obtaining an encrypted copy of the common set of frame keys from a given container file and decrypting the encrypted copy of the common set of frame keys using a content key using the playback device; obtaining a set of DRM information from the given container file using the playback device; obtaining portions of video from the given container file containing one of the plurality of alternative streams of protected video using the playback device; <u>decrypting encrypted video frames from the obtained portions of video using the playback</u>

	<u>device and the decrypted copy of the common set of frame keys according to the obtained set of DRM information; and playing back the obtained portions of video using the playback device.</u>
20. The method of claim 18, wherein: each of the alternative streams of protected content is contained within a separate container file; and the top level index file identifies a container file containing each of the alternative streams.	17. The method of claim 15, wherein: the container files containing each of the alternative streams of protected video comprise at least one header that includes information and information that describes the encoding of the stream of protected video; and the top level index file <u>identifies the location of the at least one header within each container file.</u>

Claim Rejections - 35 USC § 103

7. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. Claims 1,3 and 18 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Amini et al. (US 2004/0202320 A1) hereafter refers as to Amini in view of Thorwirth (WO 2011/103364 A1).

Regarding claim 1, Amini discloses a device (***fig. 2 a multi-encoder platform 220 i.e. "a device"***), comprising: a memory containing a client application, wherein the client application configures the processor (***Fig. 11 processor 1110 and furthermore***

Para 0068, 0069) a plurality of alternative streams of protected content (***fig. 2 a multimedia stream source 210 i.e. “a plurality of alternative”***), where each of the alternative streams of protected content are encrypted using common cryptographic information; obtain the common cryptographic information (***fig. 2 encryptor 240 discloses same key is used for different streams i.e. “common cryptographic information” para 0054 discloses “...a single key per stream, then all alternate streams must use the same key”***); request portions of content from at least the plurality of alternative streams of protected content (***fig. 2 and para 0031 discloses multi-encoder 220 generates multiple encoded access units and gives alternate or multiple streams***); access the protected content using the common cryptographic information; and playback the content. (***Para 0032 discloses encryptor 240 where the streams are encrypted and fig, 2 and para 0054 discloses same key is used for different streams i.e. “common cryptographic information”***).

Amini does not explicitly request a top level index file.

However, Thorwirth discloses a top level index file (***para 0009 discloses top level Index file pointing to a number of alternate streams that contain actual video and audio data***).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Thorwirth with the teachings of Amini in order for providing a playlist with a list of URLs pointing to TS container files that contain alternative chunks for the sections of a piece of content (Thorwirth, para 0010).

Regarding claim 3 Amini as modified by Thorwirth discloses wherein: each of the alternative streams of protected content is contained within a separate container file; and the top level index file identifies a container file containing each of the alternative streams **(Para 0004 of Thorwirth discloses sections of files in a container file and para 0009 and 0010 of Thorwirth discloses different media containers for adaptive streaming).**

Regarding claim 18, Amini discloses a method of performing adaptive bitrate streaming using a plurality of alternative streams of protected content, where each of the streams of protected content is protected using common cryptographic information, the method comprising: identifying a plurality of alternative streams of protected content using a payback device **(Fig. 2 a multimedia stream source 210 i.e. “a plurality of alternative”)** where each of the alternative streams of protected content are encrypted using common cryptographic information **(Fig. 2 a multimedia stream source 210 i.e. “a plurality of alternative”)** obtaining the common cryptographic information using the payback device; requesting portions of content from at least the plurality of alternative streams of protected content using the payback device; accessing the protected content using the payback device and the common cryptographic information; and praying back the content using the payback device. **(Fig. 2 encryptor 240 discloses same key is used for different streams i.e. “common cryptographic information” para 0054 discloses “...a single key per stream, then all alternate streams must use the same key”);**

Amini does not explicitly request a top level index file.

However, Thorwirth discloses a top level index file (***para 0009 discloses top level Index file pointing to a number of alternate streams that contain actual video and audio data***).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Thorwirth with the teachings of Amini in order for providing a playlist with a list of URLs pointing to TS container files that contain alternative chunks for the sections of a piece of content (Thorwirth, para 0010).

10. Claims 2, 4-8, 19-20 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Amini et al. (US 2004/0202320 A1) hereafter refers as to Amini in view of Thorwirth (WO 2011/103364 A1) as applied to claim 1 above, and further in view of Schnell (US 2009/0328228 A1).

Regarding claim 2 Amini as modified by Thorwirth discloses wherein: the alternative streams of protected content are alternative streams of protected video (***Para 0052 of Thorwirth discloses alternative streams of protected content***); and identifying at least a portion of the common cryptographic information used to access the encrypted portions of the frames of video (***para 0054 of Amini discloses a stream source 210 offers unencoded 13ccess units (i.e. frames) to the encoder, pars 0031 t see fig. 2; encryptor 240 where the streams are encrypted, para 0032, see fig. 2; same keys used for different streams (i.e. “common cryptographic Information”)***); and the client application configures the processor to: obtain a protected frame of video from one of the alternative streams of protected video (***figs 4 and 5 of Thorwirth***

discloses Encryption is a sort of a content protecting method of preventing illegal copy redistribution, editing and the like of contents provided by a content provider (CP) in a manner of transforming data using a specific algorithm);
decrypt the encrypted portion of the protected frame of video using the identified portion of the common cryptographic information; and decode the frame of video. ***(Para 0059 of Thorwirth discloses decryption of streamed file utilizes the content keys based on the sections).***

Though Amini as modified by Thorwirth teaches a stream is encrypted with an indexed stream **(para 0060 of Amini, for example)** However, Amini as modified by Thorwirth does not explicitly discloses each of the alternative streams of protected video includes DRM information indicating portions of frames of video that are encrypted and obtain DRM information indicating a portion of the protected frame of video that is encrypted; identify at least a portion of the common cryptographic information that is used to access the encrypted portion of the protected frame using the DRM information;

Schnell discloses each of the alternative streams of protected video includes DRM information indicating portions of frames of video that are encrypted ***(para 0034 OF discloses media device 202 also includes DRM platform 21 to receive the ORM license)*** and obtain DRM information indicating a portion of the protected frame of video that is encrypted ***(para 0002 discloses digital rights management (DRM) system, various devices that obtain or download digital media content can perform***

actions on the protected media content as permitted by a DRM license and furthermore para); identify at least a portion of the common cryptographic information that is used to access the encrypted portion of the protected frame using the DRM information **(para 0028-0031 discloses content server 122 and a DRM system 118 distribute protected media content 120 to various wireless media devices 106).**

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Schnell to Incorporate the DRM system with the teachings of Amini as modified by Thorwirth for the purpose of providing DRM associated features such as licenses that correspond to the media segments of the protected media (Schnell para 0004).

Regarding claim 4 Amini as modified by Thorwirth further in view of Schnell discloses wherein: the container files containing each of the alternative streams of protected content **(Para 0004 of Thorwirth discloses sections of files in a container file para 0009 and 0010 of Thorwirth discloses different media containers for adaptive streaming)** comprise at least one header including the common cryptographic information and information that describes the encoding of the stream of protected content; and the top level index file identifies the location of the at least one header within each container file. **(fig. 2 and para 0037 of Schnell discloses file header object 218 [DRM header element] has the ORM licenses for the protected media content, para 0036, written in a file segment 160, which has track objects 222 associated with the tracks or video tracks).**

The examiner supplies the same rationale for the combination of Amini as modified by Thorwirth further in view of Schnell as in claim 2 which is set forth above.

Regarding claim 5 Amini as modified by Thorwirth further in view of Schnell discloses wherein the common cryptographic information is a set of encryption keys.

(Para 0054 of Amini discloses encryptor 240 where the streams are encrypted and para 0032. Also see. fig. 2; same key is used for different streams i.e. (“common cryptographic Information”).

The examiner supplies the same rationale for the combination of Amini as modified by Thorwirth further in view of Schnell as in claim 2 which is set forth above.

Regarding claim 6 Amini as modified by Thorwirth further in view of Schnell discloses wherein: the common set of encryption keys is encrypted; and the client application configures the processor to securely receive cryptographic information used to unencrypt the common set of encryption keys. ***(Para 0058 of Thorwirth discloses the content keys used to encrypt the content are encrypted using a key unique to a specific user or client device However, Thorwirth lacks the teaching of common cryptographic information. However, Amini teaches a content distribution with common cryptographic information for the alternate streams of content (para 0054, 0044 of Amini discloses multi-encoder 220 generates multiple encoded access units and gives alternate or multiple streams, para 0031, see fig. 2; same key is used for different streams, (protecting the content)).***

The examiner supplies the same rationale for the combination of Amini as modified by Thorwirth further in view of Schnell as in claim 2 which is set forth above.

Regarding claim 7 Amini as modified by Thorwirth further in view of Schnell discloses wherein the client application configures the processor to obtain the common cryptographic information by requesting at least one header of a container file identified in the top level index file. **(Para 0004 of Thorwirth discloses sections of files in a container file and para 0004 of Thorwirth, different media containers for adaptive streaming).**

The examiner supplies the same rationale for the combination of Amini as modified by Thorwirth further in view of Schnell as in claim 2 which is set forth above.

Regarding claim 8 Amini as modified by Thorwirth further in view of Schnell discloses wherein: each container file containing one of the alternative streams of protected content further comprises an index; and the client application configures the processor to request a portion of content from one of the container files by configuring the processor to: request at least a portion of an index from the container file; identify the portion of the container file containing a specific portion of content using the index; and request the identified portion of the container file. **(Para 0053 Thorwirth server provides access to the client based on the selection or chunks requested).**

The examiner supplies the same rationale for the combination of Amini as modified by Thorwirth further in view of Schnell as in claim 2 which is set forth above.

Regarding claim 19 Amini as modified by Thorwirth further in view of Schnell discloses wherein: the alternative streams of protected content are alternative streams of protected video; each of the alternative streams of protected video **(Para 0052 of Thorwirth discloses alternative streams of protected content)**; includes DRM

information indicating portions of frames of video that are encrypted and identifying at least a portion of the common cryptographic information used to access the encrypted portions of the frames of video; and the method further comprises: obtaining a protected frame of video from one of the alternative streams of protected video using the playback device ***figs 4 and 5 of Thorwirth discloses Encryption is a sort of a content protecting method of preventing illegal copy redistribution, editing and the like of contents provided by a content provider (CP) in a manner of transforming data using a specific algorithm***) obtaining DRM information indicating a portion of the protected frame of video that is encrypted using the playback device; identify at least a portion of the common cryptographic information that is used to access the encrypted portion of the protected frame using the playback device and the DRM information; decrypting the encrypted portion of the protected frame of video using the playback device and the identified portion of the common cryptographic information; and decoding the frame of video using the playback device. ***(Para 0028-0031 of Schnell discloses content server 122 and a ORM system 118 distribute protected media content 120 to various wireless media devices 106).***

The examiner supplies the same rationale for the combination of Amini as modified by Thorwirth further in view of Schnell as in claim 2 which is set forth above.

Regarding claim 20 Amini as modified by Thorwirth further in view of Schnell discloses wherein: each of the alternative streams of protected content is contained within a separate container file; and the top level index file identifies a container file containing each of the alternative streams. ***(Para 0004 of Thorwirth discloses***

sections of files in a container file and para 0009 and 0010 of Thorwirth discloses different media containers for adaptive streaming).

The examiner supplies the same rationale for the combination of Amini as modified by Thorwirth further in view of Schnell as in claim 2 which is set forth above.

11. Claims 9-17 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Amini et al. (US 2004/0202320 A1) hereafter refers as to Amini in view of Thorwirth (WO 2011/103364 A1) and further in view of Schnell (US 2009/0328228 A1) as applied above in claim 4 and further in view of Soroushian et al. (US 2009/0132721 A1) herein after refer as to Soroushian.

Regarding claim 9 Amini as modified by Thorwirth further in view of Schnell discloses all claimed limitations except for wherein the container files are Matroska container files.

However, Soroushian discloses wherein the container files are Matroska container files. ***(see fig, 1c and para 0031, Matroska is MKV, discloses Soroushian is in the field of playback and distribution systems (abstract) and further teaches wherein the content is stored as chunks or elements in a Matroska container (MKV container composed of lists, chunks and/or elements).***

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Invention to use the teachings of Soroushian to incorporate with the teaching of Amini as modified by Thorwirth modified Schnell in order for the purpose of providing a MKV container for distributing high-definition downloadable content on the internet and peer-to-peer networks (Soroushian, para 0003).

Regarding claim 10 Amini as modified by Thorwirth and further modified Soroushian discloses wherein the common cryptographic information is stored in a common DRM Header element contained within a Tracks element within each of the Matroska container files containing the alternative streams of protected content. ***(Para 0052 of Thorwirth discloses the chunks are protected using different watermark payloads, i.e. "alternative streams of protected content")***

Regarding claim 11 Amini as modified by Thorwirth and further modified Soroushian discloses wherein: the common cryptographic information is a set of encryption keys; and the set of encryption keys is encrypted and stored within the DRM Header element. ***(para 0036 0037 of Schnell file header object 218 (DRM header element) has the DRM licenses for the protected media content,; tracks objects 22 which has the track attributes and segment data to identify the content).***

The examiner supplies the same rationale for the combination of Amini as modified by Thorwirth further in view of Schnell and further in view of Soroushian as in claim 9 which is set forth above.

Regarding claim 12 Amini as modified by Thorwirth modified Schnell and further modified Soroushian discloses wherein the client application configures the processor to: obtain cryptographic information that can be used to unencrypt the set of encryption keys stored within the DRM Header element; and unencrypt the set of encryption keys stored within the DRM Header element using the obtained cryptographic information. ***(Para 0036 of Schnell file header object 218 (DRM header element) has the DRM licenses for the protected media content).***

The examiner supplies the same rationale for the combination of Amini as modified by Thorwirth further in view of Schnell and further in view of Soroushian as in claim 9 which is set forth above.

Regarding claim 13 Amini as modified by Thorwirth modified Schnell and further modified Soroushian discloses wherein the client application configures the processor to obtain the DRM Header element by requesting a Tracks element from one of the Matroska container files identified in the top level index file. ***(See para 0004 of Thorwirth, different media containers for adaptive streaming, para 0009 of Thorwirth [background]) and a top level index file identifies a container file containing each of the alternative streams and furthermore para 0009 of Thorwirth top level Index file pointing to a number of alternate streams that contain actual video and audio data,).***

The examiner supplies the same rationale for the combination of Amini as modified by Thorwirth further in view of Schnell and further in view of Soroushian as in claim 9 which is set forth above.

Regarding claim 14 Amini as modified by Thorwirth modified Schnell and further modified Soroushian discloses wherein: each Matroska container file containing an alternative stream of protected content further comprises an index contained within a Cues element ; and the client application configures the processor to request a portion of content from one of the Matroska container files by configuring the processor to: request at least a portion of a Cues element from a Matroska container file containing one of the alternative streams of protected content; identify a portion of the Matroska

container file containing a specific portion of content using at least one CueTrackPosition element within the Cues element; and request the portion of the Matroska container file identified by the at least one CueTrackPosition element.

(Schnell teaches file index 158 for each me and the corresponding segments, para 0031, see fig. 2; and (track objects 222 has the attributes and information included in a track ("Cues element"), para 0036, 0037 see fig. 2 and includes size, type, mode 10, Index, 'Algorithm 10 with index. para 0041 and table under it).

The examiner supplies the same rationale for the combination of Amini as modified by Thorwirth further in view of Schnell and further in view of Soroushian as in claim 9 which is set forth above.

Regarding claim 15 Amini as modified by Thorwirth modified Schnell and further modified Soroushian discloses wherein the index comprises a plurality of CueTrackPosition elements that identify the location of a plurality of Cluster elements within the Matroska container file. ***(See fig. 1c and Para 0031, discloses (Matroska is MKV) and furthermore Para 0037 of Soroushian table with hierarchical index Identifiers with CUEPOS_ID, table above).***

The examiner supplies the same rationale for the combination of Amini as modified by Thorwirth further in view of Schnell and further in view of Soroushian as in claim 9 which is set forth above.

Regarding claim 16 Amini as modified by Thorwirth modified Schnell and further modified Soroushian discloses wherein: each Cluster element contains a plurality of BlockGroup elements including encoded portions of content; a CueTrack Position

element indexes each Cluster element; and each CueTrackPosition element includes the size of the Cluster element that it indexes. **(fig. 2 para 0031 of Schnell file index 158 for each file, and the corresponding segments (segments can be interpreted as track elements or comprising of cluster element and furthermore fig 2 and para 0036, 0037 and para 9041 of Schnell teaches size, type, mode ID. index, Algorithm ID with index).**

The examiner supplies the same rationale for the combination of Amini as modified by Thorwirth further in view of Schnell and further in view of Soroushian as in claim 9 which is set forth above.

Regarding claim 17 Amini as modified by Thorwirth modified Schnell and further modified Soroushian discloses wherein the alternative streams of protected content are alternative streams of protected video **(para 0052 of Thorwirth discloses CDN stores six alternative chunks [video] created for each section with different encoding parameters and two different watermark payloads [alternative streams of protected content]);** each of the Matroska container files containing an alternative stream of protected video includes a DRMInfo element in a BlockGroup element containing a protected frame of video **(para 0052 of Thorwirth discloses the chunks are protected using different watermark payloads),** where the DRMInfo element indicates at least a portion of the protected frames of video that is encrypted and identifies at least a portion of the common cryptographic information used to access the at least one encrypted portion of the protected frame of video **(para 0036 of Schnell file header object 218 i.e. “DRM header Element” has the DRM licenses for the**

protected media content); and the client application configures the processor to access video frames in a stream of protected video using the common cryptographic information by configuring the processor to: obtain a BlockGroup containing a protected frame of video; parse the BlockGroup element to obtain a DRMInfo element indicating at least a portion of the protected frame of video that is encrypted using an encryption key from the set of encryption keys; decrypt the at least one encrypted portion of the protected frame of video using the identified encryption key; and decode the frame of video. ***(figs 4 and 5 of Thorwirth discloses Encryption is a sort of a content protecting method of preventing illegal copy redistribution, editing and the like of contents provided by a content provider (CP) in a manner of transforming data using a specific algorithm)***;

The examiner supplies the same rationale for the combination of Amini as modified by Thorwirth further in view of Schnell and further in view of Soroushian as in claim 9 which is set forth above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ABIY GETACHEW whose telephone number is (571)272-6932. The examiner can normally be reached on Monday to Friday 8Am to 4:30Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kambiz Zand can be reached on (571)272-3811. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2434

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://pair-direct.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). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DANT SHAFER HARRIMAN/
Primary Examiner, Art Unit 2434
04/06/2015

/ABIY GETACHEW/
Examiner, Art Unit 2434

A.G.
April 3, 2015

Notice of References Cited	Application/Control No. 14/564,003		Applicant(s)/Patent Under Reexamination KIEFER ET AL.	
	Examiner ABIY GETACHEW		Art Unit 2434	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2004/0202320 A1	10-2004	Amini et al.	380/036
*	B	US-2009/0328228 A1	12-2009	Schnell, Patrik	726/26
*	C	US-2009/0132721 A1	05-2009	Soroshian et al.	709/231
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	THORWIRTH NIELS et al. August 25, 2011 WO 2011103364 A1
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1449	713/160.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/04/03 16:16
L2	2373	(((((access\$ playS playS1 back playback) with (Common "same" identical\$5) with Key) and((access\$ playS playS1 back playback) with (common "same" identical\$5) with key) and ((access\$ playS1 back playback) with (common "same" identical\$5) with key).ab.))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/04/03 16:18
L4	1	713/160.ccls. and (((access\$ playS playS1 back playback) with (Common "same" identical\$5) with Key) and((access\$ playS playS1 back playback) with (common "same" identical\$5) with key) and ((access\$ playS1 back playback) with (common "same" identical\$5) with key).ab.))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/04/03 16:18
L5	183	2 AND ((H04W12/04 OR H04W12/02 OR H04W12/06 OR H04W36/0011 OR H04W80/02 OR H04W76/02 OR H04W84/12 OR H04W88/08 OR H04W12/00 OR H04W12/08 OR H04W76/023 OR H04W92/10 OR H04W36/0022 OR H04W36/08 OR H04W36/14 OR H04W36/28 OR H04W72/02 OR H04W74/004 OR H04W84/18 OR H04W8/26 OR B29L2031/466).CPC.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/04/03 16:20
L6	9194	(H04N21/64715 OR H04L9/32 OR H04L2209/603).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/04/03 16:22
L7	26	L2 and (H04N21/64715 OR H04L9/32 OR H04L2209/603).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/04/03 16:23
S1	2	(13/340623).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	2015/04/02 17:35

			JPO; DERWENT; IBM_TDB			
S2	6	"47754059".FMI D.	US-PGPUB; USPAT; FPRS	OR	OFF	2015/04/02 17:36
S3	0	(14/564003).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/04/03 10:01
S4	2	(13/340623).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/04/03 10:46
S5	2	(13/340623).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/04/03 14:43
S6	5	("8909922").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/04/03 14:44

EAST Search History (Interference)

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BIB DATA SHEET

CONFIRMATION NO. 5114

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.	
14/564,003	12/08/2014	713	2434	D1-02359A.CON	
RULE					
APPLICANTS Sonic IP, Inc., San Diego, CA, Assignee (with 37 CFR 1.172 Interest); INVENTORS Michael George Kiefer, Lake Havasu City, AZ; Eric William Grab, San Diego, CA; Jason Branness, San Diego, CA; ** CONTINUING DATA ***** This application is a CON of 13/340,623 12/29/2011 PAT 8909922 which claims benefit of 61/530,305 09/01/2011 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 02/10/2015					
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and Acknowledged <u>/ABIY GETACHEW/</u> Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY AZ	SHEETS DRAWINGS 19	TOTAL CLAIMS 20	INDEPENDENT CLAIMS 2
ADDRESS KPPB LLP 2400 EAST KATELLA AVENUE SUITE 1050 ANAHEIM, CA 92806 UNITED STATES					
TITLE Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information					
FILING FEE RECEIVED 1600	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

<i>Index of Claims</i> 	Application/Control No. 14564003	Applicant(s)/Patent Under Reexamination KIEFER ET AL.
	Examiner ABIY GETACHEW	Art Unit 2434

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

☐ Claims renumbered in the same order as presented by applicant		☐ CPA		☐ T.D.		☐ R.1.47			
CLAIM		DATE							
Final	Original	04/03/2015							
	1	✓							
	2	✓							
	3	✓							
	4	✓							
	5	✓							
	6	✓							
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	18	✓							
	19	✓							
	20	✓							

Search Notes 	Application/Control No. 14564003	Applicant(s)/Patent Under Reexamination KIEFER ET AL.
	Examiner ABIY GETACHEW	Art Unit 2434

CPC- SEARCHED		
Symbol	Date	Examiner
H04N 21/64715OR H04L 9/32 OR H04L 2209/603HH	04/03/2015	A.G.

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
713	160	04/03/2015	A.G.

SEARCH NOTES		
Search Notes	Date	Examiner
Class/subclass, Text search and NPL search.	04/03/2015	A.G.

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number
14/564,003

APPLICATION AS FILED - PART I

(Column 1)		(Column 2)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	280
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	600
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720
TOTAL CLAIMS (37 CFR 1.16(j))	20	minus 20 = *			OR	x 80 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2	minus 3 = *				x 420 =	0.00
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).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
			TOTAL			TOTAL	1600

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY		
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
		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))								OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY		
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
		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))								OR		
	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.



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/564,003	12/08/2014	Michael George Kiefer	D1-02359A.CON

CONFIRMATION NO. 5114

71897
KPPB LLP
2400 EAST KATELLA AVENUE
SUITE 1050
ANAHEIM, CA 92806

NOTICE



Date Mailed: 02/11/2015

INFORMATIONAL NOTICE TO APPLICANT

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

A new inventor's oath or declaration that identifies this application (e.g., by Application Number and filing date) is required. The inventor's oath or declaration does not comply with 37 CFR 1.63 in that it:

- does not state that the above-identified application was made or authorized to be made by the person executing the oath or declaration.

Michael George Kiefer
Eric William Grab
Jason Braness



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
14/564,003	12/08/2014	2431	1600	D1-02359A.CON	20	2

CONFIRMATION NO. 5114

71897
KPPB LLP
2400 EAST KATELLA AVENUE
SUITE 1050
ANAHEIM, CA 92806

FILING RECEIPT



Date Mailed: 02/11/2015

Receipt is acknowledged of this non-provisional 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 APPLICANT, 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 Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections 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**

Inventor(s)

Michael George Kiefer, Lake Havasu City, AZ;
Eric William Grab, San Diego, CA;
Jason Braness, San Diego, CA;

Applicant(s)

Sonic IP, Inc., San Diego, CA

Assignment For Published Patent Application

Sonic IP, Inc.

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 13/340,623 12/29/2011 PAT 8909922
which claims benefit of 61/530,305 09/01/2011

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.

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If Required, Foreign Filing License Granted: 02/10/2015

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/564,003**

Projected Publication Date: 05/21/2015

Non-Publication Request: No

Early Publication Request: No

Title

Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using
Common Cryptographic Information

Preliminary Class

713

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

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DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION

PATENT

Docket No. : D1:02359A

As a below named inventor, I hereby declare that:

My residence, mailing address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled SYSTEMS AND METHODS FOR PLAYING BACK ALTERNATIVE STREAMS OF PROTECTED CONTENT PROTECTED USING COMMON CRYPTOGRAPHIC INFORMATION, the specification of which is attached hereto unless the following is checked:

X was filed on December 29, 2011 as United States Application Number or PCT International Application Number 13/340623 and was amended on ____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of the foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States of America, listed below and have also identified below, any foreign application for patent or inventor's certificate, or any PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

<u>Application Number</u>	<u>Country</u>	<u>Filing Date (day/month/year)</u>	<u>Priority Claimed</u>
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I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below.

<u>Application Number</u>	<u>Filing Date</u>
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61/530305	September 1, 2011
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I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

<u>Application Number</u>	<u>Filing Date</u>	<u>Patented/Pending/Abandoned</u>
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**DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION**

Docket No.: 01:02359A

POWER OF ATTORNEY: I hereby appoint the practitioners associated with the law firm of Kauth, Pomeroy, Peck & Bailey LLP,

CUSTOMER NUMBER 71897

to prosecute this application and any U.S. continuation or divisional application based on it, and to prosecute any international application under the Patent Cooperation Treaty based on it, and to transact all business in the U.S. Patent and Trademark Office connected with either of them in accordance with instructions from the assigner of the entire interest in this application; or from the first or sole inventor named below in the event the application is not assigned; or from ____ in the event the power granted herein is for an application filed on behalf of a foreign attorney or agent.

The authority under this Power of Attorney of each person associated with the law firm of Kauth, Pomeroy, Peck & Bailey LLP, Customer Number 71897, shall automatically terminate and be revoked upon such person ceasing to be a member or associate of or of counsel to that law firm.

DIRECT ALL CORRESPONDENCE TO: CUSTOMER NUMBER 71897

DIRECT TELEPHONE CALLS TO: David J. Bailey, 949.852.0000

KAUTH, POMEROY, PECK & BAILEY LLP

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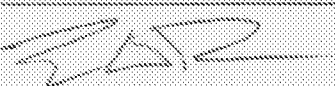
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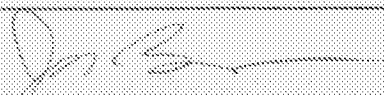
I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment,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

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DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION

Docket No.: D1:02359A

NAME OF SECOND INVENTOR			
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**SYSTEMS AND METHODS FOR PLAYING BACK ALTERNATIVE STREAMS OF PROTECTED
CONTENT PROTECTED USING COMMON CRYPTOGRAPHIC INFORMATION**

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The current application is a continuation of U.S. Patent Application Serial No. 13/340,623 entitled "Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information" to Kiefer et al., filed December 29, 2011, which claims priority under 35 U.S.C. § 119(e) to U.S. Provisional Application Serial No. 61/530,305 filed September 1, 2011, entitled "Multi-Asset Protected Content Multimedia Delivery System". The disclosures of Application Serial Nos. 13/340,623 and 61/530,305 are hereby incorporated by reference in their entirety.

FIELD OF THE INVENTION

[0002] The present invention generally relates to adaptive streaming and more specifically to adaptive bitrate streaming of encoded media contained within Matroska container files using Hypertext Transfer Protocol.

BACKGROUND

[0003] The term streaming media describes the playback of media on a playback device, where the media is stored on a server and continuously sent to the playback device over a network during playback. Typically, the playback device stores a sufficient quantity of media in a buffer at any given time during playback to prevent disruption of playback due to the playback device completing playback of all the buffered media prior to receipt of the next portion of media. In many instances, content is divided into multiple streams. For example, content can be divided into audio, video, and subtitle streams and some streams can be encoded as alternative streams that are suitable for different network connection bandwidths or comply with specific geographic restrictions and/or other restrictions.

[0004] Adaptive bit rate streaming or adaptive streaming involves detecting the present streaming conditions (e.g. the user's network bandwidth and CPU capacity) in real time and adjusting the quality of the streamed media accordingly by selecting between different streams encoded for use at different network connection data rates. Typically, the source media is encoded at multiple bitrates and the playback device or client switches between streaming the different encodings depending on available resources.

[0005] Adaptive streaming solutions typically utilize either Hypertext Transfer Protocol (HTTP), published by the Internet Engineering Task Force and the World Wide Web Consortium as RFC 2616 to stream media between a server and a playback device. HTTP is a stateless protocol that enables a playback device to request a byte range within a file. HTTP is described as stateless, because the server is not required to record information concerning the state of the playback device requesting information or the byte ranges requested by the playback device in order to respond to requests received from the playback device.

[0006] In adaptive streaming systems, the source media is typically stored on a media server as a top level index file pointing to a number of alternate streams that contain the actual video and audio data. Each stream is typically stored in one or more container files. Different adaptive streaming solutions typically utilize different index and media containers. The Synchronized Multimedia Integration Language (SMIL) developed by the World Wide Web Consortium is utilized to create indexes in several adaptive streaming solutions including IIS Smooth Streaming developed by Microsoft Corporation of Redmond, Washington, and Flash Dynamic Streaming developed by Adobe Systems Incorporated of San Jose, California. HTTP Adaptive Bitrate Streaming developed by Apple Computer Incorporated of Cupertino, California implements index files using an extended M3U playlist file (.M3U8), which is a text file containing a list of URIs that typically identify a media container file. The most commonly used media container formats are the MP4 container format specified in MPEG-4 Part 14 (i.e. ISO/IEC 14496-14) and the MPEG transport stream (TS) container specified in MPEG-2 Part 1 (i.e. ISO/IEC Standard 13818-1). The MP4 container format is utilized in IIS

Smooth Streaming and Flash Dynamic Streaming. The TS container is used in HTTP Adaptive Bitrate Streaming.

[0007] The Matroska container is a media container developed as an open standard project by the Matroska non-profit organization of Aussonne, France. The Matroska container is based upon Extensible Binary Meta Language (EBML), which is a binary derivative of the Extensible Markup Language (XML). Decoding of the Matroska container is supported by many consumer electronics (CE) devices. The DivX Plus file format developed by DivX, LLC of San Diego, California utilizes an extension of the Matroska container format (i.e. is based upon the Matroska container format, but includes elements that are not specified within the Matroska format).

[0008] The term Digital Rights Management (DRM) is utilized to describe access control technologies that are used to control access to and/or copying of digital content. DRM systems typically involve the use of cryptographic information to control access to or protect a piece of content. Content protection is typically achieved using cryptographic information such as (but not limited to) one or more encryption keys to encrypt some or all of the content. An important component of most DRM systems is a mechanism for securely providing cryptographic information to authorized playback devices for use in accessing protected content. The protected content cannot be accessed without the cryptographic data and ideally the cryptographic data is bound to specific playback devices and cannot be readily used by unauthorized playback devices or is securely provided to the playback devices (often on a session basis).

SUMMARY OF THE INVENTION

[0009] Systems and methods in accordance with embodiments of the invention perform adaptive bitrate streaming using alternative streams of protected content. One embodiment of the invention includes a processor, and memory containing a client application. In addition, the client application configures the processor to: request a top level index file identifying a plurality of alternative streams of protected content, where each of the alternative streams of protected content are encrypted using common cryptographic information; obtain the common cryptographic information; request

portions of content from at least the plurality of alternative streams of protected content; access the protected content using the common cryptographic information; and playback the content.

[0010] In a further embodiment, the alternative streams of protected content are alternative streams of protected video, each of the alternative streams of protected video includes DRM information indicating portions of frames of video that are encrypted and identifying at least a portion of the common cryptographic information used to access the encrypted portions of the frames of video, and the client application configures the processor to: obtain a protected frame of video from one of the alternative streams of protected video; obtain DRM information indicating a portion of the protected frame of video that is encrypted; identify at least a portion of the common cryptographic information that is used to access the encrypted portion of the protected frame using the DRM information; decrypt the encrypted portion of the protected frame of video using the identified portion of the common cryptographic information; and decode the frame of video.

[0011] In another embodiment, each of the alternative streams of protected content is contained within a separate container file, and the top level index file identifies a container file containing each of the alternative streams.

[0012] In still further embodiment, the container files containing each of the alternative streams of protected content includes at least one header including the common cryptographic information and information that describes the encoding of the stream of protected content, and the top level index file identifies the location of the at least one header within each container file.

[0013] In still another embodiment, the common cryptographic information is a set of encryption keys.

[0014] In a yet further embodiment, the common set of encryption keys is encrypted; and the client application configures the processor to securely receive cryptographic information used to unencrypt the common set of encryption keys.

[0015] In yet another embodiment, the client application configures the processor to obtain the common cryptographic information by requesting at least one header of a container file identified in the top level index file.

[0016] In a further embodiment again, each container file containing one of the alternative streams of protected content further includes an index, and the client application configures the processor to request a portion of content from one of the container files by configuring the processor to: request at least a portion of an index from the container file; identify the portion of the container file containing a specific portion of content using the index; and request the identified portion of the container file.

[0017] In another embodiment again, the container files are Matroska container files.

[0018] In a further additional embodiment, the common cryptographic information is stored in a common DRM Header element contained within a Tracks element within each of the Matroska container files containing the alternative streams of protected content.

[0019] In another additional embodiment, the common cryptographic information is a set of encryption keys; and the set of encryption keys is encrypted and stored within the DRM Header element.

[0020] In a still yet further embodiment, the client application configures the processor to: obtain cryptographic information that can be used to unencrypt the set of encryption keys stored within the DRM Header element; and unencrypt the set of encryption keys stored within the DRM Header element using the obtained cryptographic information.

[0021] In still yet another embodiment, the client application configures the processor to obtain the DRM Header element by requesting a Tracks element from one of the Matroska container files identified in the top level index file.

[0022] In a still further embodiment again, each Mastroska container file containing an alternative stream of protected content further includes an index contained within a Cues element, and the client application configures the processor to request a portion of content from one of the Matroska container files by configuring the processor to: request at least a portion of a Cues element from a Matroska container file containing one of the

alternative streams of protected content; identify a portion of the Matroska container file containing a specific portion of content using at least one CueTrackPosition element within the Cues element; and request the portion of the Matroska container file identified by the at least one CueTrackPosition element.

[0023] In still another embodiment again, the index includes a plurality of CueTrackPosition elements that identify the location of a plurality of Cluster elements within the Matroska container file.

[0024] In a still further additional embodiment, each Cluster element contains a plurality of BlockGroup elements including encoded portions of content, a CueTrackPosition element indexes each Cluster element, and each CueTrackPosition element includes the size of the Cluster element that it indexes.

[0025] In still another additional embodiment, the alternative streams of protected content are alternative streams of protected video, each of the Matroska container files containing an alternative stream of protected video includes a DRMInfo element in a BlockGroup element containing a protected frame of video, where the DRMInfo element indicates at least a portion of the protected frames of video that is encrypted and identifies at least a portion of the common cryptographic information used to access the at least one encrypted portion of the protected frame of video, and the client application configures the processor to access video frames in a stream of protected video using the common cryptographic information by configuring the processor to: obtain a BlockGroup containing a protected frame of video; parse the BlockGroup element to obtain a DRMInfo element indicating at least a portion of the protected frame of video that is encrypted using an encryption key from the set of encryption keys; decrypt the at least one encrypted portion of the protected frame of video using the identified encryption key; and decode the frame of video.

[0026] An embodiment of the method of the invention includes requesting a top level index file identifying a plurality of alternative streams of protected content using a playback device, where each of the alternative streams of protected content are encrypted using common cryptographic information, obtaining the common cryptographic information using the playback device, requesting portions of content from

at least the plurality of alternative streams of protected content using the playback device, accessing the protected content using the playback device and the common cryptographic information, and playing back the content using the playback device.

[0027] In a further embodiment of the method of the invention, the alternative streams of protected content are alternative streams of protected video, each of the alternative streams of protected video includes DRM information indicating portions of frames of video that are encrypted and identifying at least a portion of the common cryptographic information used to access the encrypted portions of the frames of video, and the method further includes obtaining a protected frame of video from one of the alternative streams of protected video using the playback device, obtaining DRM information indicating a portion of the protected frame of video that is encrypted using the playback device, identify at least a portion of the common cryptographic information that is used to access the encrypted portion of the protected frame using the playback device and the DRM information, decrypting the encrypted portion of the protected frame of video using the playback device and the identified portion of the common cryptographic information, and decoding the frame of video using the playback device.

[0028] In another embodiment of the method of the invention, each of the alternative streams of protected content is contained within a separate container file, and the top level index file identifies a container file containing each of the alternative streams.

[0029] In a still further embodiment of the method of the invention, the container files containing each of the alternative streams of protected content include at least one header including the common cryptographic information and information that describes the encoding of the stream of protected content, and the top level index file identifies the location of the at least one header within each container file.

[0030] In still another embodiment of the method of the invention, the common cryptographic information is a set of encryption keys.

[0031] In a yet further embodiment of the method of the invention, the set of encryption keys is encrypted so that it is accessible using cryptographic information obtained by the playback device, and the method further comprising obtaining cryptographic information using the playback device.

[0032] In yet another embodiment of the method of the invention, the set of encryption keys is encrypted using at least one encryption key, and the playback device securely obtains the at least one encryption key.

[0033] In a further embodiment again of the method of the invention, the at least one encryption key is encrypted using at least one encryption key included in the cryptographic information bound to the playback device.

[0034] Another embodiment again of the method of the invention also includes obtaining the common cryptographic information by requesting at least one header of a container file identified in the top level index file using the playback device.

[0035] In a further additional embodiment of the method of the invention, each container file containing one of the alternative streams of protected content further includes an index, and the method further includes: requesting at least a portion of an index from the container file using the playback device; identify the portion of the container file containing a specific portion of content using the playback device and the index; and requesting the identified portion of the container file using the playback device.

[0036] In another additional embodiment of the method of the invention, the container files are Matroska container files.

[0037] In a still yet further embodiment of the method of the invention, the common cryptographic information is stored in a common DRM Header element contained within a Tracks element within each of the Matroska container files containing the alternative streams of protected content.

[0038] In still yet another embodiment of the method of the invention, the common cryptographic information is a set of encryption keys, and the set of encryption keys is encrypted and stored within the DRM Header element.

[0039] In a still further embodiment again of the method of the invention, the set of encryption keys is encrypted so that it is accessible using cryptographic information obtained by the playback device, and the method further comprising obtaining cryptographic information using the playback device.

[0040] Still another embodiment again of the method of the invention also includes obtaining the DRM Header element by requesting a Tracks element from one of the Matroska container files identified in the top level index file.

[0041] In a still further additional embodiment of the method of the invention, each Matroska container file containing an alternative stream of protected content further includes an index contained within a Cues element, and the method further includes: requesting at least a portion of a Cues element from a Matroska container file containing one of the alternative streams of protected content using the playback device; identifying a portion of the Matroska container file containing a specific portion of content using the playback device and at least one CueTrackPosition element within the Cues element; and requesting the portion of the Matroska container file identified by the at least one CueTrackPosition element.

[0042] In still another additional embodiment of the method of the invention, the index includes a plurality of CueTrackPosition elements that identify the location of a plurality of Cluster elements within the Matroska container file.

[0043] In a yet further embodiment again of the method of the invention, each Cluster element contains a plurality of BlockGroup elements including encoded portions of content, a CueTrack Position element indexes each Cluster element, and each CueTrackPosition element includes the size of the Cluster element that it indexes.

[0044] In yet another embodiment again of the method of the invention, the alternative streams of protected content are alternative streams of protected video, each of the Matroska container files containing an alternative stream of protected video includes a DRMInfo element in a BlockGroup element containing a protected frame of video, where the DRMInfo element indicates at least a portion of the protected frames of video that is encrypted and identifies at least a portion of the common cryptographic information used to access the at least one encrypted portion of the protected frame of video, and the method further includes: obtaining a BlockGroup containing a protected frame of video using the playback device; parsing the BlockGroup element to obtain a DRMInfo element indicating at least a portion of the protected frame of video that is encrypted using the playback device and an encryption key from the set of encryption

keys; decrypting the at least one encrypted portion of the protected frame of video using the playback device and the identified encryption key; and decoding the frame of video using the playback device.

[0045] Another further embodiment includes a machine readable medium containing processor instructions, where execution of the instructions by a processor causes the processor to perform a process including request a top level index file identifying a plurality of alternative streams of protected content, where each of the alternative streams of protected content are encrypted using common cryptographic information, obtaining the common cryptographic information, requesting portions of content from at least the plurality of alternative streams of protected content, accessing the protected content using the common cryptographic information, and playing back the content.

[0046] In still another further embodiment, the alternative streams of protected content are alternative streams of protected video, each of the alternative streams of protected video includes DRM information indicating portions of frames of video that are encrypted and identifying at least a portion of the common cryptographic information used to access the encrypted portions of the frames of video, and execution of the instructions by a processor also causes the processor to perform a process including: obtaining a protected frame of video from one of the alternative streams of protected video; obtaining DRM information indicating a portion of the protected frame of video that is encrypted; identify at least a portion of the common cryptographic information that is used to access the encrypted portion of the protected frame using the DRM information; decrypting the encrypted portion of the protected frame of video using and the identified portion of the common cryptographic information; and decoding the frame of video.

[0047] In yet another further embodiment, the machine readable medium is non-volatile memory.

BRIEF DESCRIPTION OF THE DRAWINGS

[0048] FIG. 1A is a network diagram of an adaptive bitrate streaming system in accordance with an embodiment of the invention.

[0049] FIG. 1B is a block diagram illustrating a source encoder in accordance with an embodiment of the invention.

[0050] FIG. 1C is a block diagram illustrating a content distribution server in accordance with an embodiment of the invention.

[0051] FIG. 1D is a block diagram illustrating a playback device in accordance with an embodiment of the invention.

[0052] FIG. 2 conceptually illustrates a top level index file and Matroska container files generated by the encoding of source media in accordance with embodiments of the invention.

[0053] FIG. 3 conceptually illustrates a specialized Matroska container file incorporating a TracksData Payload containing cryptographic information in accordance with an embodiment of the invention.

[0054] FIGS. 4a – 4c conceptually illustrate the insertion of different types of protected media into the Clusters element of a Matroska container file subject to various constraints that facilitate adaptive bitrate streaming in accordance with embodiments of the invention.

[0055] FIG. 4d conceptually illustrates the multiplexing of different types of protected media into the Clusters element of a Matroska container file subject to various constraints that facilitate adaptive bitrate streaming in accordance with an embodiment of the invention.

[0056] FIG. 4e conceptually illustrates the inclusion of a protected trick play track into the Clusters element of a Matroska container file subject to various constraints that facilitate adaptive bitrate streaming in accordance with an embodiment of the invention.

[0057] FIG. 5 conceptually illustrates a modified Cues element of a specialized Matroska container file, where the Cues element includes information enabling the retrieval of Cluster elements using HTTP byte range requests in accordance with an embodiment of the invention.

[0058] FIG. 5a conceptually illustrates a modified Cues element of a specialized Matroska container file in accordance with an embodiment of the invention, where the Cues element is similar to the Cues element shown in FIG. 5 with the exception that attributes that are not utilized during adaptive bitrate streaming are removed.

[0059] FIG. 6 conceptually illustrates the indexing of Cluster elements within a specialized Matroska container file utilizing modified CuePoint elements within the container file in accordance with embodiments of the invention.

[0060] FIG. 7 conceptually illustrates the use of a hierarchical index to index CuePoint elements within a Matroska container file in accordance with embodiments of the invention.

[0061] FIG. 8 is a flow chart illustrating a process for encoding and protecting source media for adaptive bitrate streaming in accordance with an embodiment of the invention.

[0062] FIG. 9 is a flow chart illustrating a process for encoding and encrypting frames of source video in accordance with an embodiment of the invention.

[0063] FIG. 10 conceptually illustrates a DRM header element that can be included in a Matroska container file in accordance with an embodiment of the invention.

[0064] FIG. 11 conceptually illustrates communication between a playback device and an HTTP server associated with the commencement of streaming of encoded media contained within Matroska container files indexed by a top level index file in accordance with an embodiment of the invention.

[0065] FIGS. 12a and 12b conceptually illustrate communication between a playback device and an HTTP server associated with switching between streams in response to the streaming conditions experienced by the playback device prior to the decision to switch streams in accordance with embodiments of the invention.

DETAILED DISCLOSURE OF THE INVENTION

[0066] Turning now to the drawings, systems and methods for performing adaptive bitrate streaming using alternative streams of protected content in accordance with embodiments of the invention are illustrated. In a number of embodiments, source

media is encoded as a number of alternative streams and the alternative streams are protected using a common set of cryptographic information. In many embodiments, the alternative streams are video streams and each stream is protected by encrypting at least a portion of a plurality of video frames within the stream using the common set of cryptographic information. In several embodiments, the common set of cryptographic information is a set of frame keys. In order to protect a video frame, a frame key can be selected from the set of frame keys and used to encrypt at least a portion of the encoded frame and DRM information can be provided with the protected frame indicating the frame key utilized to perform the encryption and the location of the encrypted portion within the frame. By encrypting each of the alternative streams using the same set of cryptographic information, a playback device can switch between streams without the need to maintain or acquire multiple sets of cryptographic information in memory or to reinitialize the decryption engine of the playback device with a different set of cryptographic information.

[0067] In many embodiments, each of the alternative streams is stored in a separate container file referenced by a top level index file. In several embodiments, the common cryptographic information is embedded in each of the container files so that a playback device has access to the cryptographic information irrespective of which alternative is initially select to commence playback of the media. The common cryptographic information can be stored on a content distribution system and associated with a title identifier or title ID that uniquely identifies the source content used to create the alternative streams. When a new alternative stream is generated, a source encoder can utilize the title ID to request the common cryptographic information from the content distribution system and the common cryptographic information can be utilized to encrypt the new alternative stream and embedded in a container file created to contain the new encrypted alternative stream.

[0068] In several embodiments, each stream associated with a piece of source content and/or title ID is stored in a Matroska (MKV) container file. In many embodiments, the Matroska container file is a specialized Matroska container file in that the manner in which the media in each stream is encoded and stored within the

container is constrained to improve streaming performance. In several embodiments, the Matroska container file is further specialized in that additional DRM elements (i.e. elements that are not specified as part of the Matroska container format) can be included within the file to facilitate the distribution of protected media during adaptive bitrate streaming. In a number of embodiments, common cryptographic information is included within a DRM header element in each of the Matroska container files and references to the common cryptographic information are made using DRMInfo elements within a BlockGroup element corresponding to a specific frame of encrypted video. In other embodiments, any of a variety of mechanisms can be utilized to store DRM information within a Matroska container in accordance with embodiments of the invention. In several embodiments, each stream (i.e. audio, video, or subtitle) is stored within a separate Matroska container file. In other embodiments, an encoded video stream is multiplexed with one or more encoded audio, and/or subtitle streams in each Matroska container file.

[0069] A top level index file containing an index to the streams contained within each of the container files is also generated to enable adaptive bitrate streaming of the encoded media. In many embodiments, the top level index file is a Synchronized Multimedia Integration Language (SMIL) file containing URIs for each of the Matroska container files. In other embodiments, any of a variety of file formats can be utilized in the generation of the top level index file.

[0070] The performance of an adaptive bitrate streaming system in accordance with embodiments of the invention can be significantly enhanced by encoding each portion of the source video at each bit rate in such a way that the portion of video is encoded in each stream as a single (or at least one) closed group of pictures (GOP) starting with an Instantaneous Decoder Refresh (IDR) frame. The GOP for each stream can then be stored as a Cluster element within the Matroska container file for the stream. In this way, the playback device can switch between streams at the completion of the playback of a Cluster and, irrespective of the stream from which a Cluster is obtained the first frame in the Cluster will be an IDR frame and can be decoded without reference to any encoded media other than the encoded media contained within the

Cluster element. In many embodiments, the sections of the source video that are encoded as GOPs are all the same duration. In a number of embodiments each two second sequence of the source video is encoded as a GOP.

[0071] Adaptive streaming of source media encoded in the manner outlined above can be coordinated by a playback device in accordance with embodiments of the invention. The playback device obtains information concerning each of the available streams from the top level index file and selects one or more streams to utilize in the playback of the media. The playback device can then obtain header information from the Matroska container files containing the one or more bitstreams or streams, and the headers provide information concerning the decoding of the streams including a DRM header, which contains the cryptographic information utilized to protect the stream. The playback device can also request index information that indexes the encoded media stored within the relevant Matroska container files. The index information can be stored within the Matroska container files or separately from the Matroska container files in the top level index or in separate index files. The index information enables the playback device to request byte ranges corresponding to Cluster elements within the Matroska container file containing specific portions of encoded media via HTTP from the server. As the playback device receives the Cluster elements from the HTTP server, the playback device can evaluate current streaming conditions to determine whether to increase or decrease the bitrate of the streamed media. In the event that the playback device determines that a change in bitrate is necessary, the playback device can obtain header information and index information for the container file(s) containing the desired stream(s) (assuming the playback device has not already obtained this information). The playback device need not perform the computationally intensive process of accessing the encrypted cryptographic information in the header of the new stream, because each of the alternative streams uses common cryptographic information. The index information can then be used to identify the byte range of the Cluster element containing the next portion of the source media encoded at the desired bit rate and the identified Cluster element can be retrieved from the server via HTTP. The next portion of the source media that is requested is typically identified based upon the Cluster

elements already requested by the playback device and the Cluster elements buffered by the playback device. The next portion of source media requested from the alternative stream is requested to minimize the likelihood that the buffer of the playback device will underflow (i.e. run out media to playback) prior to receipt of the Cluster element containing the next portion of source media by the playback device. In this way, the playback device can achieve adaptive bitrate streaming by retrieving sequential Cluster elements from the various streams as appropriate to the streaming conditions using the top level index and index information describing the Cluster elements within each of the Matroska container files.

[0072] In a number of embodiments, variation in the bitrate between different streams can be achieved by modifying the encoding parameters for each stream including but not limited to the bitrate, frame rate, resolution and sample aspect ratio. The encoding and protection of source video using common cryptographic information for use in adaptive bitrate streaming and the playback of alternative streams of protected content via adaptive bitrate streaming in accordance with embodiments of the invention is discussed further below.

ADAPTIVE STREAMING SYSTEM ARCHITECTURE

[0073] An adaptive bitrate streaming system in accordance with an embodiment of the invention is illustrated in FIG. 1. The adaptive streaming system 10 includes a source encoder 12 configured to encode source media as a number of alternative streams and to protect the encoded streams using common cryptographic information. Alternative streams are streams that encode the same media content in different ways. In several embodiments, the source encoder 12 ingests source content and obtains a title ID and common cryptographic information from a content distribution server 14 that the content distribution server assigns to the source content. The source encoder encodes the alternative streams and protects the streams using the common cryptographic information received from the content distribution server. In many instances, alternative streams encode media content (such as but not limited to video) at different maximum bitrates. In a number of embodiments, the alternative streams are

encoded with different resolutions, sample aspect ratios and/or frame rates. When the streams are written to file(s), the common cryptographic information is also written to the file(s). The content distribution server 14 can receive request to access the alternative streams of content (i.e. the title) via the Internet from a playback device such as (but not limited to) a user computer 18 or a mobile phone 20 and can commence streaming content. In several embodiments, the common cryptographic information is protected by encrypting at least a portion of the common cryptographic information using at least one encryption key. The playback device can securely obtain the cryptographic key using a process such as (but not limited to) Hypertext Transfer Protocol Secure or HTTPS. Other processes for securely obtaining cryptographic information to obtain access to encrypted common cryptographic information in accordance with embodiments of the invention are discussed below.

[0074] In many embodiments, a playback device commences playback by requesting a top level index file from the content distribution server. The source encoder 12, the content distribution server 14, or another server can generate the top level index to the file(s) containing the streams, at least a plurality of which are alternative streams, at the time the request is made or at the time the streams are generated by the source encoder. The playback device can then use HTTP or another appropriate stateless protocol to request portions of the top level index file and the file(s) containing the protected streams via a network 16 such as the Internet.

[0075] In many embodiments, the top level index file is a SMIL file and the media is stored in Matroska container files. As is discussed further below, the media can be stored within the Matroska container file in a way that facilitates the protection of the content using common cryptographic information. In many embodiments, the Matroska container files are specialized Matroska container files that include enhancements (i.e. elements that do not form part of the Matroska file format specification) that facilitate retrieval and decryption using common cryptographic information of specific portions of media during adaptive bitrate streaming.

[0076] Although a specific content distribution system configured to support adaptive bitrate streaming is illustrated in FIG. 1A, any of a variety of content distribution system architectures can be utilized to implement an adaptive bitrate streaming system in accordance with embodiments of the invention. Source encoders, content distribution server systems, and playback devices in accordance with embodiments of the invention are discussed further below.

SOURCE ENCODERS

[0077] In many embodiments, a source encoder can be implemented using a server. In other embodiments, the source encoder can be any processing device including a processor and sufficient resources to perform the transcoding and encryption of source media (including but not limited to video, audio, and/or subtitles). A source encoder in accordance with an embodiment of the invention is illustrated in FIG. 1B. The source encoder 12 is implemented on a computing platform including a processor 12a, volatile memory 12b and non-volatile storage 12c. An encoder application 12d is stored in non-volatile storage 12c. The encoder application includes the machine readable instructions that configure the processor to encode source content 12e as a plurality of streams. In a number of embodiments, the encoder application also configures the source encoder to obtain common cryptographic information 12g that can be utilized to protect alternative streams generated using the source content 12e. In many embodiments, the source encoder obtains the common cryptographic information and a title ID from a content distribution system. In other embodiments, the source encoder generates a title ID and/or cryptographic data and provides the generated information to a content distribution system.

[0078] Although a specific source encoder in accordance with embodiments of the invention is illustrated in FIG. 1B, any of a variety of computing platforms can be utilized to implement a source encoder that is configured to encode at least one stream of source content as a plurality of alternative streams and to protect each of the alternative streams using common cryptographic information in accordance with embodiments of the invention.

CONTENT DISTRIBUTION SERVERS

[0079] Content distribution servers in accordance with embodiments of the invention can be responsible for storing protected streams of content for streaming to playback devices using adaptive bitrate streaming processes. Content distribution servers can also store common cryptographic information utilized to protect the alternative streams of protected content. In several embodiments, the common cryptographic information is identified utilizing a title ID associated with the common cryptographic information and a set of streams that form part of a specific title or piece of content. A content distribution server in accordance with an embodiment of the invention is illustrated in FIG. 1C. The content distribution server is implemented using a computing platform including a processor 14a, volatile memory 14b, and non-volatile storage 14c. In the illustrated embodiment, a plurality of container files 14d are stored on the content distribution server. Playback devices can stream content from the content distribution server utilizing adaptive bitrate streaming processes in accordance with embodiments of the invention. To facilitate the creation of new streams with respect to a specific piece of content, the content distribution server also stores title IDs 14e for specific pieces of content and common cryptographic information 14f associated with each title ID. A source encoder can request common cryptographic information to protect a new stream related to a specific piece of content, by providing a request to the content distribution server that identifies the specific piece of content using the title ID assigned to it.

[0080] Although a specific content distribution server is illustrated in FIG. 1C, any of a variety of computational platform including (but not limited to) platforms in which container files and common cryptographic information are stored on separate servers can be utilized in content distribution systems in accordance with embodiments of the invention.

PLAYBACK DEVICES

[0081] Referring back to FIG. 1A, the illustrated playback devices include personal computers 18 and mobile phones 20. In other embodiments, playback devices can include consumer electronics devices such as DVD players, Blu-ray players, televisions,

set top boxes, video game consoles, tablets, and other devices that are capable of playing back protected media stored on a content distribution server using adaptive bitrate streaming. A playback device in accordance with an embodiment of the invention is illustrated in FIG. 1D. The playback device is implemented on a processing platform 20 including a processor 20a, volatile memory 20b, and non-volatile memory (or other non-volatile storage) 20c. The non-volatile memory 20c contains a client application 20d, which includes machine readable instructions that can be utilized to configure the processor to register with a content distribution system to obtain cryptographic data 20e bound to the playback device. The playback device can then use the bound cryptographic data 20e to request adaptive bitrate streaming of protected content. As is discussed further below, the alternative streams of protected content utilized to perform adaptive bitrate streaming are protected using common cryptographic information. Once the client application 20d has obtained the common cryptographic information, which can be a time consuming and/or computationally intensive process, the playback device can use the same cryptographic information to access content in any of the alternative streams of protected content within a single instance of a title.

[0082] Although a specific architecture for a playback device is shown in FIG. 1D any of a variety of architectures can be utilized that enable playback devices to request portions of the top level index file and the container files in accordance with embodiments of the invention.

FILE STRUCTURE

[0083] Files generated by a source encoder and/or stored on an HTTP server for streaming to playback devices in accordance with embodiments of the invention are illustrated in FIG. 2. The files utilized in the adaptive bitrate streaming of the source media include a top level index 30 and a plurality of container files 32 that each contain at least one stream. The top level index file describes the content of each of the container files. As is discussed further below, the top level index file can take a variety of forms including an SMIL file and the container files can take a variety of forms including a specialized Matroska container file.

[0084] In many embodiments, each Matroska container file contains a single protected stream. For example, the stream could be one of a number of alternate video streams protected using common cryptographic information, an audio stream, one of a number of alternate audio streams, a subtitle stream, one of a number of alternate subtitle streams, a trick play stream, or one of a number of alternate trick play streams protected using common cryptographic information. In several embodiments, the Matroska container file includes multiple multiplexed streams. For example, the Matroska container could include a video stream, and one or more audio streams, one or more subtitle streams, and/or one or more trick play streams. As is discussed further below, in many embodiments the Matroska container files are specialized files. The encoding of the media and the manner in which the media is stored within Cluster elements within the Matroska container file can be subject to constraints designed to enhance the performance of an adaptive bitrate streaming system. In a number of embodiments, common cryptographic information is included within a DRM header element in each of the Matroska container files and references to the common cryptographic information are made using DRMInfo elements included within BlockGroup elements of protected (not all frames need be protected to protect the stream). In addition, the Matroska container file can include index elements that facilitate the location and downloading of Cluster elements from the various Matroska container files during the adaptive streaming of the media. Top level index files and Matroska container files that can be used in adaptive bitrate streaming systems in accordance with embodiments of the invention are discussed below.

TOP LEVEL INDEX FILES

[0085] Playback devices in accordance with many embodiments of the invention utilize a top level index file to identify the container files that contain the streams available to the playback device for use in adaptive bitrate streaming. In many embodiments, the top level index files can include references to container files that each include an alternative stream of encoded media. The playback device can utilize the information in the top level index file to retrieve encoded media from each of the

container files according to the streaming conditions experienced by the playback device.

[0086] In several embodiments, the top level index file provides information enabling the playback device to retrieve information concerning the encoding of the media in each of the container files and an index to encoded media within each of the container files. In a number of embodiments, each container file includes information concerning the encoded media contained within the container file and an index to the encoded media within the container file and the top level index file indicates the portions of each container file containing this information. Therefore, a playback device can retrieve the top level index file and use the top level index file to request the portions of one or more of the container files that include information concerning the encoded media contained within the container file and an index to the encoded media within the container file. A variety of top level index files that can be utilized in adaptive bitrate streaming systems in accordance with embodiments of the invention are discussed further below.

[0087] In a number of embodiments, the top level index file utilized in the adaptive bitrate streaming of media is a SMIL file, which is an XML file that includes a list of URIs describing each of the streams and the container files that contain the streams. The URI can include information such as the "system-bitrate" of the stream contained within the stream and information concerning the location of specific pieces of data within the container file. The top level index SMIL file can be generated when the source media is encoded for playback via adaptive bitrate streaming. Alternatively, the top level index SMIL file can be generated when a playback device requests the commencement of playback of the encoded media. When the playback device receives the top level index SMIL file, the playback device can parse the SMIL file to identify the available streams. The playback device can then select the streams to utilize to playback the content and can use the SMIL file to identify the portions of the container file to download to obtain information concerning the encoding of a specific stream and/or to obtain an index to the encoded media within the container file.

[0088] Although top level index SMIL files are described above, any of a variety of top level index file formats can be utilized to create top level index files as appropriate to a specific application in accordance with an embodiment of the invention. The use of top level index files to enable playback of encoded media using adaptive bitrate streaming in accordance with embodiments of the invention is discussed further below.

STORING PROTECTED MEDIA IN MKV FILES FOR ADAPTIVE BITRATE STREAMING

[0089] A Matroska container file used to store encoded video in accordance with an embodiment of the invention is illustrated in FIG. 3. The container file 32 is an Extensible Binary Markup Language (EBML) file that is an extension of the Matroska container file format. The specialized Matroska container file 32 includes a standard EBML element 34, and a standard Segment element 36 that includes a standard Seek Head element 40, a standard Segment Information element 42, and a standard Tracks element 44 including a tracks data payload that is a non-standard EBML element containing cryptographic information utilized to access the protected stream(s) contained within the Matroska container file. In many embodiments, the cryptographic data takes the form of a DRMHeaders element (discussed below) that includes a set of keys utilized to access encrypted portions of the stream contained within the Matroska container file. In many embodiments, the set of keys is encrypted in such a way that a playback device can only access the set of keys in the clear using a specific piece or set of cryptographic information.

[0090] The Segment element 36 also includes a standard Clusters element 46. As is described below, the manner in which encoded media is inserted within individual Cluster elements 48 within the Clusters element 46 is constrained to improve the playback of the media in an adaptive streaming system. In many embodiments, the constraints imposed upon the encoded video are consistent with the specification of the Matroska container file format and involve encoding the video so that each cluster includes at least one closed GOP commencing with an IDR frame. In addition to the above elements, the Segment element 36 can optionally include a modified version of

the standard Cues element. As is discussed further below, the Cues element includes specialized CuePoint elements (i.e. non-standard CuePoint elements) that facilitate the retrieval of the media contained within specific Cluster elements via HTTP. The Segment element 36 can optionally include a non-standard Hierarchical Index element 54. The Hierarchical Index element is an extension to the Matroska file format proposed by DivX, LLC of San Diego, California. The Hierarchical Index element is described in U.S. Patent Application Serial No. 12/272,631, the disclosure of which is incorporated by reference above in its entirety.

[0091] The constraints imposed upon the encoding of media and the formatting of the encoded media within the Clusters element of a Matroska container file for adaptive bitrate streaming of protected streams and the additional DRM and index information inserted within the container file in accordance with embodiments of the invention are discussed further below.

ENCODING MEDIA FOR INSERTION IN CLUSTER ELEMENTS

[0092] An adaptive bitrate streaming system provides a playback device with the option of selecting between different protected streams of encoded media during playback according to the streaming conditions experienced by the playback device. In many embodiments, switching between protected streams is facilitated by separately pre-encoding discrete portions of the source media in accordance with the encoding parameters of each stream and then including each separately encoded portion in its own Cluster element within the stream's container file. Furthermore, the media contained within each Cluster is encoded so that the media is capable of playback without reference to media contained in any other Cluster within the stream. In this way, each stream includes a Cluster element corresponding to the same discrete portion of the source media and, at any time, the playback device can select the Cluster element from the stream that is most appropriate to the streaming conditions experienced by the playback device and can commence playback of the media contained within the Cluster element. Accordingly, the playback device can select clusters from different streams as the streaming conditions experienced by the playback

device change over time. In several embodiments, the Cluster elements are further constrained so that each Cluster element contains a portion of encoded media from the source media having the same duration. In a number of embodiments, each Cluster element includes two seconds of encoded media. The specific constraints applied to the media encoded within each Cluster element depending upon the type of media (i.e. video, audio, or subtitles) are discussed below.

[0093] A Clusters element of a Matroska container file containing a video stream in accordance with an embodiment of the invention is illustrated in FIG. 4a. The Clusters element 46 includes a plurality of Cluster elements 48 that each contains a discrete portion of encoded video. In the illustrated embodiment, each Cluster element 48 includes two seconds of encoded video. In other embodiments, the Cluster elements include encoded video having a greater or lesser duration than two seconds. In several embodiments, the encoded video sequences in the Cluster elements have different durations.

[0094] Each Cluster element 48 includes a Timecode element 60 indicating the start time of the encoded video within the Cluster element and a plurality of BlockGroup elements. As noted above, the encoded video stored within the Cluster is constrained so that the encoded video can be played back without reference to the encoded video contained within any of the other Cluster elements in the container file. In many embodiments, encoding the video contained within the Cluster element as a GOP in which the first frame is an IDR frame enforces the constraint. In the illustrated embodiment, the first BlockGroup element 62 contains an IDR frame. Therefore, the first BlockGroup element 62 does not include a ReferenceBlock element. The first BlockGroup element 62 includes a Block element 64, which specifies the Timecode attribute of the frame encoded within the Block element 64 relative to the Timecode of the Cluster element 48 and a DRMInfo element 65 that identifies a portion of the frame that is encrypted and the cryptographic information that can be utilized to access the encrypted portion of the frame. In a number of embodiments, only a small portion of the video frame is encrypted and the DRMInfo includes a reference to the start of an encrypted block of data and the size of the encrypted block of data. As is discussed

further below, the common cryptographic information utilized to protect alternative streams of video content is a set of frame keys in many embodiments of the invention and the DRMInfo element can also include an index to a specific frame key in the set of frame keys that can be utilized to access the encrypted block of data in the clear. In other embodiments, any of a variety of information appropriate to identifying encrypted data within a video frame and decrypting the encrypted data can be stored within a DRMInfo element.

[0095] Subsequent BlockGroup elements 66 are not restricted in the types of frames that they can contain (other than that they cannot reference frames that are not contained within the Cluster element). Therefore, subsequent BlockGroup elements 66 can include ReferenceBlock elements 68 referencing other BlockGroup element(s) utilized in the decoding of the frame contained within the BlockGroup or can contain IDR frames and are similar to the first BlockGroup element 62. In addition, subsequent BlockGroup elements 66 can also include DRMInfo elements to describe the manner in which the frame of video contained within the BlockGroup element is protected. As noted above, the manner in which encoded video is inserted within the Cluster elements of the Matroska file conforms with the specification of the Matroska file format.

[0096] The insertion of encoded audio and subtitle information within a Clusters element 46 of a Matroska container file in accordance with embodiments of the invention is illustrated in FIGS. 4b and 4c. In the illustrated embodiments, the encoded media is inserted within the Cluster elements 48 subject to the same constraints applied to the encoded video discussed above with respect to FIG. 4a. In addition, the duration of the encoded audio and subtitle information within each Cluster element corresponds to the duration of the encoded video in the corresponding Cluster element of the Matroska container file containing the encoded video. In other embodiments, the Cluster elements within the container files containing the audio and/or subtitle streams need not correspond with the start time and duration of the Cluster elements in the container files containing the alternative video streams. In many embodiments, audio, and/or subtitle tracks are protected and information identifying the protected portions of

the stream can be included in an element in a manner similar to that described above with respect to protected video streams.

MULIPLEXING STREAMS IN A SINGLE MKV CONTAINER FILE

[0097] The Clusters elements shown in FIGS. 4a – 4c assume that a single stream is contained within each Matroska container file. In several embodiments, media from multiple streams is multiplexed within a single Matroska container file. In this way, a single container file can contain a video stream multiplexed with one or more corresponding audio streams, and/or one or more corresponding subtitle streams. Storing the streams in this way can result in duplication of the audio and subtitle streams across multiple alternative video streams. However, the seek time to retrieve encoded media from a video stream and an associated audio, and/or subtitle stream can be reduced due to the adjacent storage of the data on the server. The Clusters element 46 of a Matroska container file containing multiplexed video, audio and subtitle data in accordance with an embodiment of the invention is illustrated in FIG. 4d. In the illustrated embodiment, each Cluster element 48 includes additional BlockGroup elements for each of the multiplexed streams. The first Cluster element includes a first BlockGroup element 62v for encoded video that includes a Block element 64v containing an encoded video frame and indicating the Timecode attribute of the frame relative to the start time of the Cluster element (i.e. the Timecode attribute 60). A second BlockGroup element 62a includes a Block element 64a including an encoded audio sequence and indicating the timecode of the encoded audio relative to the start time of the Cluster element, and a third BlockGroup element 62s including a Block element 64s containing an encoded subtitle and indicating the timecode of the encoded subtitle relative to the start time of the Cluster element. In the illustrated embodiment, only the video stream is protected. Therefore, the BlockGroup elements 62v containing the video stream include DRMInfo elements 65v to identify the portions of the frames within the video stream that are encrypted. In other embodiments, the audio, and/or subtitle streams can also be protected. Although not shown in the illustrated embodiment, each Cluster element 48 likely would include additional BlockGroup

elements containing additional encoded video, audio or subtitles. Despite the multiplexing of the encoded video, audio, and/or subtitle streams, the same constraints concerning the encoded media apply.

INCORPORATING TRICK PLAY STREAMS IN MKV CONTAINER FILES FOR USE IN ADAPTIVE BITRATE STREAMING SYSTEMS

[0098] The incorporation of trick play tracks within Matroska container files is proposed by DivX, LLC in U.S. Patent Application No. 12/260,404 entitled "Application Enhancement Tracks", filed October 29, 2008, the disclosure of which is hereby incorporated by reference in its entirety. Trick play tracks similar to the trick play tracks described in U.S. Patent Application No. 12/260,404 can be used to provide a trick play stream in an adaptive bitrate streaming system in accordance with an embodiment of the invention to provide smooth visual search through source content encoded for adaptive bitrate streaming. A separate trick play stream can be encoded that appears to be an accelerated visual search through the source media when played back, when in reality the trick play stream is simply a separate stream encoding the source media at a lower frame rate. In several embodiments, a trick play stream is generated in the manner outlined in U.S. Patent Application No. 12/260,404 and inserting the trick play stream into a Matroska container file subject to the constraints mentioned above with respect to insertion of a video stream into a Matroska container file. In many embodiments, the trick play stream is also subject to the further constraint that every frame in the GOP of each Cluster element in the trick play stream is encoded as an IDR frame. As with the other video streams, each Cluster element contains a GOP corresponding to the same two seconds of source media as the corresponding Cluster elements in the other streams. There are simply fewer frames in the GOPs of the trick play stream and each frame has a longer duration. In this way, transitions to and from a trick play stream can be treated in the same way as transitions between any of the other encoded streams are treated within an adaptive bitrate streaming system in accordance with embodiments of the invention. In embodiments where the trick play stream(s) are protected, the same common cryptographic information utilized to encrypt the primary

video stream(s) is utilized to protect the trick play stream(s). Playback of the frames contained within the trick play stream to achieve accelerated visual search typically involves the playback device manipulating the timecodes assigned to the frames of encoded video prior to providing the frames to the playback device's decoder to achieve a desired increase in rate of accelerated search (e.g. x2, x4, x6, etc.).

[0099] A Clusters element containing encoded media from a trick play stream is shown in FIG. 4e. In the illustrated embodiment, the encoded trick play stream is inserted within the Cluster elements 48 subject to the same constraints applied to the encoded video discussed above with respect to FIG. 4a including the constraint that frames are protected using the common cryptographic information. However, each BlockGroup element contains an IDR. In other embodiments, the Cluster elements within the container files containing the trick play streams need not correspond with the start time and duration of the Cluster elements in the container files containing the alternative video streams.

[00100] In many embodiments, source content can be encoded to provide a single trick play stream or multiple trick play streams for use by the adaptive bit rate streaming system. When a single trick play stream is provided, the trick play stream is typically encoded at a low bitrate. When multiple alternative trick play streams are provided, adaptive streaming can also be performed with respect to the trick play streams. In several embodiments, multiple trick play streams are provided to support different rates of accelerated visual search through the encoded media.

INCORPORATING INDEXING INFORMATION WITHIN MKV CONTAINER FILES

[00101] The specification for the Matroska container file format provides for an optional Cues element that is used to index Block elements within the container file. A modified Cues element that can be incorporated into a Matroska container file in accordance with an embodiment of the invention to facilitate the requesting of clusters by a playback device using HTTP is illustrated in FIG. 5. The Cues element 52 is similar to a standard Cues element 52 in that it includes a plurality of standard CuePoint elements 70 that each include a standard CueTime attribute 72. Each CuePoint

element includes a CueTrackPositions element 74 containing the standard CueTrack 76 and CueClusterPosition 78 attributes. In many embodiments, the CuePoint element is mainly configured to identify a specific Cluster element as opposed to a specific Block element within a Cluster element. Although, in several applications the ability to seek to specific Block elements within a Cluster element is required and additional index information is included in the Cues element.

[00102] The use of a modified Cues element to index encoded media within a Clusters element of a Matroska file in accordance with an embodiment of the invention is illustrated in FIG. 6. A CuePoint element is generated to correspond to each Cluster element within the Matroska container file. The CueTime attribute 72 of the CuePoint element 70 corresponds to the Timecode attribute 60 of the corresponding Cluster element 48. In addition, the CuePoint element contains a CueTrackPositions element 74 having a CueClusterPosition attribute 78 that points to the start of the corresponding Cluster element 48. The CueTrackPositions element 74 can also include a CueBlockNumber attribute, which is typically used to indicate the Block element containing the first IDR frame within the Cluster element 48.

[00103] As can readily be appreciated the Cues element 52 forms an index to each of the Cluster elements 48 within the Matroska container file. Furthermore, the CueTrackPosition elements provide information that can be used by a playback device to request the byte range of a specific Cluster element 48 via HTTP or another suitable protocol from a remote server. The Cues element of a conventional Matroska file does not directly provide a playback device with information concerning the number of bytes to request from the start of the Cluster element in order to obtain all of the encoded video contained within the Cluster element. The size of a Cluster element is, therefore, inferred by using the CueClusterPosition attribute of the CueTrackPositions element that indexes the first byte of the next Cluster element. Alternatively, additional CueTrackPosition elements could be added that index the last byte of the Cluster element (in addition to the CueTrackPositions elements that index the first byte of the Cluster element), and/or a non-standard CueClusterSize attribute that specifies the size of the Cluster element pointed to by the CueClusterPosition attribute is included in each

CueTrackPosition element to assist with the retrieval of specific Cluster elements within a Matroska container file via HTTP byte range requests or a similar protocol.

[00104] The modification of the Cues element in the manner outlined above significantly simplifies the retrieval of Cluster elements from a Matroska container file via HTTP or a similar protocol during adaptive bitrate streaming. In addition, by only indexing the first frame in each Cluster the size of the index is significantly reduced. Given that the index is typically downloaded prior to playback, the reduced size of the Cues element (i.e. index) means that playback can commence more rapidly. Using the CueClusterPosition elements, a playback device can request a specific Cluster element from the stream most suited to the streaming conditions experienced by the playback device by simply referencing the index of the relevant Matroska container file using the Timecode attribute for the desired Cluster element.

[00105] A number of the attributes within the Cues element are not utilized during adaptive bitrate streaming. Therefore, the Cues element can be further modified by removing the unutilized attributes to reduce the overall size of the index for each Matroska container file. A modified Cues element that can be utilized in a Matroska container file that includes a single encoded stream, where portions of the encoded stream having the same duration are contained in each Cluster element within the Matroska file in accordance with an embodiment of the invention is illustrated in FIG. 5a. The Cues element 52' shown in FIG. 5a is similar to the Cues element 52 shown in FIG. 5 with the exception that the CuePoint elements 70' do not include a CueTime attribute (see 72 in FIG. 5) and/or the CueTrackPositions elements 74' do not include a CueTrack attribute (76 in FIG. 5). When the portions of encoded media in each Cluster element in the Matroska container file have the same duration, the CueTime attribute is not necessary. When the Matroska contain file includes a single encoded stream, the CueTrack attribute is not necessary. In other embodiments, the Cues element and/or other elements of the Matroska container file can be modified to remove elements and/or attributes that are not necessary for the adaptive bitrate streaming of the encoded stream contained within the Matroska container file, given the manner in which the stream is encoded and inserted in the Matroska container file.

[00106] Although various modifications to the Cues element to include information concerning the size of each of the Cluster elements within a Matroska container file and to eliminate unnecessary attributes are described above, many embodiments of the invention utilize a conventional Matroska container. In several embodiments, the playback device simply determines the size of Cluster elements on the fly using information obtained from a conventional Cues element, and/or relies upon a separate index file containing information concerning the size and/or location of the Cluster elements within the MKV container file. In several embodiments, the additional index information is stored in the top level index file. In a number of embodiments, the additional index information is stored in separate files that are identified in the top level index file. When index information utilized to retrieve Cluster elements from a Matroska container file is stored separately from the container file, the Matroska container file is still typically constrained to encode media for inclusion in the Cluster elements in the manner outlined above. In addition, wherever the index information is located, the index information will typically index each Cluster element and include (but not be limited to) information concerning at least the starting location and, in many instances, the size of each Cluster element.

INCORPORATING HIERARCHICAL INDEXES INTO MKV CONTAINERS

[00107] Retrieval of media using HTTP during adaptive streaming can be improved by adding additional index information to the Matroska container files used to contain each of the encoded streams. In a number of embodiments, the index is a reduced index in that the index only points to the IDRs at the start of each cluster. In many embodiments, the index of the Matroska container file includes additional non-standard attributes (i.e. attributes that do not form part of the Matroska container file format specification) that specify the size of each of the clusters so that a playback device can retrieve a Cluster element from the Matroska container file via HTTP using a byte range request. In several embodiments, the Matroska container file includes a hierarchical index using a HierarchicalIndex element similar to the hierarchical indexes disclosed in U.S. Patent Application Serial No. 12/272,631 entitled "Hierarchical and Reduced Index

Structures for Multimedia Files” to Soroushian et al. filed November 17, 2008 to increase the speed with which a playback device can seek to a specific Cluster element containing encoded media within the container file. The disclosure of U.S. Patent Application Serial No. 12/272,631 is hereby incorporated by reference in its entirety.

[00108] A hierarchical index included in a Matroska container file using a HierarchicalIndex element in accordance with an embodiment of the invention is illustrated in FIG. 7. The HierarchicalIndex element 54 includes a plurality of HierarchicalIndexPointer elements 80 that each point to a CuePoint element 70 within the Cues element 52. In this way, the hierarchical index can be utilized to rapidly locate specific Cluster elements within a Matroska file using the Timecode attribute of the Cluster element. Furthermore, the entire index (i.e. the entire Cues element) need not be downloaded in order to locate a specific Cluster element. The playback device can simply download the hierarchical index and download the specific CuePoint elements that enable the location of a desired Cluster element within the Matroska container file.

[00109] In several embodiments, the HierarchicalIndex element is generated so that the HierarchicalIndexPointer elements point to CuePoint elements indexing Cluster elements that are a predetermined time period apart. For example, the HierarchicalIndexPointer elements can point to CuePoint elements indexing Cluster elements that are spaced 30 seconds apart. In other implementations, any of a variety of implementations can be utilized to determine the interval between the CuePoint elements referenced by the higher layers of the hierarchical index. In addition, although a two layer hierarchical index is illustrated in FIG. 7, hierarchical indexes including three or more layers can also be incorporated within Matroska container files generated for use in adaptive bitrate streaming systems in accordance with embodiments of the invention.

[00110] As noted above, index information can be stored in a separate file to the Matroska container file in accordance with embodiments of the invention. In embodiments where the index information is stored separately, the index can be hierarchical to prevent the need to download the entire index for a container file prior to playback and to facilitate seeking within the index.

ENCODING AND PROTECTING SOURCE MEDIA FOR ADAPTIVE BITRATE STREAMING

[00111] A process for encoding source media as a top level index file and a plurality of Matroska container files for use in an adaptive bitrate streaming system in accordance with an embodiment of the invention is illustrated in FIG. 8. The encoding process 100 commences by writing headers for each of the MKV files that will contain the streams of content generated using the source content. In the illustrated embodiment, the source content includes a stream of video that is encoded as a plurality of protected streams. The frames of the source video are encoded (104) using the encoding parameters associated with each of the alternative streams and portions of the encoded frames can be encrypted using a frame key selected from a set of frame keys. When the encoding and encryption of the streams is complete, an index is inserted (106) into each Matroska container file containing an alternative stream of protected video. The common set of frame keys is also encrypted (108) and the process writes (110) a DRM header including the encrypted set of frame keys to each container file. DRM headers and processes for restricting access to cryptographic information stored within the DRM header of a Matroska container file in accordance with embodiments of the invention are discussed further below.

[00112] A process for encoding and protecting frames of video to create a plurality of alternative streams of protected video in accordance with embodiments of the invention is illustrated in FIG. 9. The process 120 includes selecting (122) a first portion of the source media and encoding (123) the source media using the encoding parameters for each alternative stream. Assuming that the resulting frame is to be encrypted, a frame key can be selected (124) from a common set of frame keys and utilized to encrypt at least a portion of the frame of video. A DRMInfo element can then be written (125) to a BlockGroup element. The DRMInfo element identifies the portion of the frame that is encrypted and the frame key that can be utilized by a playback device to access the encrypted portion of the frame. The encoded and/or encrypted frame can then be written (126) to the BlockGroup element. When the entire source video stream is determined (127) as being encoded and protected, then the process is complete.

[00113] Each portion of source video that is encoded (123) can be encoded as a single GOP commencing with an IDR frame. In many embodiments, encoding parameters used to create the alternative GOPs vary based upon bitrate, frame rate, encoding parameters and resolution. In this way, the portion of media is encoded as a set of interchangeable alternatives and a playback device can select the alternative most appropriate to the streaming conditions experienced by the playback device. When different resolutions are supported, the encoding of the streams is constrained so that each stream has the same display aspect ratio. A constant display aspect ratio can be achieved across different resolution streams by varying the sample aspect ratio with the resolution of the stream. In many instances, reducing resolution can result in higher quality video compared with higher resolution video encoded at the same bit rate.

[00114] Although specific processes involving the encoding and protection of a source video stream as a set of alternative streams are illustrated in FIGS. 8 and 9, any of a variety of processes can be utilized to protect audio, video, and/or subtitle streams using common cryptographic information in accordance with embodiments of the invention. Following the encoding of the source media to create Matroska container files containing each of the protected streams, which can include trick play streams, the Matroska container files can be uploaded to a content distribution server for adaptive bitrate streaming to playback devices. The adaptive bitrate streaming of protected media encoded in accordance with embodiments of the invention using HTTP requests is discussed further below.

DRM HEADERS

[00115] Common cryptographic information utilized in protecting alternative streams can be inserted into container files containing each of the alternative streams. When the container files are Matroska container files, the common cryptographic information can be inserted into the container file as a DRMHeader element. A DRMHeader element configured to contain a set of keys in accordance with an embodiment of the invention is illustrated in FIG. 10. The DRM Header element 130 includes a plurality of pieces of information 132 including a frame keys record 134 that can be utilized to

contain a set of frame keys or frame key table common to each of a plurality of alternative streams.

[00116] If the frame key record 134 is communicated in the clear, then any playback device can access the protected streams. Therefore, the frame keys record 134 is typically encrypted using one or more encryption keys. The encryption key(s) used to encrypt the frame key record 134 can be securely provided to an individual playback device using any of a variety of techniques appropriate to a specific application. In the context of streaming systems that also support the downloading of content.

[00117] Although a specific format for storing common cryptographic information in a Matroska container file is illustrated in FIG. 10, any format can be utilized to store common cryptographic information in a Matroska container file and/or any other container file appropriate to a specific application in accordance with an embodiment of the invention. Adaptive bitrate streaming of protected content in accordance with embodiments of the invention is discussed further below.

ADAPTIVE BITRATE STREAMING FROM MKV CONTAINER FILES USING HTTP

[00118] When source media is encoded so that there are alternative streams of protected media contained in separate Matroska container files for at least one of video, audio, and subtitle content, adaptive streaming of the media contained within the Matroska container files can be achieved using HTTP requests or a similar stateless data transfer protocol. In many embodiments, a playback device requests a top level index file from a content distribution server and uses the index information to identify the streams that are available to the playback device and the cryptographic information required to access any protected streams. The playback device can then retrieve the indexes for one or more of the Matroska files and can use the indexes to request media from one or more of the protected streams contained within the Matroska container files using HTTP requests or using a similar stateless protocol. As noted above, many embodiment of the invention implement the indexes for each of the Matroska container files using a modified Cues element. In several embodiments, the index is a hierarchical index and is also includes a HierarchicalIndex element contained within the

Matroska container file. In a number of embodiments, however, the encoded media for each stream is contained within a standard Matroska container file and separate index file(s) can also be provided for each of the container files.

[00119] Based upon the streaming conditions experienced by the playback device, the playback device can select media from alternative protected streams encoded at different bitrates. When the media from each of the streams is protected using common cryptographic information and inserted into the Matroska container files in the manner outlined above, transitions between streams can occur upon the completion of playback of media within a Cluster element without the need to retrieve additional cryptographic information. As noted above, the size of the Cluster elements (i.e. the duration of the encoded media within the Cluster elements) is typically chosen so that the playback device is able to respond quickly enough to changing streaming conditions and to instructions from the user that involve utilization of a trick play track. The smaller the Cluster elements (i.e. the smaller the duration of the encoded media within each Cluster element) the higher the overhead associated with requesting each Cluster element. Therefore, a tradeoff exists between the responsiveness of the playback device to changes in streaming conditions and the effective data rate of the adaptive streaming system for a given set of streaming conditions (i.e. the portion of the available bandwidth actually utilized to transmit encoded media). In many embodiments, the size of the Cluster elements is chosen so that each Cluster element contains two seconds of encoded media. In other embodiments, the duration of the encoded media can be greater or less than two seconds and/or the duration of the encoded media can vary from Cluster element to Cluster element.

[00120] Communication between a playback device or client and an HTTP server during the playback of media encoded in separate streams contained within Matroska container files indexed by a top level index file in accordance with an embodiment of the invention is illustrated in FIG. 11. In the illustrated embodiment, the playback device 200 commences playback by requesting the top level index file from the server 202 using an HTTP request or a similar protocol for retrieving data. The server 202 provides the bytes corresponding to the request. The playback device 200 then parses the top

level index file to identify the URIs of each of the Matroska container files containing the streams of encoded media derived from a specific piece of source media. The playback device can then request the byte ranges corresponding to headers of one or more of the Matroska container files via HTTP or a similar protocol, where the byte ranges are determined using the information contained in the URI for the relevant Matroska container files (see discussion above). The server returns the following information in response to a request for the byte range containing the headers of a Matroska container file:

- ELEM("EBML")
- ELEM("SEEKHEAD")
- ELEM("SEGMENTINFO")
- ELEM("TRACKS")

[00121] The EBML element is typically processed by the playback device to ensure that the file version is supported. The SeekHead element is parsed to find the location of the Matroska index elements and the SegmentInfo element contains two key elements utilized in playback: TimecodeScale and Duration. The TimecodeScale specifies the timecode scale for all timecodes within the Segment of the Matroska container file and the Duration specifies the duration of the Segment based upon the TimecodeScale. The Tracks element contains the information used by the playback device to decode the encoded media contained within the Clusters element of the Matroska file including the common cryptographic information, which can take a variety of forms including but not limited to a DRMHeader element. As noted above, adaptive bitrate streaming systems in accordance with embodiments of the invention can support different streams encoded using different encoding parameters including but not limited to frame rate, and resolution. Therefore, the playback device can use the information contained within the Matroska container file's headers to configure the decoder every time a transition is made between encoded streams. Due to the fact that alternative protected streams utilize the same cryptographic information, the engine utilized to decrypt the content on the client 200 (i.e. the software process used to decrypt

encrypted portions of frames of video) does not require reconfiguration using different cryptographic information with each stream switch.

[00122] In many embodiments, the playback device does not retrieve the headers for all of the Matroska container files indexed in the top level index file. Instead, the playback device determines the stream(s) that will be utilized to initially commence playback and requests the headers from the corresponding Matroska container files. Depending upon the structure of the URIs contained within the top level index file, the playback device can either use information from the URIs or information from the headers of the Matroska container files to request byte ranges from the server that contain at least a portion of the index from relevant Matroska container files. The byte ranges can correspond to the entire index or can correspond to the top level of a hierarchical index and a portion of a lower level index (i.e. a HierarchicalIndex element and one or more CuePoint elements). The server provides the relevant byte ranges containing the index information to the playback device, and the playback device can use the index information to request the byte ranges of Cluster elements containing encoded media using this information. When the Cluster elements are received, the playback device can extract encoded media from the BlockGroup elements within the Cluster element, and can decode and playback the media within the BlockGroup elements in accordance with their associated Timecode attributes. Prior to decoding the encoded media, the playback device can check for the presence of a DRMInfo element within each BlockGroup of a video stream to identify whether the encoded media is protected. The playback device can use the information within the DRMInfo element to decrypt encrypted portions of the video prior to decoding.

[00123] In the illustrated embodiment, the playback device 200 requests sufficient index information from the HTTP server prior to the commencement of playback that the playback device can stream the entirety of each of the selected streams using the index information. In other embodiments, the playback device continuously retrieves index information as media is played back. In several embodiments, all of the index information for the lowest bitrate stream is requested prior to playback so that the index

information for the lowest bitrate stream is available to the playback device in the event that streaming conditions deteriorate rapidly during playback.

SWITCHING BETWEEN STREAMS

[00124] The communications illustrated in FIG. 11 assume that the playback device continues to request media from the same streams (i.e. Matroska container files) throughout playback of the media. In reality, the streaming conditions experienced by the playback device are likely to change during the playback of the streaming media and the playback device can request media from alternative streams (i.e. different Matroska container files) to provide the best picture quality for the streaming conditions experienced by the playback device. In addition, the playback device may switch streams in order to perform a trick play function that utilizes a trick play track stream.

[00125] Communication between a playback device and a server when a playback device switches to a new stream in accordance with embodiments of the invention are illustrated in FIG. 12a. The communications illustrated in FIG. 12a assume that the index information for the new stream has not been previously requested by the playback device and that downloading of Cluster elements from the old stream proceeds while information is obtained concerning the Matroska container file containing the new stream. When the playback device 200 detects a change in streaming conditions, determines that a higher bitrate stream can be utilized at the present streaming conditions, or receives a trick play instruction from a user, the playback device can use the top level index file to identify the URI for a more appropriate alternative stream to at least one of the video, audio, or subtitle streams from which the playback device is currently requesting encoded media. The playback device can save the information concerning the current stream(s) and can request the byte ranges of the headers for the Matroska container file(s) containing the new stream(s) using the parameters of the corresponding URIs. Caching the information in this way can be beneficial when the playback device attempts to adapt the bitrate of the stream downward. When the playback device experiences a reduction in available bandwidth, the playback device ideally will quickly switch to a lower bitrate stream. Due to the reduced bandwidth

experienced by the playback device, the playback device is unlikely to have additional bandwidth to request header and index information. Ideally, the playback device utilizes all available bandwidth to download already requested higher rate Cluster elements and uses locally cached index information to start requesting Cluster elements from Matroska container file(s) containing lower bitrate stream(s). When a hierarchical index is used, the playback device typically will download additional index information. However, the amount of index information that is downloaded is significantly reduced as the headers of the Matroska container file are already cached on the playback device and the playback device only needs a portion of the index in order commence requesting Cluster elements from the Matroska container file(s) containing the new stream(s).

[00126] Byte ranges for index information for the Matroska container file(s) containing the new stream(s) can be requested from the HTTP server 202 in a manner similar to that outlined above with respect to FIG. 11. At which point, the playback device can stop downloading of cluster elements from the previous streams and can commence requesting the byte ranges of the appropriate Cluster elements from the Matroska container file(s) containing the new stream(s) from the HTTP server, using the index information from the Matroska container file(s) to identify the Cluster element(s) containing the encoded media following the encoded media in the last Cluster element retrieved by the playback device. As noted above, the encoding of the alternative streams so that corresponding Cluster elements within alternative streams (i.e. Cluster elements containing the same portion of the source media encoded in accordance with different encoding parameters) start with the same Timecode element and an IDR frame facilitates the smooth transition from one stream to another. In addition, the use of common cryptographic information further facilitates smooth switching between alternative streams.

[00127] When the Matroska file includes a hierarchical index, the process for switching between streams can involve downloading less than the entire index of the new streams. The index information can be downloaded by requesting the byte range for the hierarchical index and then using the Timecode attribute of media played back

by the playback device 200 to identify the location of CuePoint elements within the Matroska container file(s) containing the new stream(s) that reference Cluster elements containing sequential encoded media and requesting the byte ranges of the CuePoint elements from the HTTP server 202. After the HTTP server has provided the byte ranges including the CuePoint elements, the playback device can use the information within the CuePoint elements to request byte ranges containing desired Cluster elements from the HTTP server. At which point, playback of the encoded media contained within the Cluster elements proceeds in the manner discussed above.

[00128] When the playback device caches the header and the entire index for each stream that has been utilized in the playback of the media, the process of switching back to a previously used stream can be simplified. The playback device already has the header and index information for the Matroska file containing the previously utilized stream and the playback device can simply use this information to start requesting Cluster elements from the Matroska container file of the previously utilized stream via HTTP. Communication between a playback device and an HTTP server when switching back to a stream(s) for which the playback device has cached header and index information in accordance with an embodiment of the invention is illustrated in FIG. 12b. The process illustrated in FIG. 12b is ideally performed when adapting bitrate downwards, because a reduction in available resources can be exacerbated by a need to download index information in addition to media. The likelihood of interruption to playback is reduced by increasing the speed with which the playback device can switch between streams and reducing the amount of overhead data downloaded to achieve the switch. When a hierarchical index is utilized, the playback device requests the appropriate portion of the index from the Matroska container file(s) containing the lower bitrate stream(s) prior to requesting Cluster elements from the Matroska container file.

[00129] Although the present invention has been described in certain specific aspects, many additional modifications and variations would be apparent to those skilled in the art. It is therefore to be understood that the present invention may be practiced otherwise than specifically described, including various changes in the implementation such as utilizing encoders and decoders that support features beyond those specified within a particular standard with which they comply, without departing from the scope and spirit of the present invention. Thus, embodiments of the present invention should be considered in all respects as illustrative and not restrictive.

WHAT IS CLAIMED:

1. A playback device, comprising:
 - a processor;
 - memory containing a client application;
 - wherein the client application configures the processor to:
 - request a top level index file identifying a plurality of alternative streams of protected content, where each of the alternative streams of protected content are encrypted using common cryptographic information;
 - obtain the common cryptographic information;
 - request portions of content from at least the plurality of alternative streams of protected content;
 - access the protected content using the common cryptographic information; and
 - playback the content.
2. The playback device of claim 1, wherein:
 - the alternative streams of protected content are alternative streams of protected video;
 - each of the alternative streams of protected video includes DRM information indicating portions of frames of video that are encrypted and identifying at least a portion of the common cryptographic information used to access the encrypted portions of the frames of video; and
 - the client application configures the processor to:
 - obtain a protected frame of video from one of the alternative streams of protected video;
 - obtain DRM information indicating a portion of the protected frame of video that is encrypted;

identify at least a portion of the common cryptographic information that is used to access the encrypted portion of the protected frame using the DRM information;

decrypt the encrypted portion of the protected frame of video using the identified portion of the common cryptographic information; and

decode the frame of video.

3. The playback device of claim 1, wherein:
each of the alternative streams of protected content is contained within a separate container file; and
the top level index file identifies a container file containing each of the alternative streams.

4. The playback device of claim 3, wherein:
the container files containing each of the alternative streams of protected content comprise at least one header including the common cryptographic information and information that describes the encoding of the stream of protected content; and
the top level index file identifies the location of the at least one header within each container file.

5. The playback device of claim 4, wherein the common cryptographic information is a set of encryption keys.

6. The playback device of claim 5, wherein:
the common set of encryption keys is encrypted; and
the client application configures the processor to securely receive cryptographic information used to unencrypt the common set of encryption keys.

7. The playback device of claim 4, wherein the client application configures the processor to obtain the common cryptographic information by requesting at least one header of a container file identified in the top level index file.

8. The playback device of claim 7, wherein:
each container file containing one of the alternative streams of protected content further comprises an index; and
the client application configures the processor to request a portion of content from one of the container files by configuring the processor to:
request at least a portion of an index from the container file;
identify the portion of the container file containing a specific portion of content using the index; and
request the identified portion of the container file.

9. The playback device of claim 4, wherein the container files are Matroska container files.

10. The playback device of claim 9, wherein the common cryptographic information is stored in a common DRM Header element contained within a Tracks element within each of the Matroska container files containing the alternative streams of protected content.

11. The playback device of claim 10, wherein:
the common cryptographic information is a set of encryption keys; and
the set of encryption keys is encrypted and stored within the DRM Header element.

12. The playback device of claim 11, wherein the client application configures the processor to:

obtain cryptographic information that can be used to unencrypt the set of encryption keys stored within the DRM Header element; and

unencrypt the set of encryption keys stored within the DRM Header element using the obtained cryptographic information.

13. The playback device of claim 10, wherein the client application configures the processor to obtain the DRM Header element by requesting a Tracks element from one of the Matroska container files identified in the top level index file.

14. The playback device of claim 13, wherein:

each Matroska container file containing an alternative stream of protected content further comprises an index contained within a Cues element; and

the client application configures the processor to request a portion of content from one of the Matroska container files by configuring the processor to:

request at least a portion of a Cues element from a Matroska container file containing one of the alternative streams of protected content;

identify a portion of the Matroska container file containing a specific portion of content using at least one CueTrackPosition element within the Cues element; and

request the portion of the Matroska container file identified by the at least one CueTrackPosition element.

15. The playback device of claim 14, wherein the index comprises a plurality of CueTrackPosition elements that identify the location of a plurality of Cluster elements within the Matroska container file.

16. The playback device of claim 15, wherein:
each Cluster element contains a plurality of BlockGroup elements including encoded portions of content;
a CueTrack Position element indexes each Cluster element; and
each CueTrackPosition element includes the size of the Cluster element that it indexes.

17. The playback device of claim 14, wherein:
the alternative streams of protected content are alternative streams of protected video;
each of the Matroska container files containing an alternative stream of protected video includes a DRMInfo element in a BlockGroup element containing a protected frame of video, where the DRMInfo element indicates at least a portion of the protected frames of video that is encrypted and identifies at least a portion of the common cryptographic information used to access the at least one encrypted portion of the protected frame of video; and
the client application configures the processor to access video frames in a stream of protected video using the common cryptographic information by configuring the processor to:
obtain a BlockGroup containing a protected frame of video;
parse the BlockGroup element to obtain a DRMInfo element indicating at least a portion of the protected frame of video that is encrypted using an encryption key from the set of encryption keys;
decrypt the at least one encrypted portion of the protected frame of video using the identified encryption key; and
decode the frame of video.

18. A method of performing adaptive bitrate streaming using a plurality of alternative streams of protected content, where each of the streams of protected content is protected using common cryptographic information, the method comprising:

- requesting a top level index file identifying a plurality of alternative streams of protected content using a playback device, where each of the alternative streams of protected content are encrypted using common cryptographic information;

- obtaining the common cryptographic information using the playback device;

- requesting portions of content from at least the plurality of alternative streams of protected content using the playback device;

- accessing the protected content using the playback device and the common cryptographic information; and

- playing back the content using the playback device.

19. The method of claim 18, wherein:

- the alternative streams of protected content are alternative streams of protected video;

- each of the alternative streams of protected video includes DRM information indicating portions of frames of video that are encrypted and identifying at least a portion of the common cryptographic information used to access the encrypted portions of the frames of video; and

- the method further comprises:

- obtaining a protected frame of video from one of the alternative streams of protected video using the playback device;

- obtaining DRM information indicating a portion of the protected frame of video that is encrypted using the playback device;

- identify at least a portion of the common cryptographic information that is used to access the encrypted portion of the protected frame using the playback device and the DRM information;

decrypting the encrypted portion of the protected frame of video using the playback device and the identified portion of the common cryptographic information; and

decoding the frame of video using the playback device.

20. The method of claim 18, wherein:

each of the alternative streams of protected content is contained within a separate container file; and

the top level index file identifies a container file containing each of the alternative streams.

Abstract

Systems and methods for performing adaptive bitrate streaming using alternative streams of protected content in accordance with embodiments of the invention are described. One embodiment of the invention includes a processor, and memory containing a client application. In addition, the client application configures the processor to: request a top level index file identifying a plurality of alternative streams of protected content, where each of the alternative streams of protected content are encrypted using common cryptographic information; obtain the common cryptographic information; request portions of content from at least the plurality of alternative streams of protected content; access the protected content using the common cryptographic information; and playback the content.

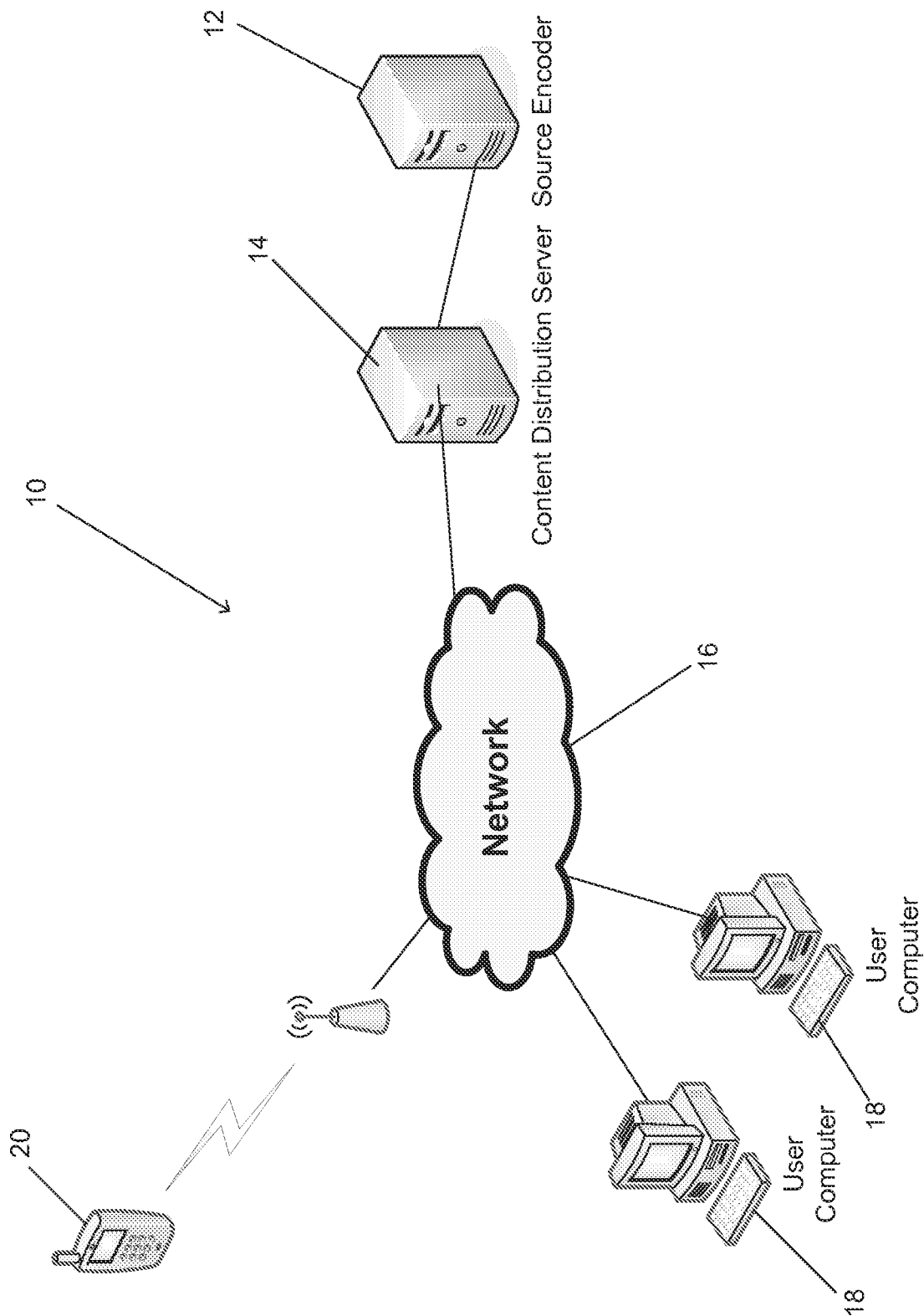


FIG. 1A

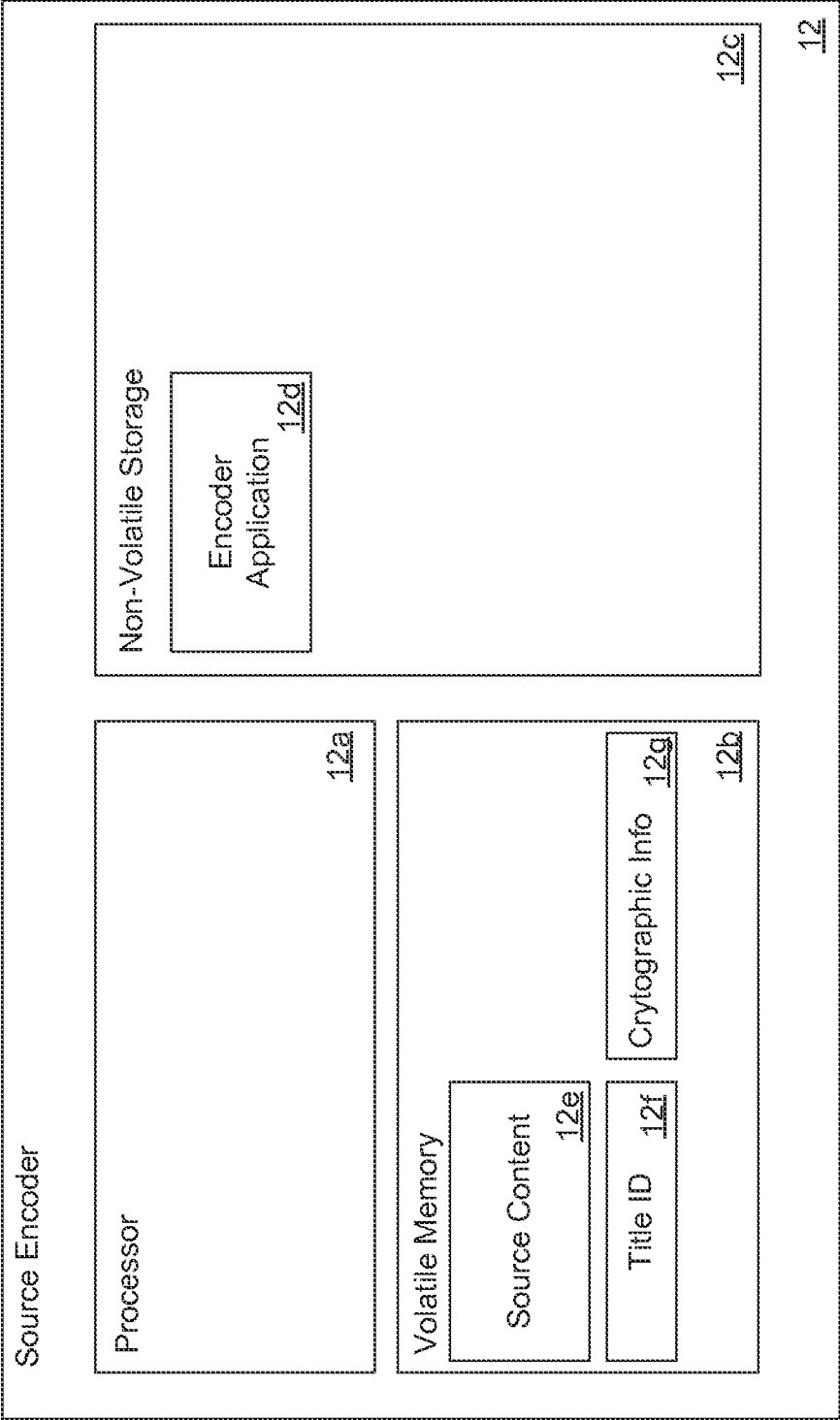


FIG. 1B

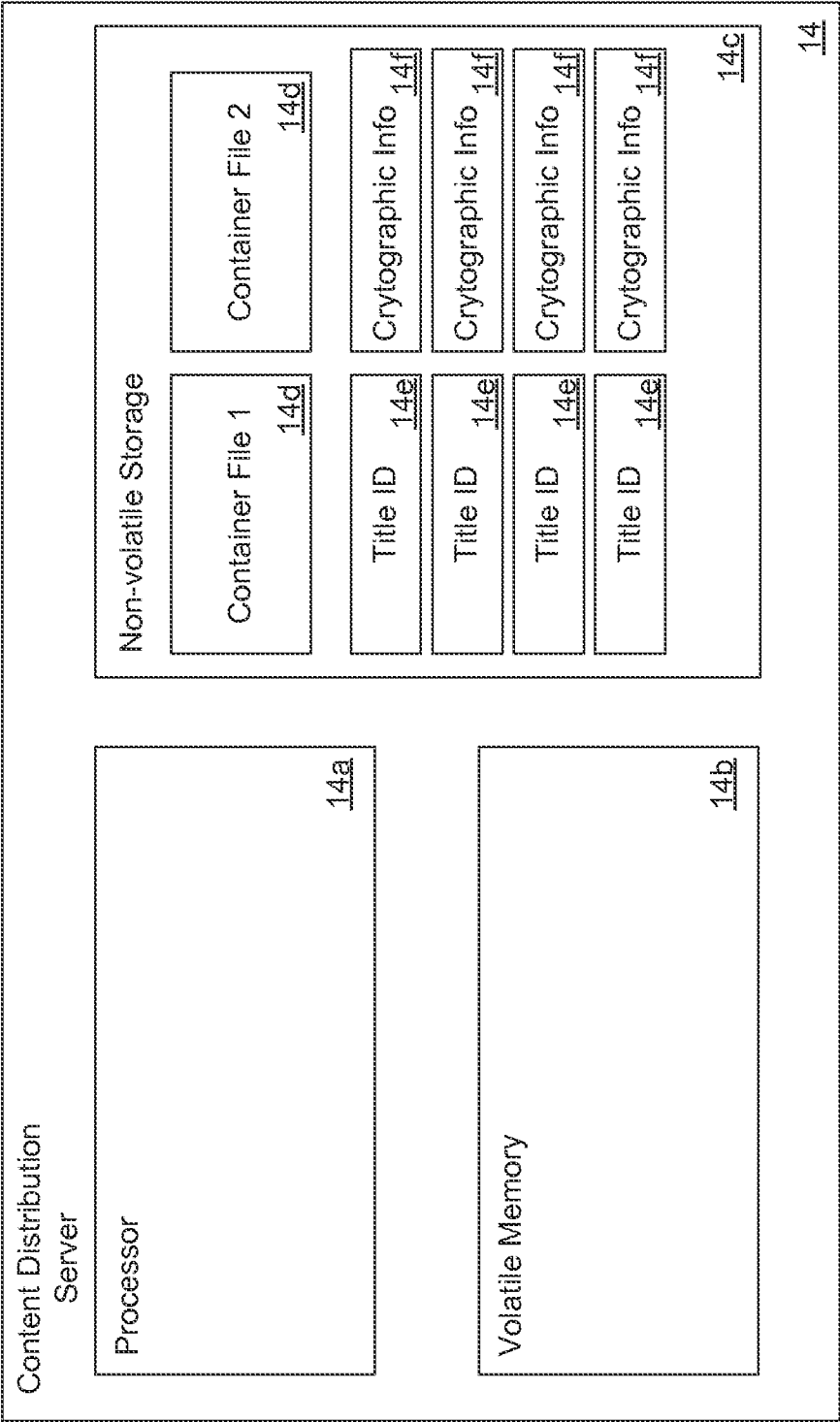


FIG. 1C

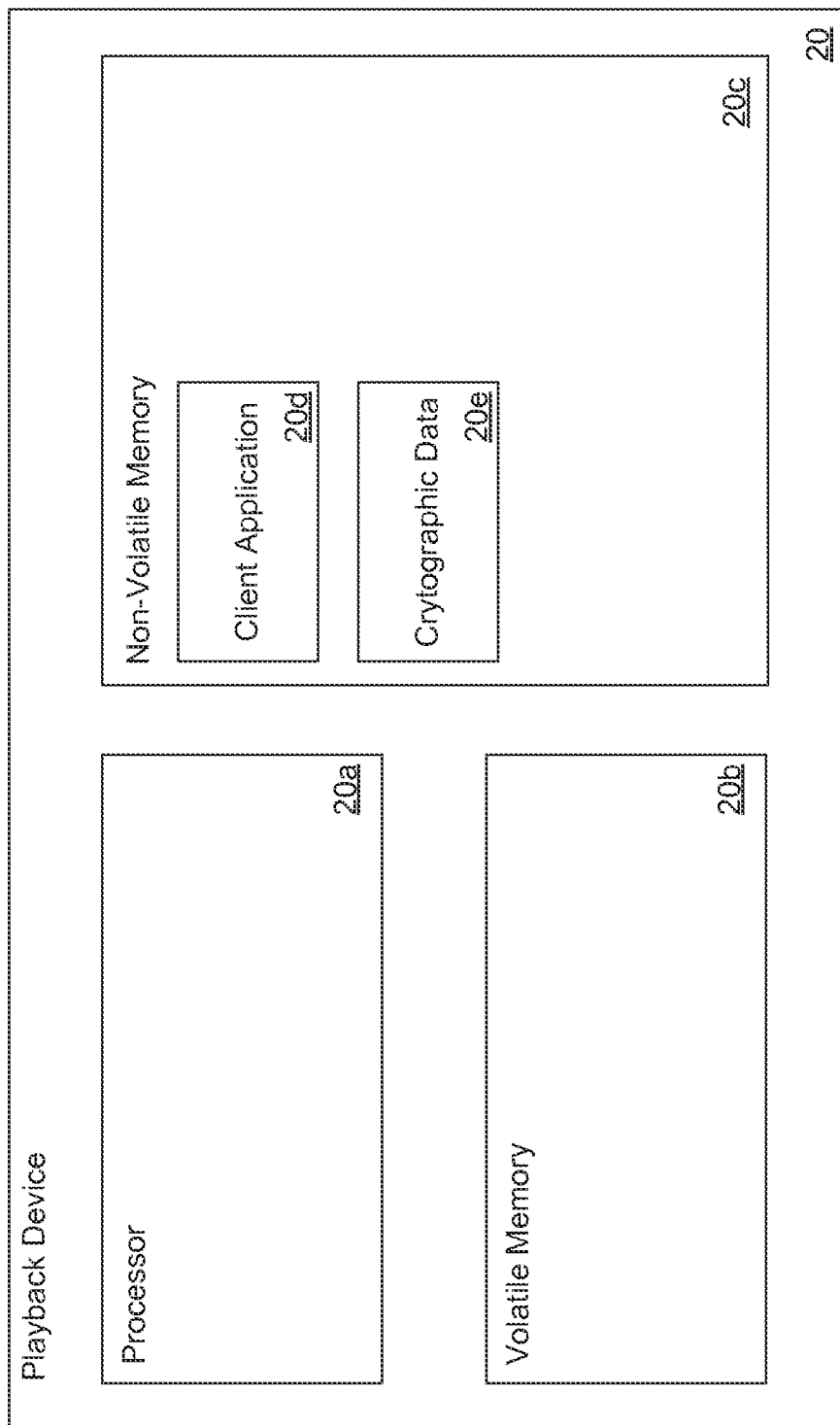


FIG. 1D

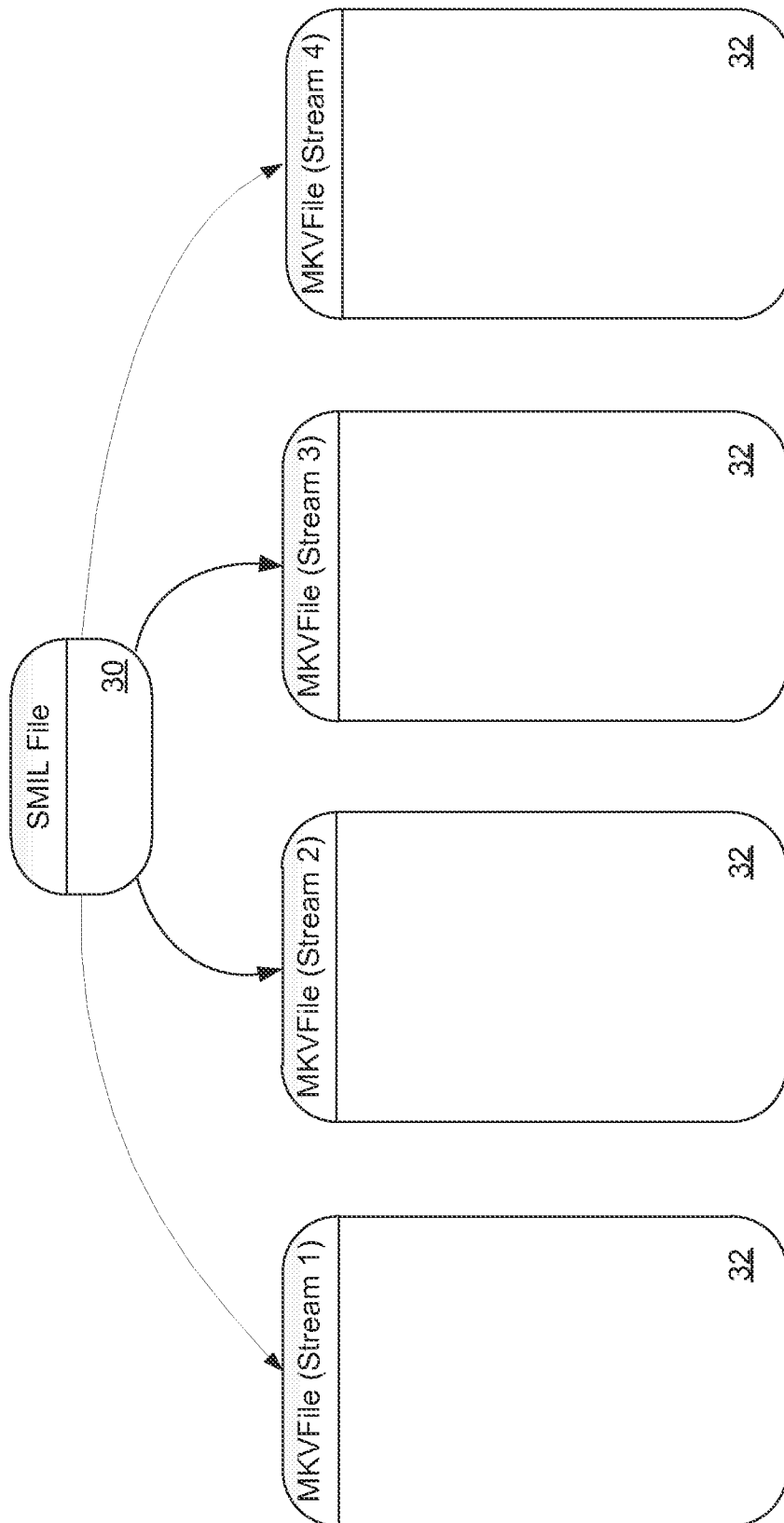


FIG. 2

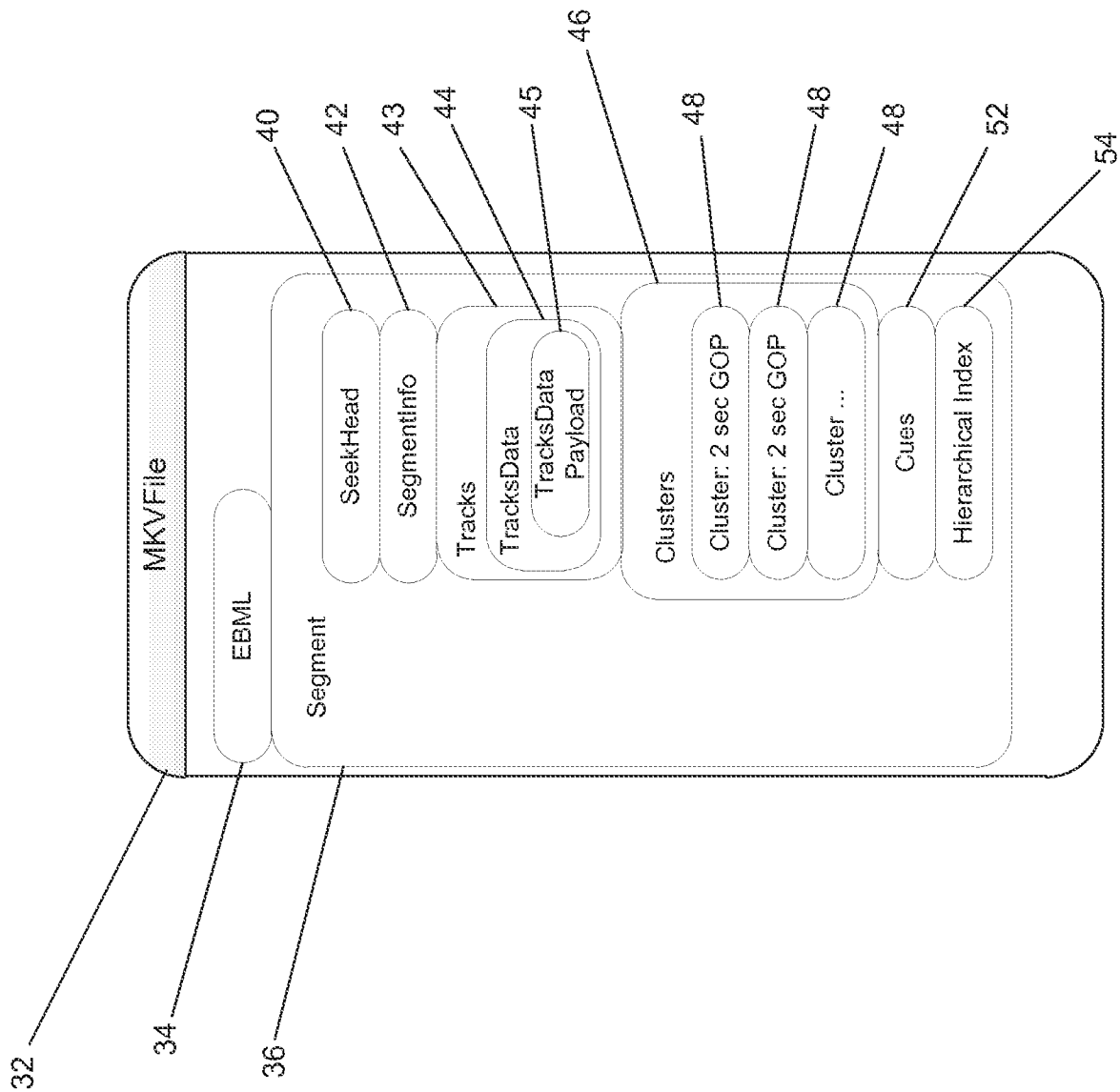


FIG. 3

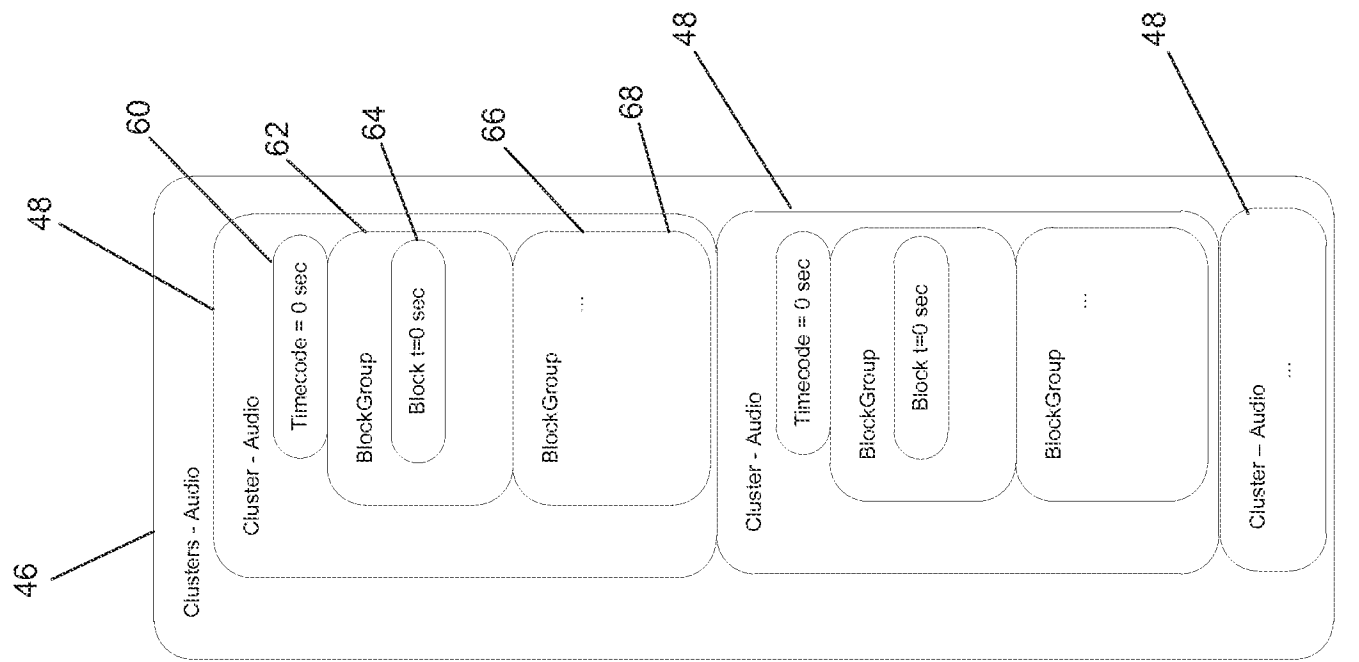


FIG. 4a

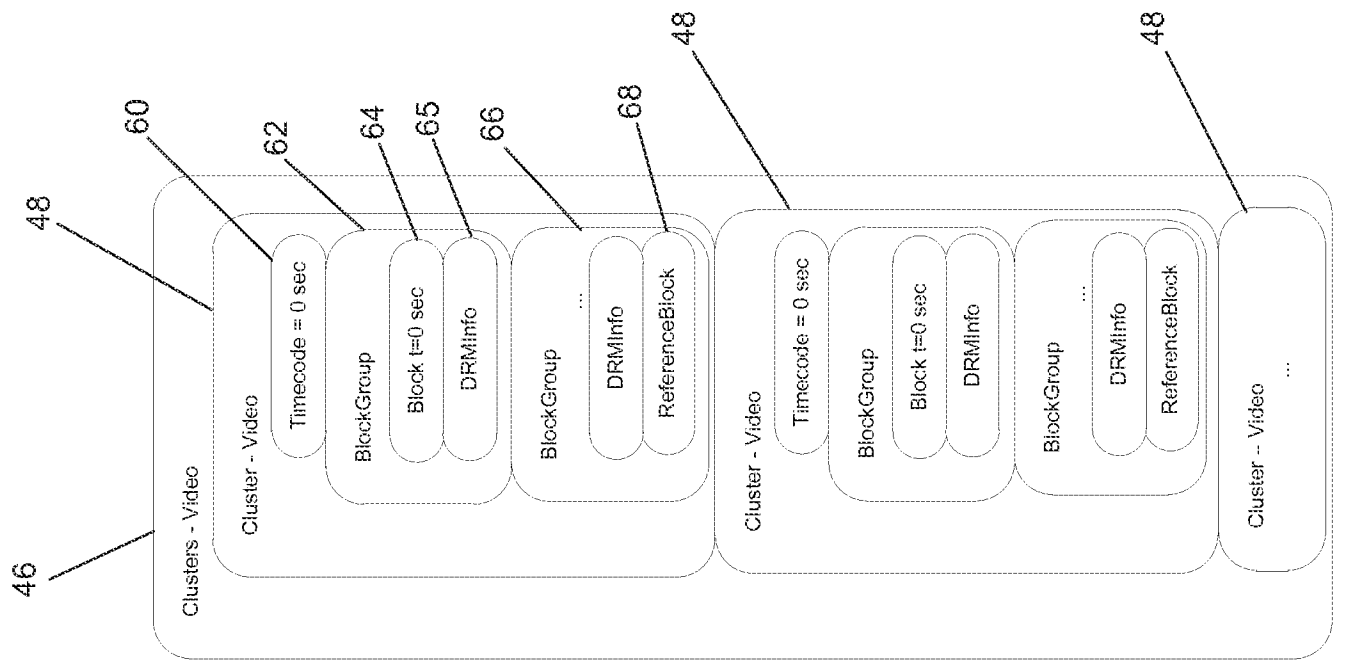
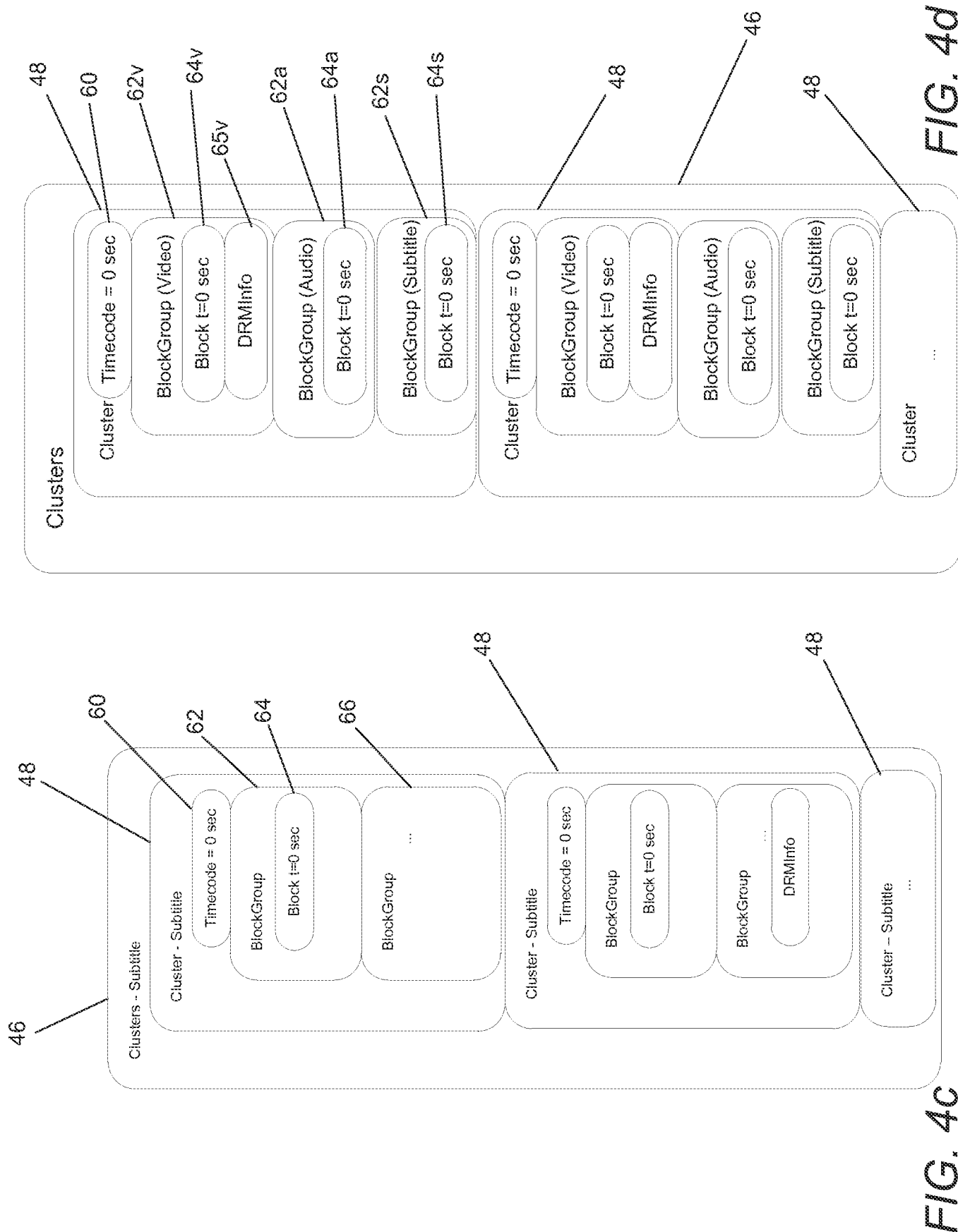


FIG. 4b



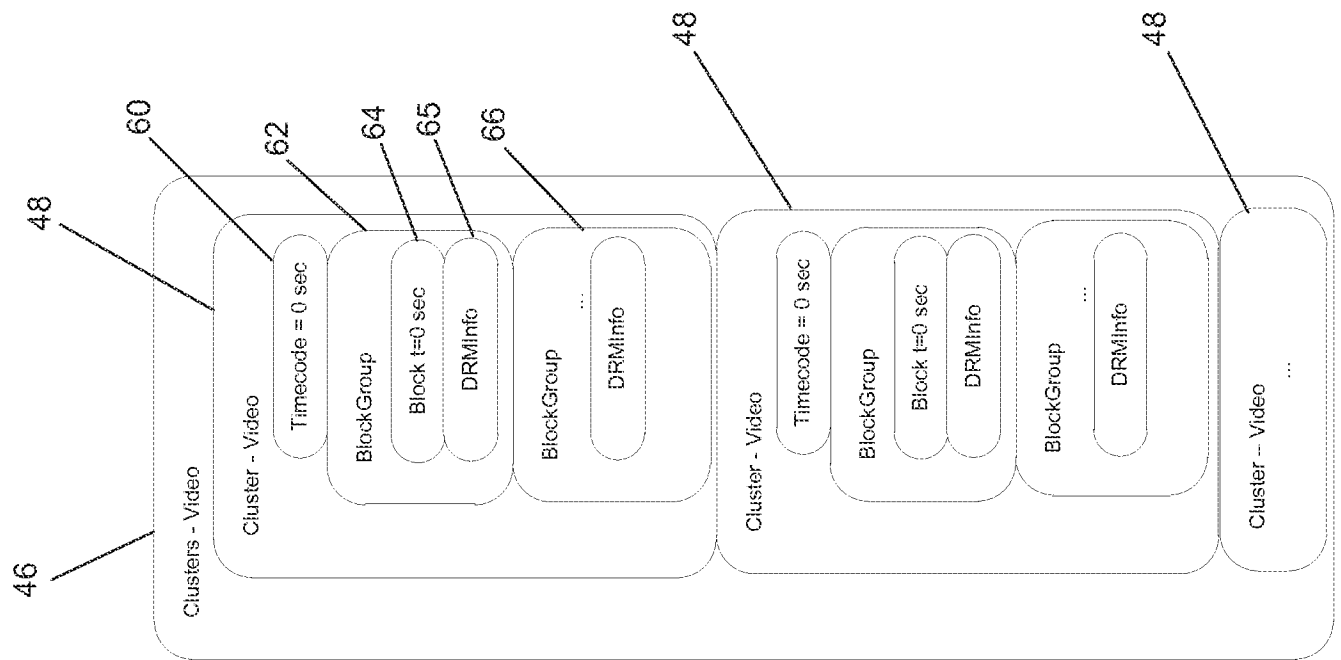


FIG. 4e

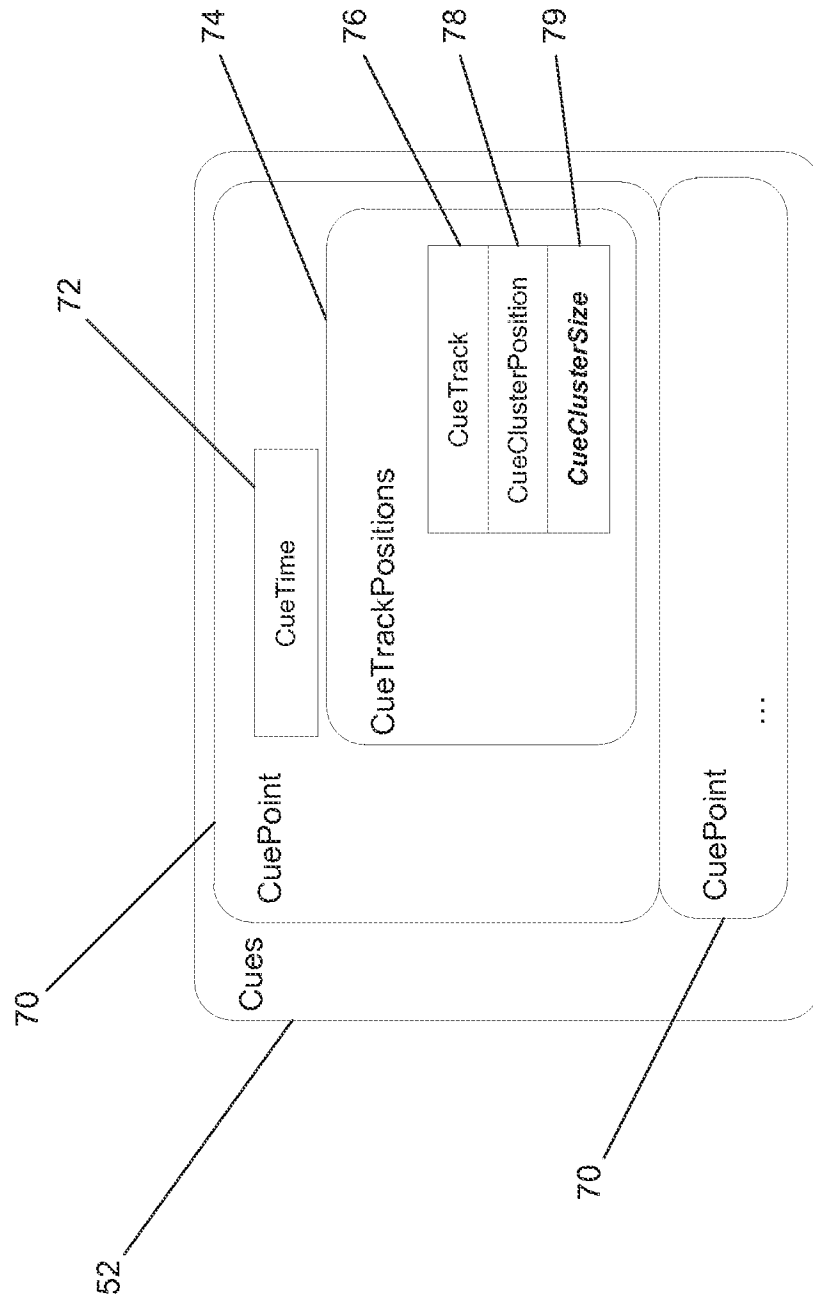


FIG. 5

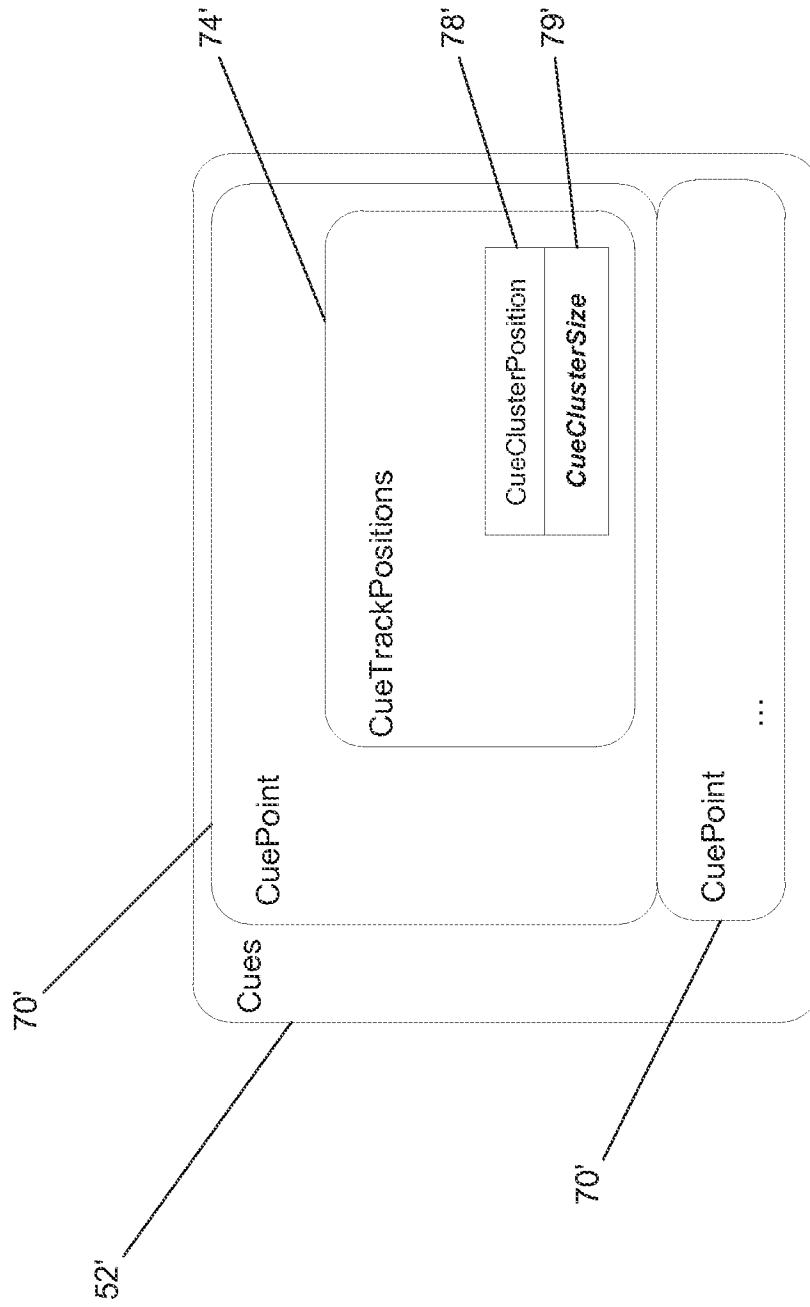


FIG. 5a

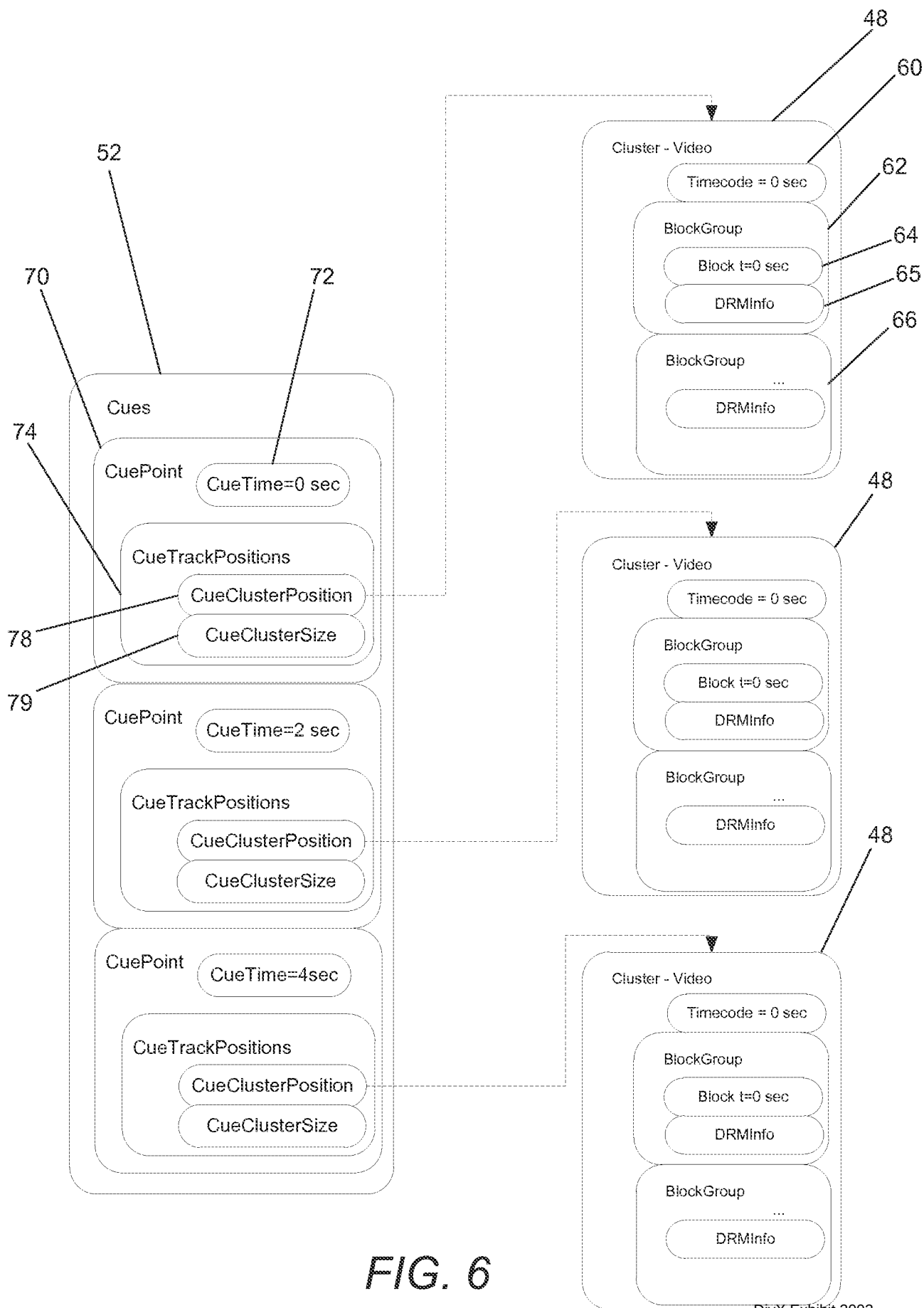


FIG. 6

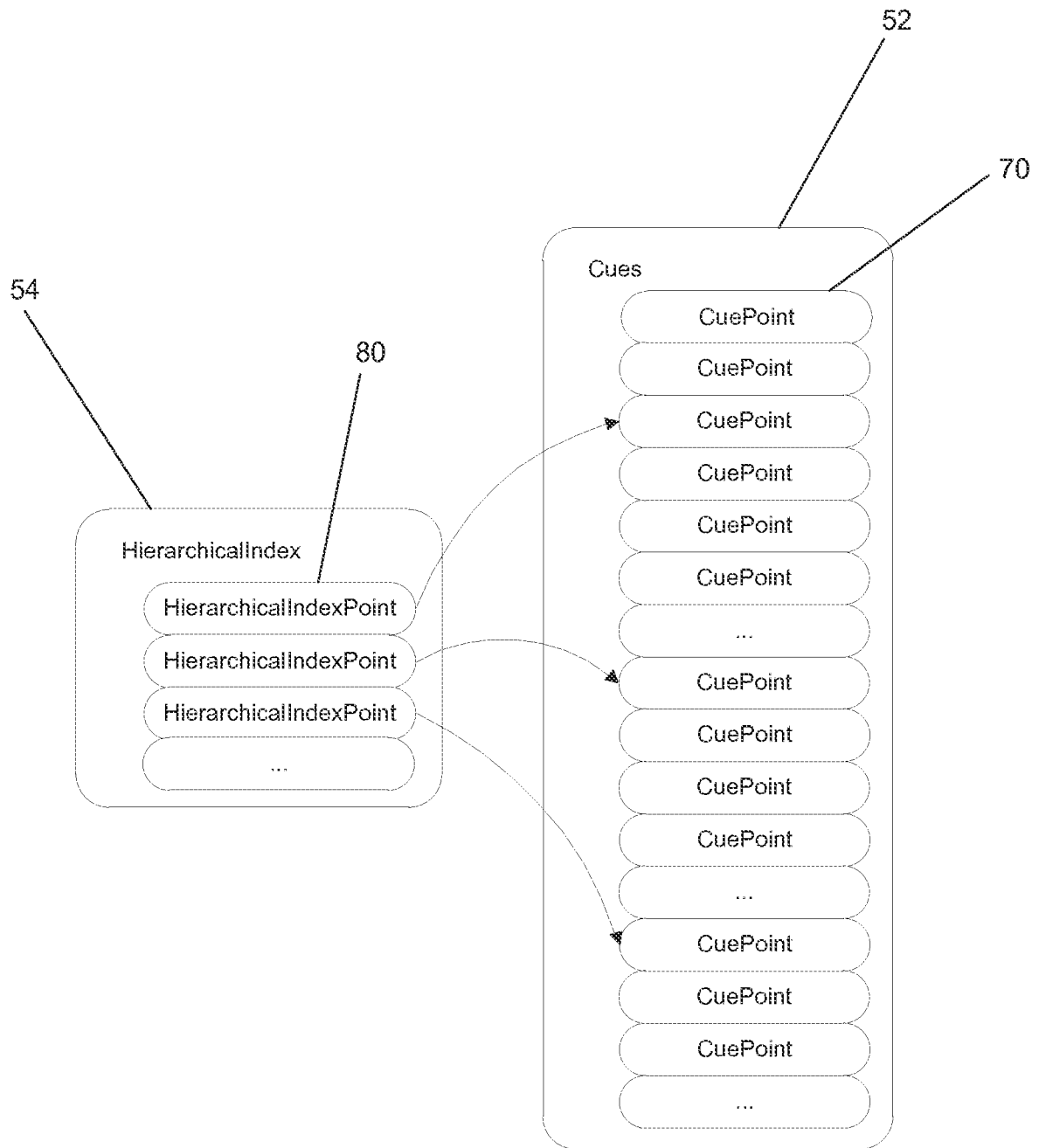


FIG. 7

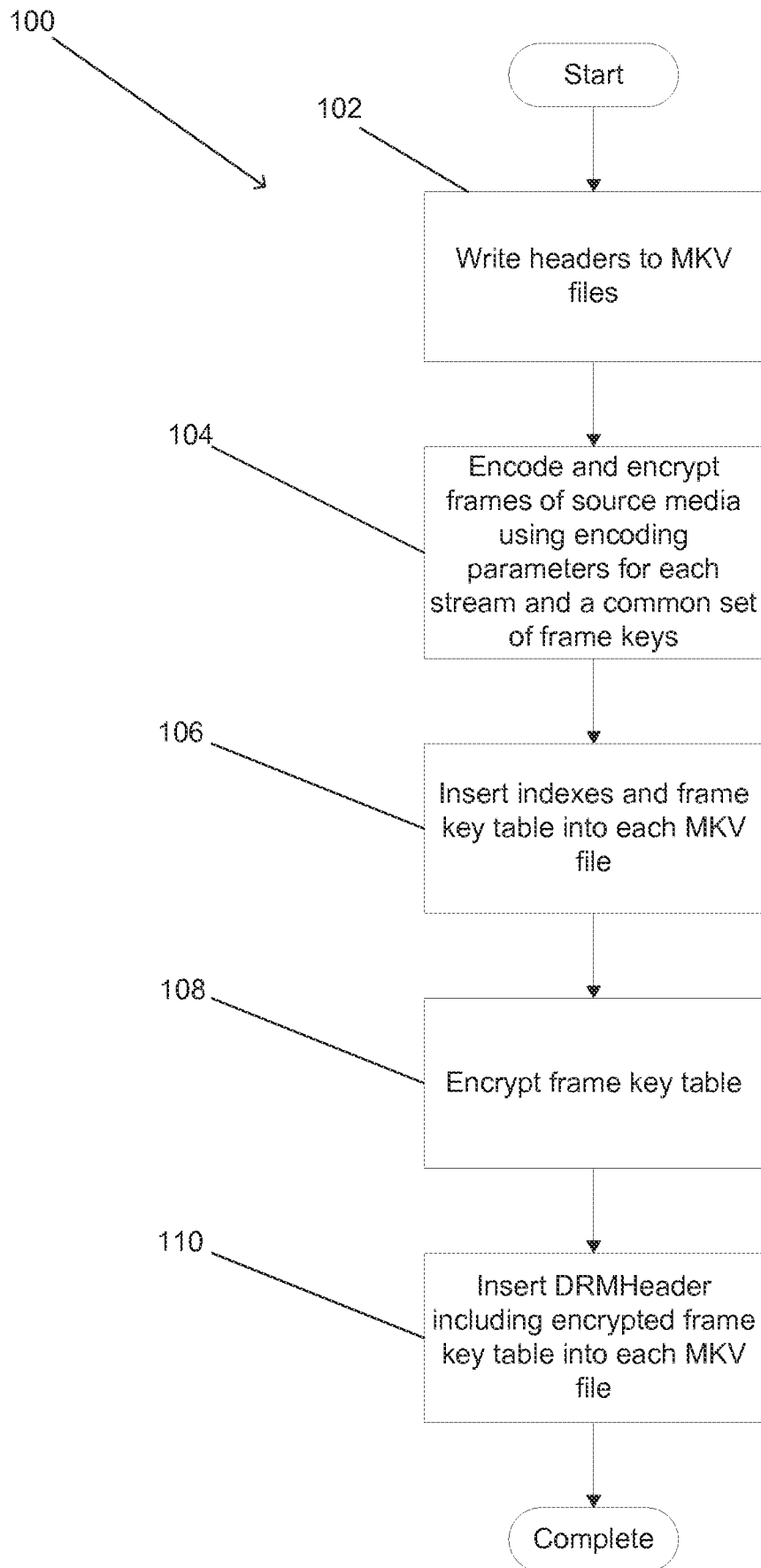


FIG. 8

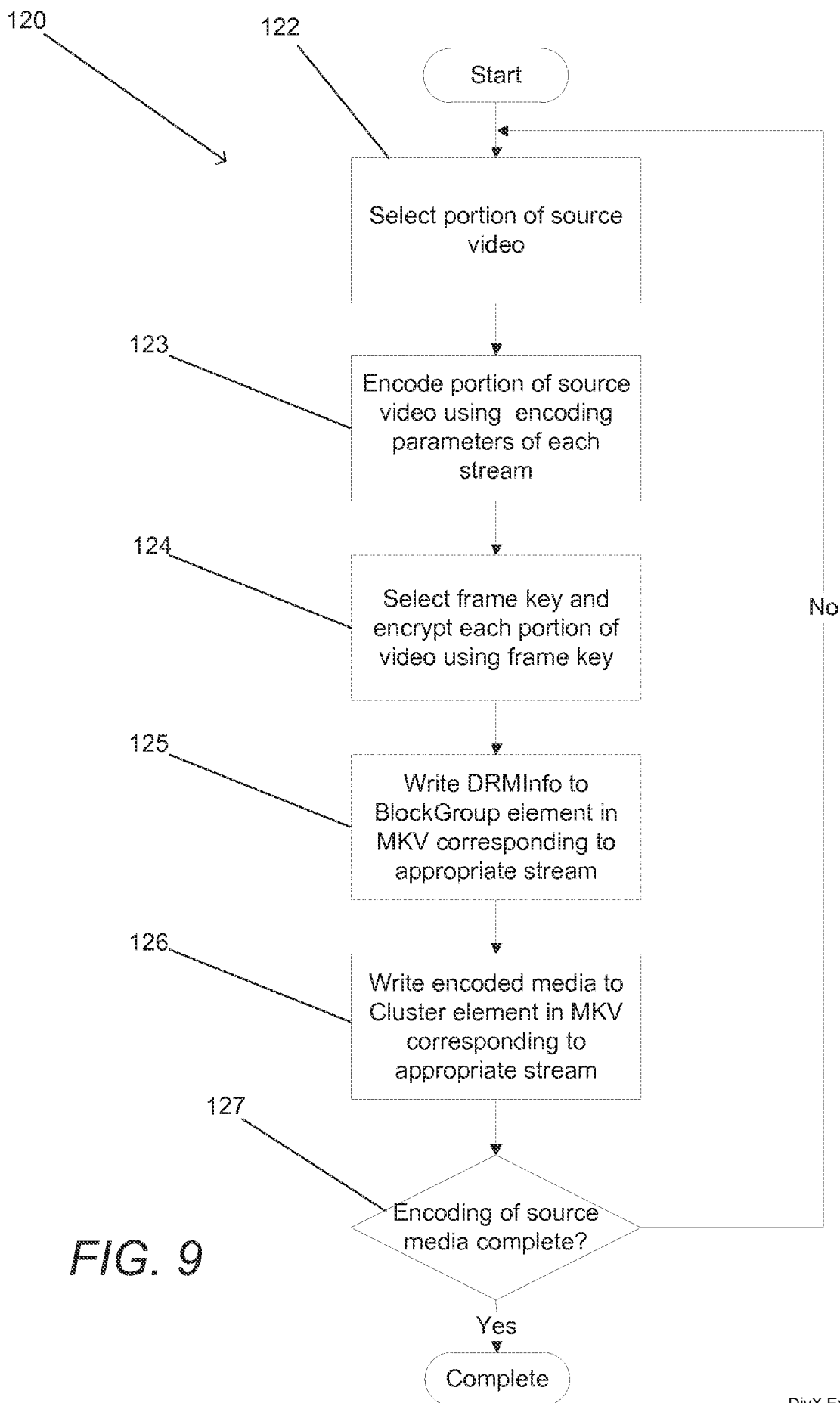


FIG. 9

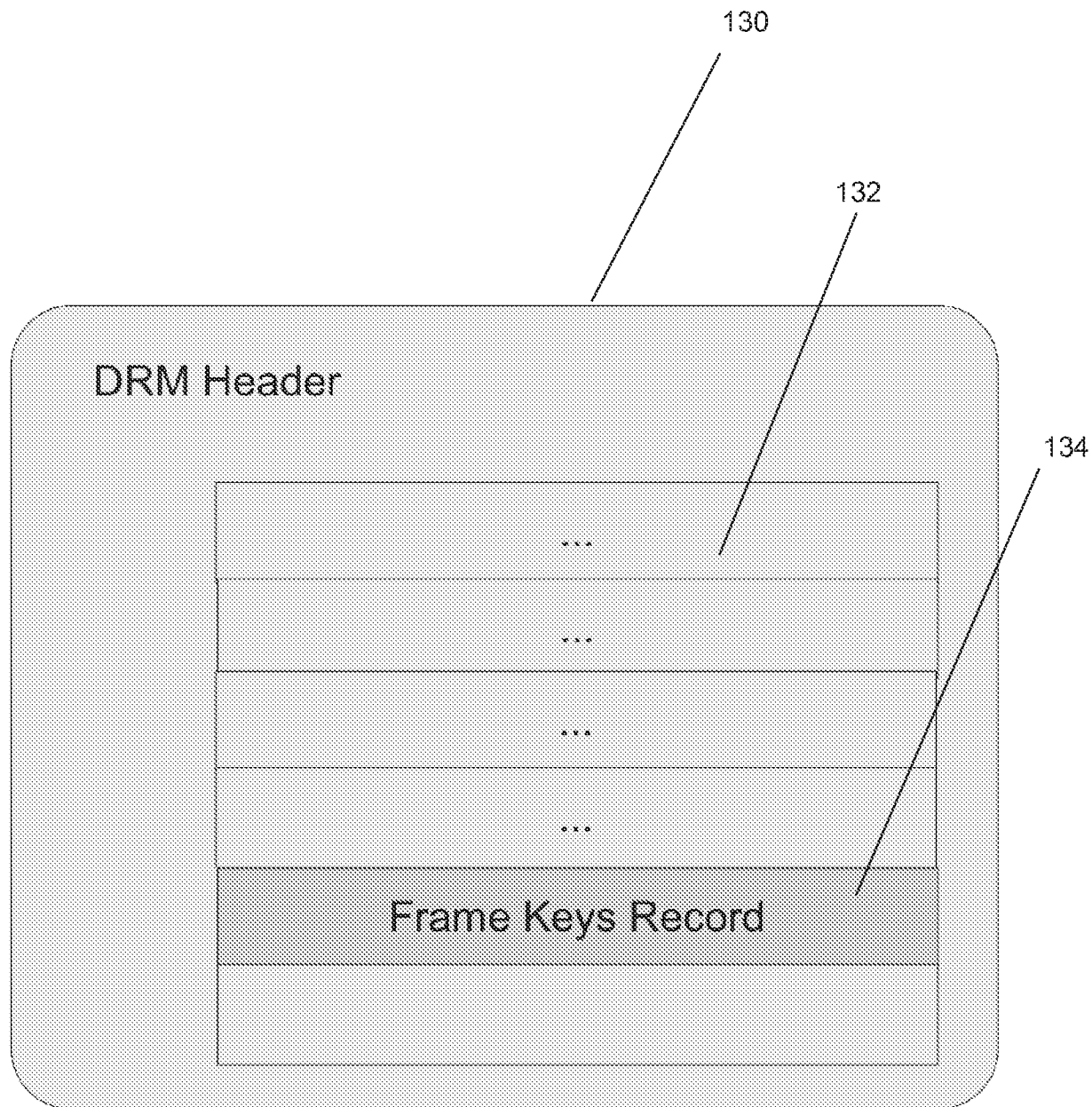


FIG. 10

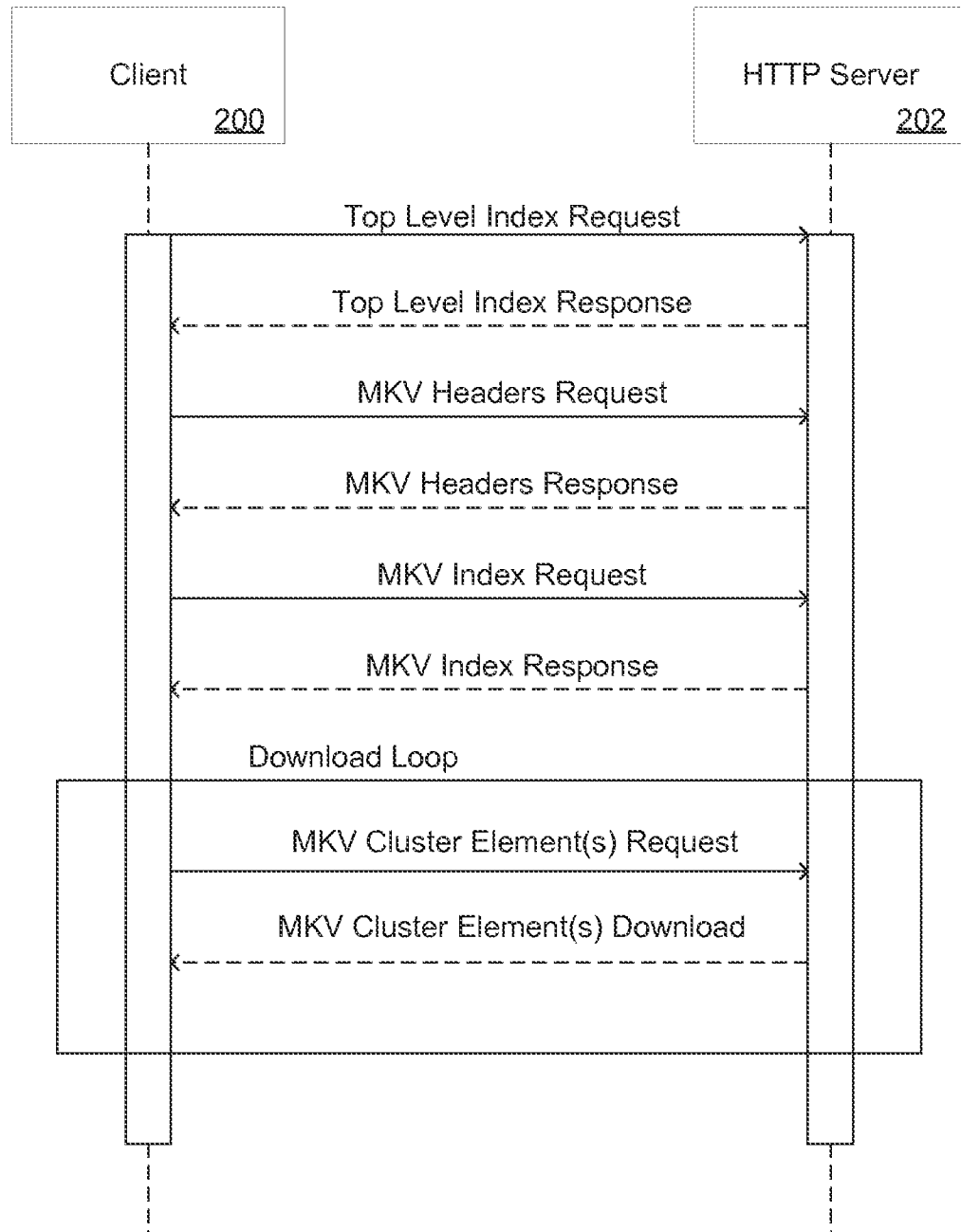
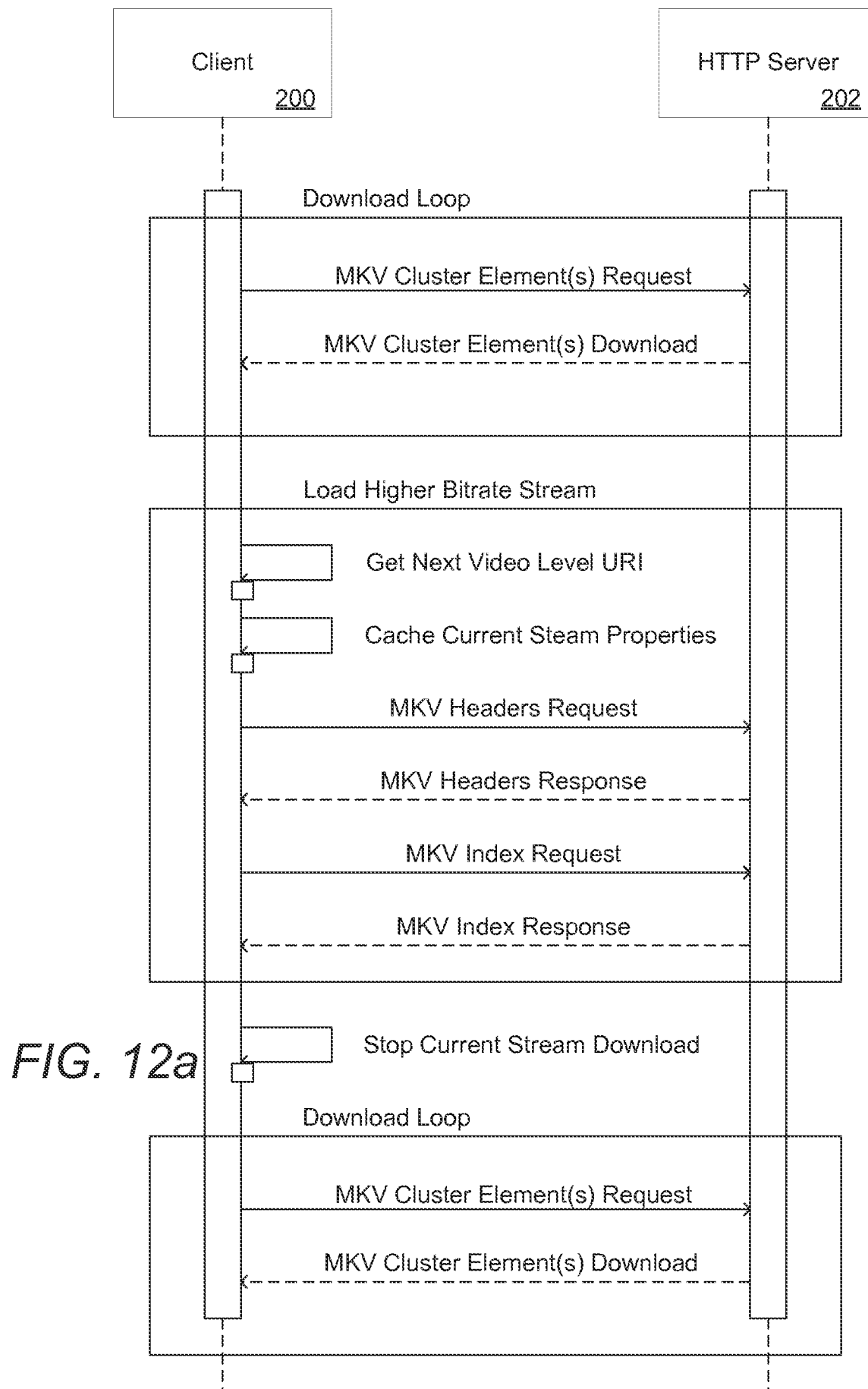


FIG. 11



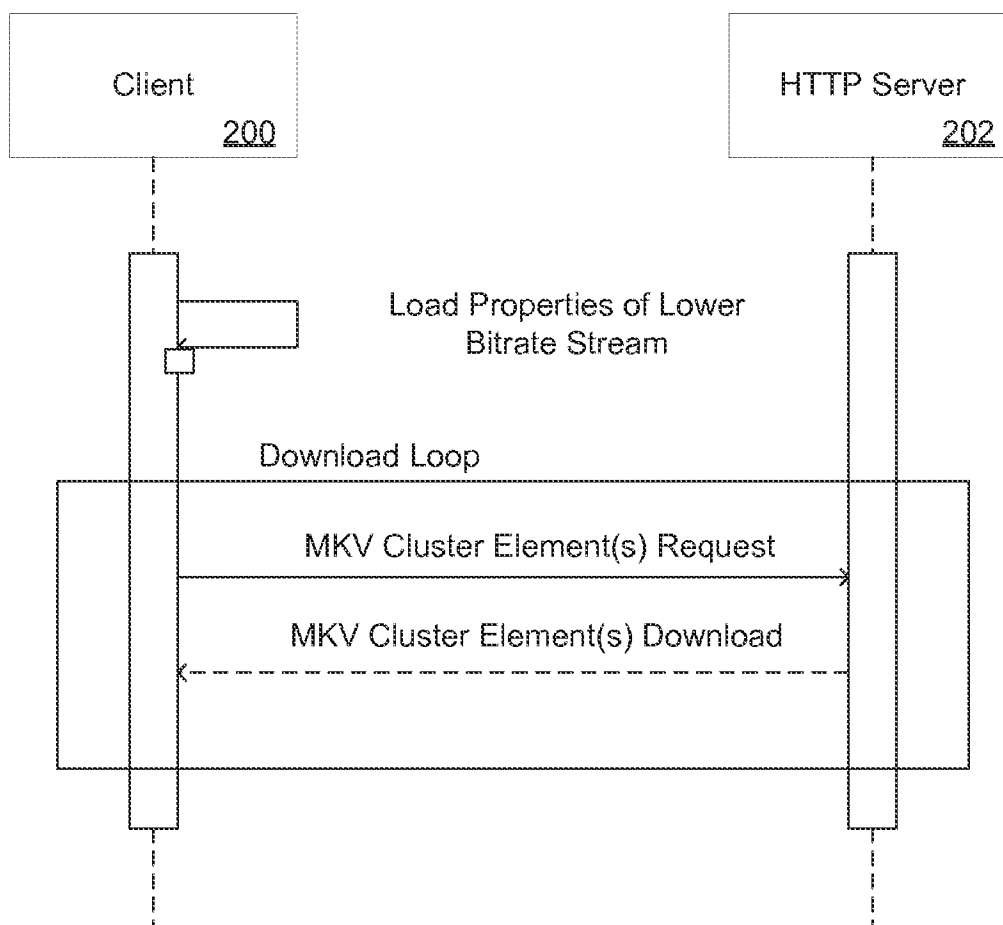


FIG. 12b

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	D1-02359A.CON
		Application Number	
Title of Invention	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information		
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.			

Secrecy Order 37 CFR 5.2

☐	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.)
--------------------------	---

Inventor Information:

Inventor 1					Remove		
Legal Name							
Prefix	Given Name		Middle Name		Family Name		Suffix
	Michael		George		Kiefer		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service							
City	Lake Havasu City		State/Province	AZ	Country of Residence	US	
Mailing Address of Inventor:							
Address 1		470 Brite Drive					
Address 2							
City	Lake Havasu City			State/Province	AZ		
Postal Code	86406		Country	US			
Inventor 2					Remove		
Legal Name							
Prefix	Given Name		Middle Name		Family Name		Suffix
	Eric		William		Grab		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service							
City	San Diego		State/Province	CA	Country of Residence	US	
Mailing Address of Inventor:							
Address 1		5387 Channing Street					
Address 2							
City	San Diego			State/Province	CA		
Postal Code	92117		Country	US			
Inventor 3					Remove		
Legal Name							
Prefix	Given Name		Middle Name		Family Name		Suffix
	Jason				Bransess		
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		D1-02359A.CON	
		Application Number			
Title of Invention		Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information			
City	San Diego	State/Province	CA	Country of Residence	US
Mailing Address of Inventor:					
Address 1		15885 Concord Ridge Terrace			
Address 2					
City	San Diego	State/Province	CA		
Postal Code	92127	Country	US		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence information of this application.			
Customer Number	71897		
Email Address	pair@kppb.com	Add Email	Remove Email

Application Information:

Title of the Invention	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information		
Attorney Docket Number	D1-02359A.CON	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	19	Suggested Figure for Publication (if any)	1

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐ Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.			
Please Select One: ☒ Customer Number ☐ US Patent Practitioner ☐ Limited Recognition (37 CFR 1.11.9)			

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	D1-02359A.CON
		Application Number	
Title of Invention	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information		
Customer Number	71897		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this 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.			
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation of	13/340623	2011-12-29
Prior Application Status	Expired	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
13/340623	non provisional of	61/530305	2011-09-01
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).			
Remove			
Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	D1-02359A.CON
		Application Number	
Title of Invention	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information		

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

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.
--

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices
If 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 World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application. In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application. In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

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.
--

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	D1-02359A.CON
		Application Number	
Title of Invention	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information		

Applicant 1			
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	Sonic IP, Inc.		
Mailing Address Information For Applicant:			
Address 1	4780 Eastgate Mall		
Address 2			
City	San Diego	State/Province	CA
Country	US	Postal Code	92121
Phone Number		Fax Number	
Email Address			
Additional Applicant Data may be generated within this form by selecting the Add button.			

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.			
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.			
If the Assignee is an Organization check here. ☒			

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	D1-02359A.CON
		Application Number	
Title of Invention	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information		

Organization Name	Sonic IP, Inc.
-------------------	----------------

Mailing Address Information For Non-Applicant Assignee:			
Address 1			
Address 2			
City		State/Province	
Country ⁱ		Postal Code	
Phone Number		Fax Number	
Email Address			

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

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.					
Signature	/Jason D. Wolfe/			Date (YYYY-MM-DD)	2014-12-08
First Name	Jason	Last Name	Wolfe	Registration Number	71327

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

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.**

Electronic Patent Application Fee Transmittal

Application Number:				
Filing Date:				
Title of Invention:	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information			
First Named Inventor/Applicant Name:	Michael George Kiefer			
Filer:	Jason Daniel Wolfe/Katrina Lee			
Attorney Docket Number:	D1-02359A.CON			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility application filing	1011	1	280	280
Utility Search Fee	1111	1	600	600
Utility Examination Fee	1311	1	720	720
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1600

Electronic Acknowledgement Receipt

EFS ID:	20900344
Application Number:	14564003
International Application Number:	
Confirmation Number:	5114
Title of Invention:	Systems and Methods for Playing Back Alternative Streams of Protected Content Protected Using Common Cryptographic Information
First Named Inventor/Applicant Name:	Michael George Kiefer
Customer Number:	71897
Filer:	Jason Daniel Wolfe/Katrina Lee
Filer Authorized By:	Jason Daniel Wolfe
Attorney Docket Number:	D1-02359A.CON
Receipt Date:	08-DEC-2014
Filing Date:	
Time Stamp:	21:06:10
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 1600
RAM confirmation Number	8322
Deposit Account	504407
Authorized User	BAILEY, DAVID

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

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Page 2003 - 239

IPR2020-00558

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Oath or Declaration filed	02359acondeclarations.pdf	2317543	no	3
			b24fdb2d77a865fea8db02b920fc620ff66a a949		

Warnings:

Information:

2		02359aconspecification.pdf	167537	yes	51
			caa6cdaa576f0eb606826a7a18e90017a566 f7e2		

Multipart Description/PDF files in .zip description

	Document Description	Start	End
	Specification	1	43
	Claims	44	50
	Abstract	51	51

Warnings:

Information:

3	Drawings-only black and white line drawings	02359acondrawings.pdf	233526	no	19
			f4e421e267f6e176b58300419c12f76d228c 502e		

Warnings:

Information:

4	Application Data Sheet	02359aconapplicationdatasheet.pdf	97601	no	6
			c31bafb4b0d6292b4cd6a83fa0d4484b3e8 78912		

Warnings:

Information:

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5	Fee Worksheet (SB06)	fee-info.pdf	35346	no	2
			00ffa4906e9b5dd17166bf3c89311608c00a 170a		

Warnings:

Information:

Total Files Size (in bytes): 2851553

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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.

SCORE Placeholder Sheet for IFW Content

Application Number: 14564003

Document Date: 12/08/2014

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

- Drawings – Other than Black and White Line Drawings

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

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Form Revision Date: September 30, 2013