(12) **United States Patent**
Jones et al.

(10) Patent No.: **US 7,747,765 B2**
(45) Date of Patent: ***Jun. 29, 2010**

(54) **METHOD AND APPARATUS FOR MEDIA DATA TRANSMISSION**

(75) Inventors: **Anne Jones**, Redwood City, CA (US); **Jay Geagan**, San Jose, CA (US); **Kevin L. Gong**, Sunnyvale, CA (US); **Alagu Periyannan**, San Francisco, CA (US); **David W. Singer**, San Francisco, CA (US)

(73) Assignee: **Apple Inc.**, Cupertino, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 315 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **11/497,038**

(22) Filed: **Jul. 31, 2006**

(65) **Prior Publication Data**

US 2007/0067477 A1   Mar. 22, 2007

Related U.S. Application Data

(63) Continuation of application No. 10/789,582, filed on Feb. 26, 2004, now Pat. No. 7,366,788, which is a continuation of application No. 10/177,119, filed on Jun. 21, 2002, now Pat. No. 6,714,984, which is a continuation of application No. 09/139,378, filed on Aug. 25, 1998, now Pat. No. 6,453,355.

(60) Provisional application No. 60/071,566, filed on Jan. 15, 1998.

(51) **Int. Cl.**
G06F 15/16   (2006.01)
(52) **U.S. Cl.** **709/230**; 709/231; 370/394
(58) **Field of Classification Search** 709/230, 709/231; 370/394; 345/327, 259
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,873,777	A	3/1975	Uehara et al.
3,932,698	A	1/1976	Yanagimachi et al.
4,688,214	A	8/1987	DeWitt et al.
4,907,224	A	3/1990	Scoles et al.
5,251,209	A	10/1993	Jurkevich et al.
5,319,707	A	6/1994	Wasilewski et al.
5,365,272	A	11/1994	Siracusa
5,371,547	A	12/1994	Siracusa et al.
5,404,469	A	4/1995	Chung et al.
5,448,568	A	9/1995	Delpuch et al.
5,497,373	A	3/1996	Hulen et al.
5,544,198	A	8/1996	Saalfrank et al.
5,574,939	A	11/1996	Keckler et al.

(Continued)

FOREIGN PATENT DOCUMENTS

CA	1298632	4/1992

(Continued)

OTHER PUBLICATIONS

Aaron E. Walsh, "Multimedia to the Macs", Dr. Dobb's Journal, Jul. 1992, pp. 76, 78-80.
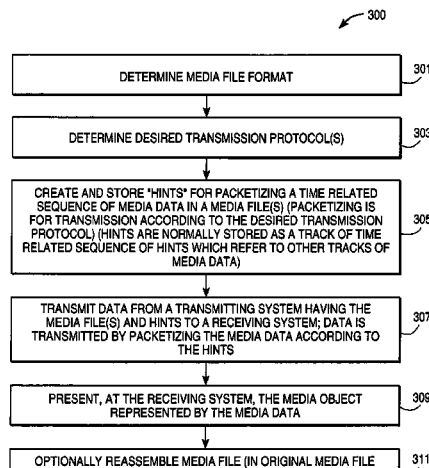
(Continued)

Primary Examiner—Krisna Lim
(74) *Attorney, Agent, or Firm*—Blakely, Sokoloff, Taylor & Zafman LLP

(57)   **ABSTRACT**

Methods and apparatuses for processing media data transmitted in a data communication medium. A digital processing system is provided with a time related sequence of media data provided to the digital processing system based on a set of data, wherein the set of data indicates a method to transmit the time related sequence of media data according to a transmission protocol. The set of data, itself, is a time related sequence of data associated with the time related sequence of media data. The time related sequence of media data may be presented and/or stored by the digital processing system.

59 Claims, 14 Drawing Sheets

DETERMINE MEDIA FILE FORMAT — 301

DETERMINE DESIRED TRANSMISSION PROTOCOL(S) — 303

CREATE AND STORE "HINTS" FOR PACKETIZING A TIME RELATED SEQUENCE OF MEDIA DATA IN A MEDIA FILE(S) (PACKETIZING IS FOR TRANSMISSION ACCORDING TO THE DESIRED TRANSMISSION PROTOCOL) (HINTS ARE NORMALLY STORED AS A TRACK OF TIME RELATED SEQUENCE OF HINTS WHICH REFER TO OTHER TRACKS OF MEDIA DATA) — 305

TRANSMIT DATA FROM A TRANSMITTING SYSTEM HAVING THE MEDIA FILE(S) AND HINTS TO A RECEIVING SYSTEM; DATA IS TRANSMITTED BY PACKETIZING THE MEDIA DATA ACCORDING TO THE HINTS — 307

PRESENT, AT THE RECEIVING SYSTEM, THE MEDIA OBJECT REPRESENTED BY THE MEDIA DATA — 309

OPTIONALLY REASSEMBLE MEDIA FILE (IN ORIGINAL MEDIA FILE — 311

U.S. PATENT DOCUMENTS

5,623,490	A	4/1997	Richter et al.
5,625,818	A	4/1997	Zarmer et al.
5,655,117	A	8/1997	Goldberg et al.
5,659,539	A	8/1997	Porter et al.
5,689,509	A	11/1997	Gaytan et al.
5,694,334	A	12/1997	Donahue et al.
5,768,535	A	6/1998	Chaddha et al.
5,774,666	A	6/1998	Portuesi
5,778,187	A	7/1998	Monteiro et al.
5,784,277	A	7/1998	Meyer
5,799,150	A	8/1998	Hamilton et al.
5,802,294	A	9/1998	Ludwig et al.
5,818,441	A	10/1998	Throckmorton et al.
5,826,024	A	10/1998	Higashimura et al.
5,838,678	A	11/1998	Davis et al.
5,859,660	A	1/1999	Perkins et al.
5,864,682	A	1/1999	Porter et al.
5,915,094	A	6/1999	Kouloheris et al.
5,928,330	A	7/1999	Goetz et al.
5,956,729	A	9/1999	Goetz et al.
5,966,120	A	10/1999	Arazi et al.
5,987,501	A	11/1999	Hamilton et al.
5,987,509	A	11/1999	Portuesi
5,995,491	A	11/1999	Richter et al.
6,055,246	A	4/2000	Jones
6,064,771	A	5/2000	Migdal et al.
6,098,188	A	8/2000	Kalmanek et al.
6,104,859	A	8/2000	Yoshida et al.
6,112,226	A	8/2000	Weaver et al.
6,119,154	A	9/2000	Weaver et al.
6,134,243	A	10/2000	Jones et al.
6,138,147	A	10/2000	Weaver et al.
6,157,674	A	12/2000	Oda et al.
6,175,871	B1	1/2001	Schuster et al.
6,175,872	B1	1/2001	Neumann et al.
6,327,418	B1	12/2001	Barton
6,438,172	B1	8/2002	Nakamura et al.
6,453,355	B1	9/2002	Jones et al.
6,512,778	B1	1/2003	Jones et al.
6,578,070	B1	6/2003	Weaver et al.
6,714,984	B2	3/2004	Jones et al.
6,717,952	B2	4/2004	Jones et al.
6,744,763	B1	6/2004	Jones et al.
6,745,226	B1	6/2004	Guedalia
6,829,648	B1	12/2004	Jones et al.
7,161,957	B2	1/2007	Wang et al.
7,366,788	B2	4/2008	Jones et al.
2002/0037037	A1	3/2002	Van Der Schaar
2005/0195899	A1	9/2005	Han
2005/0195900	A1	9/2005	Han
2007/0022215	A1	1/2007	Jones et al.

FOREIGN PATENT DOCUMENTS

CA	2 197 323	10/2001
CA	2 387 254	3/2003
EP	0 497 449 A2	8/1992
EP	0 702 309 A1	3/1996
EP	1 458 196 A2	9/2004
JP	9101928 A	4/1997
JP	9200158 A	7/1997
WO	WO 97/22201	6/1997
WO	WO 97/25817 A1	7/1997
WO	WO 02/054284	7/2002

OTHER PUBLICATIONS

Paul England, Robert Allen, Ron Underwood, "Rave: Real-Time Services for the Web", Computer Networks and ISDN Systems, pp. 1547-1558.

Susie J. Wee and John G. Apostolopoulos, "Secure Scalable Streaming Enabling Transcoding Without Decryption", Proceedings 2002 International Conference On Image Processing, ICIP, Oct. 7, 2001, vol. 1 of 3, Conf. 8, pp. 437-440, IEEE, USA.

International Search Report, PCT/US2006/028275, Dec. 18, 2006, 11 pages.

PCT International Search Report for PCT Int'l Application No. PCT/US99/00953 mailed Jul. 26, 1999.

PCT International Search Report for PCT Int'l Application No. PCT/US99/00954 mailed Jul. 26, 1999.

PCT International Search Report for PCT Int'l Application No. PCT/US99/00955 mailed Jul. 26, 1999.

Song, Jun. "Synchronzing Feature of Multimedia, "*Today's Electronics*, Jan. 18, 1997, pp. 30-31 in Chinese.

Song, Jun. "Synchronzing Feature of Multimedia, "*Today's Electronics*, Jan. 18, 1997, translated into English (pp. 1-6).

Aaron E. Walsh, "Multimedia to the Macs", Dr. Dobb's Journal, Jul. 1992, pp. 76, 78-80.

Paul England, Robert Allen, Ron Underwood, "RAVE: Real-Time Services for the Web", Computer Networks and ISDN Systems, pp. 1547-1558, May 1996.

Wee, Susie et al. "Secure Scalable Video Streaming for Wireless Networks." IEEE International Conference on Acoustics, Speech, and Signal Processing, Salt Lake City, Utah, May 2001, 4 pages.
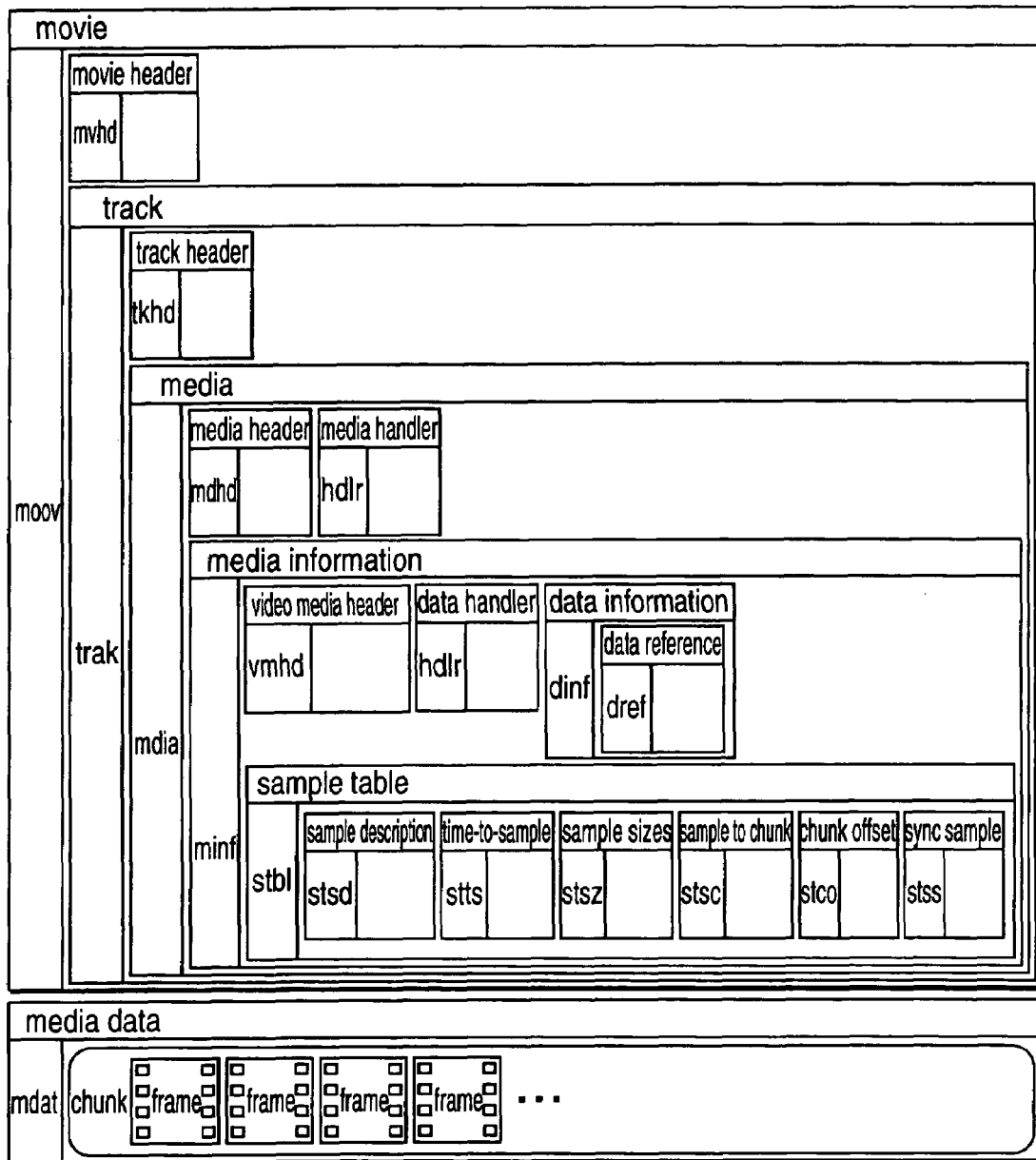
movie

movie header

mvhd

track

track header

tkhd

media

media header

mdhd

media handler

hdlr

media information

video media header

vmhd

data handler

hdlr

data information

data reference

dinf

dref

sample table

	sample description	time-to-sample	sample sizes	sample to chunk	chunk offset	sync sample
stbl	stsd	stts	stsz	stsc	stco	stss

moov

trak

mdia

minf

media data

mdat | chunk | frame | frame | frame | frame | . . .

FIG. 1

FIG. 2

300

| DETERMINE MEDIA FILE FORMAT | 301 |

| DETERMINE DESIRED TRANSMISSION PROTOCOL(S) | 303 |

| CREATE AND STORE "HINTS" FOR PACKETIZING A TIME RELATED SEQUENCE OF MEDIA DATA IN A MEDIA FILE(S) (PACKETIZING IS FOR TRANSMISSION ACCORDING TO THE DESIRED TRANSMISSION PROTOCOL) (HINTS ARE NORMALLY STORED AS A TRACK OF TIME RELATED SEQUENCE OF HINTS WHICH REFER TO OTHER TRACKS OF MEDIA DATA) | 305 |

| TRANSMIT DATA FROM A TRANSMITTING SYSTEM HAVING THE MEDIA FILE(S) AND HINTS TO A RECEIVING SYSTEM; DATA IS TRANSMITTED BY PACKETIZING THE MEDIA DATA ACCORDING TO THE HINTS | 307 |

| PRESENT, AT THE RECEIVING SYSTEM, THE MEDIA OBJECT REPRESENTED BY THE MEDIA DATA | 309 |

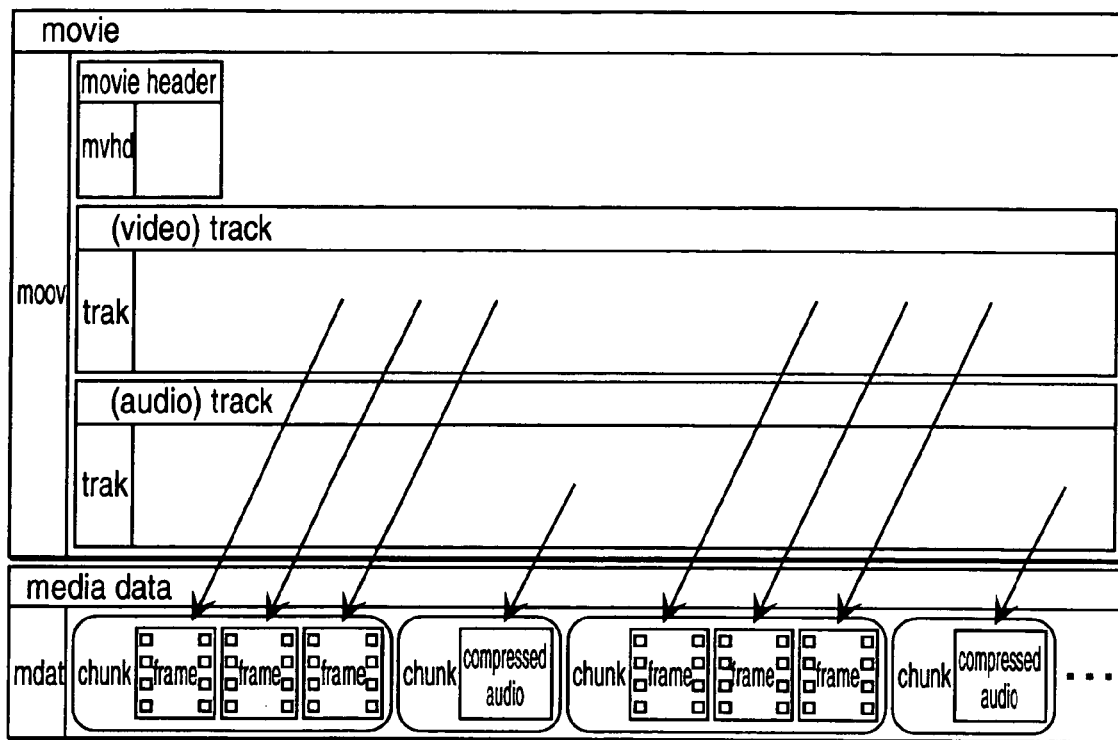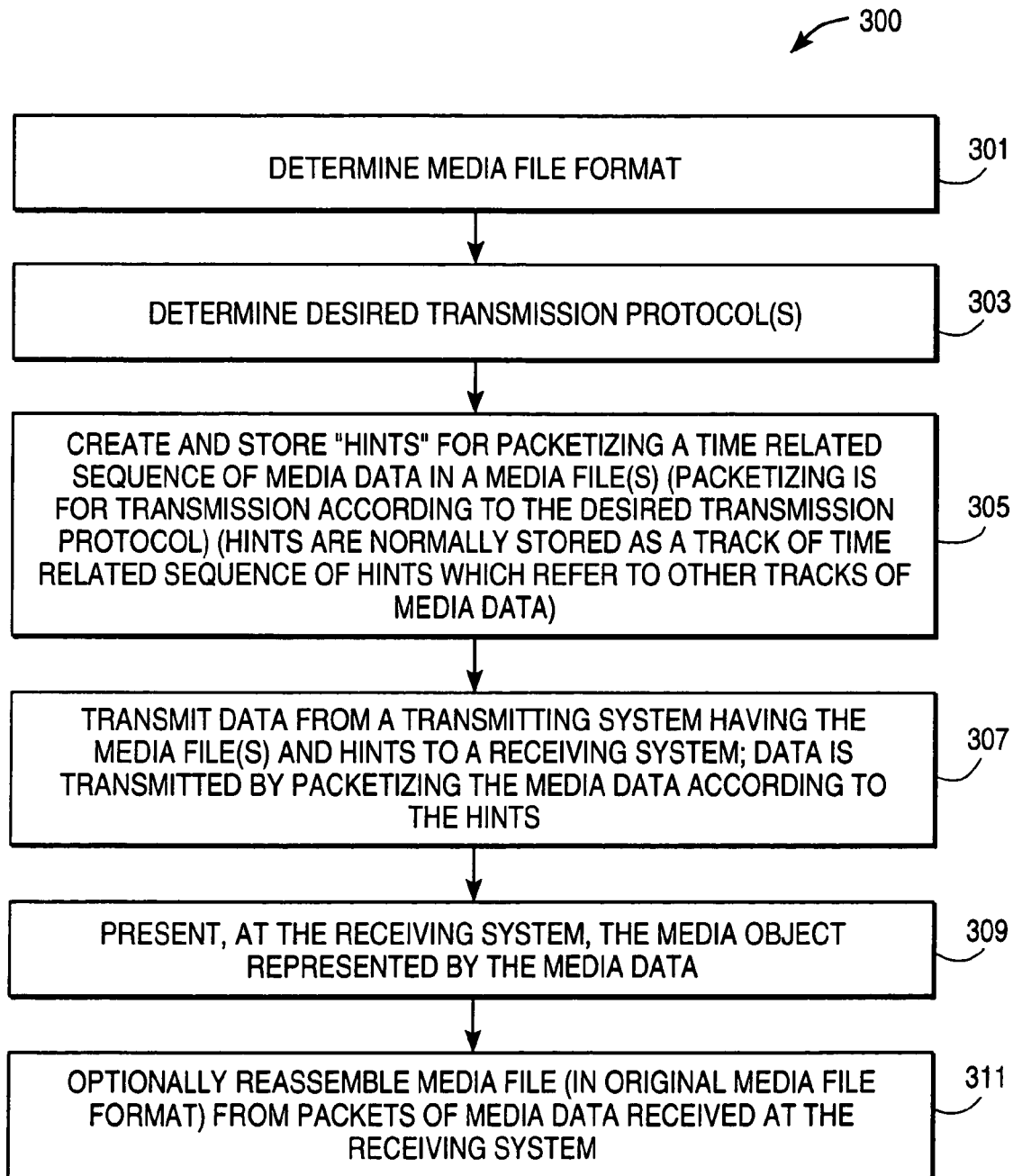| OPTIONALLY REASSEMBLE MEDIA FILE (IN ORIGINAL MEDIA FILE FORMAT) FROM PACKETS OF MEDIA DATA RECEIVED AT THE RECEIVING SYSTEM | 311 |

FIG. 3

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.

WHAT WILL YOU BUILD? | sales@docketalarm.com | 1-866-77-FASTCASE

fastcase®
Smarter legal research.