PATENT
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application Number: 12/882,665
Current Date

Filing Date: 15 SEP 2010

Patent Number: 8,515,259

Issue Date: 20 AUG 2013

CHANGE OF ENTITY STATUS PURSUANT TO 37 C.F.R. §1.27 (g)(2)

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

Sir:

This communication hereby notifies the United States Patent and Trademark Office

that small entity status is no longer applicable for the above-identified patent.

COMPANY or FIRM NAME AND ADDRESS:

SK planet
The Planet, Pangyo-ro 264,
Bundang-gu, Seongnam-si,
Gyeonggi-do, 463-400, Korea

Respectfully submitted,

Signature
Jung-hoon Park

Printed Name
Manager

Title

OR
Reg. # if US Attorney
APPLICATION NO. | ISSUE DATE | PATENT NO. | ATTORNEY DOCKET NO. | CONFIRMATION NO.
--- | --- | --- | --- | ---
12/882,665 | 08/20/2013 | 8515259 | 0366.1003 | 3369

STEIN IP, LLC
1400 EYE STREET, NW
SUITE 300
WASHINGTON, DC 20005

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 244 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):

Wonjang BAEK, Gyeonggi-do, KOREA, REPUBLIC OF;
John Kim, Seoul, KOREA, REPUBLIC OF;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.
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 new "FEE ADDRESS" for maintenance fee notifications.

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

49455 7590 06/10/2013
STEIN IP, LLC
1400 EYE STREET, NW
SUITE 300
WASHINGTON, DC 20005

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

Certificate of Mailing or Transmission
I hereby certify that the 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. 12/482,665 FILING DATE 09/15/2010
FIRST NAMED INVENTOR Wonjang BAEK
ATTORNEY DOCKET NO. 0366.1003 CONFIRMATION NO. 3369

TITLE OF INVENTION: METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J

SPECIFICATION

APPLN. TYPE nonprovisional ENTITY STATUS SMALL ISSUE FEE DUE $890 PUBLICATION FEE DUE $300 PREV. PAID ISSUE FEE $0 TOTAL FEE(S) DUE $1190 DATE DUE 09/10/2013

EXAMINER ZHAO, DAQUAN ART UNIT 2484 CLASS-SUBCLASS 386-29/4000

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/123) attached.
   □ "Fee Address" indication (or "Fee Address" indication form PTO/SB/47; Rev 03-03 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 at a member of 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. Stein IP, LLC

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 recording as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

   (A) NAME OF ASSIGNEE
   SK Planet Co., Ltd.

   (B) RESIDENCE (CITY and STATE OR COUNTRY)
   Seoul, REPUBLIC OF KOREA

   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 remit 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 503335 (enclose an extra copy of this form).

PTOL-85 (Rev. 02/11)
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 form PTO/SB/15A and 15B), issue fees 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.

Authorized Signature: [Signature]

Typed or printed name: Sungyeon Chung

Date: July 17, 2013

Registration No.: 64,130

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.

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.
**Electronic Patent Application Fee Transmittal**

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**Title of Invention:** METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION

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<th>First Named Inventor/Applicant Name:</th>
<th>Wonjang BAEK</th>
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<tr>
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<td>Attorney Docket Number:</td>
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Filed as Small Entity

### Utility under 35 USC 111(a) Filing Fees

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- Publ. Fee- Early, Voluntary, or Normal: 1504 1 300 300
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# Electronic Acknowledgement Receipt

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<td>METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION</td>
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<td>Wonjang BAEK</td>
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<tr>
<td>Filer:</td>
<td>Sungyeop Chung/Austin Dieter</td>
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<td>Sungyeop Chung</td>
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<td>Attorney Docket Number:</td>
<td>0366.1003</td>
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### Payment information:

- Submitted with Payment: yes
- Payment Type: Credit Card
- Payment was successfully received in RAM: $1190
- RAM confirmation Number: 8822
- Deposit Account
- Authorized User

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</table>
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.
NOTICE OF ALLOWANCE AND FEE(S) DUE

49455 7590 06/10/2013
STEIN IP, LLC
1400 EYE STREET, NW
SUITE 300
WASHINGTON, DC 20005

EXAMINER
ZHAO, DAIQUAN

ART UNIT PAPER NUMBER 2484

DATE MAILED: 06/10/2013

APPLICATION NO. FILING DATE FIRST NAMED INVENTOR ATTORNEY DOCKET NO. CONFIRMATION NO.
12/882,665 09/15/2010 Wonjae BAEK 0366.1003 3369

TITLE OF INVENTION: METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION

APPLN. TYPE ENTITY STATUS ISSUE FEE DUE PUBLICATION FEE DUE PREV. PAID ISSUE FEE TOTAL FEE(S) DUE DATE DUE
nonprovisional SMALL $890 $300 $0 $1190 09/10/2013

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

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WASHINGTON, DC 20005

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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. |
| 12/882,665 | 09/15/2010 | Wonjang BAEK | 0366.1003 | 3369 |

TITLE OF INVENTION: METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION

APPLN. TYPE | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
| nonprovisional | SMALL | $890 | $300 | $0 | $1190 | 09/10/2013 |

EXAMINER | ART UNIT | CLASS-SUBCLASS |
| ZHAO, DAIQUAN | 2484 | 386-294000 |

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.
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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.

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 credit any overpayment, to Deposit Account Number (enclose an extra copy of this form).

PTOL-85 (Rev. 02/11)
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☐ 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.

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Authorized Signature ____________________________ Date ____________________________

Typed or printed name ____________________________ Registration No. ____________________________

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

The Patent Term Adjustment to date is 244 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 244 day(s).

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).

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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**

--- 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 **supplemental Amendment filed on 4/5/2013.**

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 **5-7 and 10-12.** 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](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).
   a) ☒ All  
   b) ☐ Some*  
   c) ☐ None  
   d) ☐ None of the:

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

   * Certified copies not received: _____.

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

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

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

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

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)  
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
3. ☐ Examiner’s Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____.

/Daquan Zhao/
Primary Examiner, Art Unit 2484

---
1. The following is an examiner’s statement of reasons for allowance:

   For claims 5 and 10, there’s no teaching or suggestion in the prior art for the claimed first mathematical expression.

   For claims 6 and 11, there’s no teaching or suggestion in the prior art for the claimed second mathematical expression.

   For claims 7 and 12, there’s no teaching or suggestion in the prior art for the claimed third mathematical expression.

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

   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daquan Zhao whose telephone number is (571) 270-1119. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tran Thai Q, can be reached on (571)272-7382. 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.

Daquan Zhao
/Daquan Zhao/

Primary Examiner, Art Unit 2484
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(Primary Examiner) (Date) 5/31/2013

O.G. Print Claim(s) | O.G. Print Figure
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(Assistant Examiner) (Date)  
/DAQUAN ZHAO/ Primary Examiner, Art Unit 2484   5/31/2013

(Primary Examiner) (Date)
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#### Assistant Examiner

/DAQUAN ZHAO/
Primary Examiner, Art Unit 2484

#### Date

5/31/2013

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Wonjang BAEK, John KIM

Application No. 12/882,665

Confirmation No. 3369

Group Art Unit: 2484

Filed: September 15, 2010

Examiner: Daquan ZHAO

For: METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION

SUPPLEMENTARY AMENDMENT UNDER 37 CFR 1.116

Commissioner for Patents
Attention: BOX AF
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is in response to the Final Office Action mailed December 11, 2012 and the Advisory Action mailed March 5, 2013, and having an initial period for response set to expire on March 11, 2013. A petition for a one-month extension of time is made herein and the appropriate fee is enclosed, extending the due date to April 11, 2013.

Reconsideration of the claims is respectfully requested. The following remarks are respectfully submitted.
AMENDMENTS TO THE CLAIMS

Please CANCEL claims 1-4, 8 and 9, and AMEND claims 10-12 in accordance with the following:

1-4. (CANCELLED)

5. (PREVIOUSLY PRESENTED) A method for providing a progressive download service for an A/V data providing server and a playback apparatus supporting a BD-J specification, the method comprising steps of:

(a) preparing an A/V data;

(b) dividing the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size; and

(c) transmitting the plurality of clips from the A/V data providing server to the playback apparatus,

wherein the clip division information comprises at least one of the first size, the second size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered clips,

wherein a first mathematical expression \[ B_x \times \frac{S_f}{CB} + N \times \frac{S_c}{MB} \geq N \times \frac{S_f}{CB} + \frac{S_c}{CB} \] is satisfied,

where \( S_f \) represents the first size, \( S_c \) represents the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( B_x \) represents the number of buffered clips.

6. (PREVIOUSLY PRESENTED) A method for providing a progressive download service for an A/V data providing server and a playback apparatus supporting a BD-J specification, the method comprising steps of:

(a) preparing an A/V data;

(b) dividing the A/V data into a plurality of clips including a first clip group and a second
clip group using a clip division information, wherein the first clip group includes one or more first
clicks each having a first size and the second clip group includes one or more second clips each
having a second size larger than the first size; and

(c) transmitting the plurality of clips from the A/V data providing server to the playback
apparatus,

wherein the clip division information comprises at least one of the first size, the second
size, a number of the one or more first clips, a media network bandwidth of the A/V data, a
customer network bandwidth necessary for transmitting the A/V data to the playback apparatus
and a number of buffered clips,

wherein the method further comprises:

obtaining the first size, the second size, the media network bandwidth, the customer
network bandwidth and the number of buffered clips from the clip division information; and

selecting the number of the one or more first clips satisfying a second mathematical
expression \( N \geq \frac{MB \times [S_e - B_a \times S_i]}{S_s \times [CB - MB]} \), where \( S_s \) represents the first size, \( S_c \) represent the
second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media
network bandwidth, \( CB \) represents the customer network bandwidth and \( Ba \) represents the
number of buffered clips.

7. (PREVIOUSLY PRESENTED) A method for providing a progressive download service
for an A/V data providing server and a playback apparatus supporting a BD-J specification, the
method comprising steps of:

(a) preparing an A/V data;

(b) dividing the A/V data into a plurality of clips including a first clip group and a second
clip group using a clip division information, wherein the first clip group includes one or more first
clips each having a first size and the second clip group includes one or more second clips each
having a second size larger than the first size; and

(c) transmitting the plurality of clips from the A/V data providing server to the playback
apparatus,

wherein the clip division information comprises at least one of the first size, the second
size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered clips,

wherein the method further comprises:

obtaining the first size, the number of the one or more first clips, the media network bandwidth, the customer network bandwidth and the number of buffered clips; and

selecting the second size satisfying a third mathematical expression

\[ S_c \leq S_s \times \left( \frac{N(CB - MB) + B_a \times MB}{MB} \right) \],

where \( S_s \) represents the first size, \( S_c \) represents the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( B_a \) represents the number of buffered clips.

8-9. (CANCELLED)

10. (CURRENTLY AMENDED) The method in accordance with claim 4 A method for providing a progressive download service for an A/V data providing server and a playback apparatus supporting a BD-J specification, the method comprising steps of:

(a) preparing, by the A/V data providing server, an A/V data;

(b) dividing, by the A/V data providing server, the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size; and

(c) transmitting the plurality of clips from the A/V data providing server to the playback apparatus,

wherein the clip division information comprises at least one of the first size, the second size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered clips.
wherein a first mathematical expression \( B_a \times \frac{S_s}{CB} + N \times \frac{S_c}{MB} \geq N \times \frac{S_s}{CB} + \frac{S_c}{CB} \) is satisfied, where \( S_s \) represents the first size, \( S_c \) represent the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( Ba \) represents the number of buffered clips.

11. (CURRENTLY AMENDED) The method in accordance with claim 4, A method for providing a progressive download service for an A/V data providing server and a playback apparatus supporting a BD-J specification, the method comprising steps of:

(a) preparing, by the A/V data providing server, an A/V data;

(b) dividing, by the A/V data providing server, the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size; and

(c) transmitting the plurality of clips from the A/V data providing server to the playback apparatus,

wherein the clip division information comprises at least one of the first size, the second size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered clips, the method further comprising:

obtaining the first size, the second size, the media network bandwidth, the customer network bandwidth and the number of buffered clips from the clip division information; and

selecting the number of the one or more first clips satisfying a second mathematical expression \( N \geq \frac{MB \times [S_s - B_a \times S_c]}{S_c \times [CB - MB]} \), where \( S_s \) represents the first size, \( S_c \) represent the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( Ba \) represents the number of buffered clips.

12. (CURRENTLY AMENDED) The method in accordance with claim 4, A method for providing a progressive download service for an A/V data providing server and a playback
apparatus supporting a BD-J specification, the method comprising steps of:

(a) preparing, by the A/V data providing server, an A/V data;

(b) dividing, by the A/V data providing server, the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size; and

(c) transmitting the plurality of clips from the A/V data providing server to the playback apparatus,

wherein the clip division information comprises at least one of the first size, the second size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered clips, the method further comprising:

obtaining the first size, the number of the one or more first clips, the media network bandwidth, the customer network bandwidth and the number of buffered clips; and

selecting the second size satisfying a third mathematical expression

\[ S_c \leq S_s \times \left[ \frac{N(CB - MB) + B_a \times MB}{MB} \right] \],

where \( S_s \) represents the first size, \( S_c \) represent the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( B_a \) represents the number of buffered clips.
REMARKS

In accordance with the foregoing, claims 10-12 have been amended, and claims 1-4, 8
and 9 have been cancelled without prejudice or disclaimer. No new matter is presented in this
Amendment.

REQUEST FOR CONFIRMATION OF PRIORITY CLAIM:

On page 1 of the Final Office Action, the Examiner did not check boxes in item 12
related to the applicants' claims of foreign priority. As indicated in the Application Data Sheet
and the first paragraph of the instant application, as well as the Filing Receipt, applicants have
claimed priority to Korean Patent Application No. 10-2009-0089058 filed on September 21,
2009. As such, it is respectfully requested that the Examiner confirm this priority claim to
prevent confusion.

REJECTIONS UNDER 35 U.S.C. §103:

Claims 1-5, 8 and 9 stand rejected under 35 U.S.C. §103(a) as being unpatentable over
Kortum et al. (U.S. Patent Application Publication No. 2006/0026663) in view of Dua (U.S.

Claims 1-4, 8 and 9 have been cancelled without prejudice or disclaimer, thereby
rendering the rejection thereof moot.

Applicants appreciate that the Examiner withdrew the rejection of claim 5 and
recognized it as allowed (Advisory Action, item 14).

ALLOWABLE SUBJECT MATTER:

Claims 10-12 are objected to as being dependent upon a rejected base claim, but would
be allowable if rewritten in independent form including all of the limitations of the base claim and
any intervening claims.

Claims 10-12 have been amended in independent form including all of the limitations of
the base claim and any intervening claims. Thus, Applicants respectfully submit that claims 10-
12 are in condition for allowance.
Applicants appreciate that claims 5-7 are allowed.

CONCLUSION:

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

STEIN IP, LLC

Date: April 5, 2013

By: Sungyeop Chung
Registration No. 64130

1400 Eye St., N.W.
Suite 300
Washington, D.C. 20005
Telephone: (202) 216-9505
Facsimile: (202) 216-9510
# Electronic Patent Application Fee Transmittal

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**Title of Invention:** METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION

**First Named Inventor/Applicant Name:** Wonjang BAEK

**Filer:** Sungyeop Chung/Sarah Brogi

**Attorney Docket Number:** 0366.1003

Filed as Large Entity

## Utility under 35 USC 111(a) Filing Fees

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**Patent-Appeals-and-Interference:**

**Post-Allowance-and-Post-Issuance:**

**Extension-of-Time:**
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**Payment information:**

- **Submitted with Payment**: yes
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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.
**REPLY/AMENDMENT FEE TRANSMITTAL**

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**AMOUNT ENCLOSED**

| $1040.00 |

**Examiner Name**

| Daquan ZHAO |

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**FEE CALCULATION (fees effective 3/19/2013)**

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Since an Official Action set an original due date of 03/11/2013, petition is hereby made for an extension to cover the date this reply is filed for which the requisite fee is enclosed (1 month ($200)); (2 months ($600)); (3 months ($1,400)); (4 months ($2,200)); (5 months ($3,000));

Notice of Appeal is enclosed (37 CFR 41.20(b)(1): $800.00) $200.00

Information Disclosure Statement is enclosed and fee is required (37 CFR 1.17(p): $180.00) $180.00

Total of above calculations = $1040.00

Reduction by 50% for filing by small entity (37 CFR 1.27) - $

Reduction by 75% for filing by micro entity (37 CFR 1.29) - $

Total of above calculations = $1040.00

Statutory Disclaimer is enclosed (37 CFR 1.20(d): $160.00) $160.00

Total Fees Due = $1040.00

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**METHOD OF PAYMENT**

☐ Check enclosed as payment. ☐ Credit Card Payment Form, Form PTO-2038 (attached).

☐ Charge "TOTAL FEES DUE" to the Deposit Account No. below.

☒ Payment authorized and made via EFS-Web.

☐ No payment is enclosed and no charges to the Deposit Account are authorized at this time (unless specifically required to obtain a filing date).

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**GENERAL AUTHORIZATION**

☒ If the above-noted "AMOUNT ENCLOSED" is not correct, the Commissioner is hereby authorized to credit any overpayment or charge any additional fees necessary to:

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The Commissioner is also authorized to credit any overpayments or charge any additional fees required under 37 CFR 1.16 (filing fees) or 37 CFR 1.17 (processing fees) during the prosecution of this application, including any related application(s) claiming benefit hereof pursuant to 35 U.S.C. § 120 (e.g., continuations/divisionals/CIPs under 37 CFR 1.53(b) and/or continuations/divisionals/CPAs under 37 CFR 1.53(d)) to maintain pendency hereof or of any such related application.

---

**SUBMITTED BY: STEIN IP, LLC**

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## Patent Application Fee Determination Record

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*** 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.

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.

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

49455 7890 03/05/2013
STEIN MCEWEN, LLP
1400 EYE STREET, NW
SUITE 300
WASHINGTON, DC 20005

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@smiplaw.com
Response to Arguments

1. Applicant's arguments filed 2/19/2013 have been fully considered but they are not persuasive.

2. Applicant argues the claimed feature "(b) dividing, by the A/V data providing server...the first clip group... and the second clip group...each having a second size larger than the first size". The Examiner disagrees.

   Paragraph 21 and figure 1 clearly shows that A/V data is downloaded to the set top box 104 from the content provider. Since A/V data comes from the content provider, the content provider has to cooperate with the set top box to set A/V data that has file size which can be handled by the set top box based on the available bandwidth. So, it is obvious that the content provider can perform the "preparing" and "dividing" steps as claimed. Figure 2, step 202 disclose "download a first portion of a plurality of video files" and step 212 disclose "download second portion of the selected video file", which also further disclose the server is dividing the video files into two portions. The reasons behind this lies on e.g. paragraphs 14, 21, which teach "The size of the memory area is partially based on the first available bandwidth measurement. A second available bandwidth measurement of the data connection to the set top box can be determined. Moreover, the size of the memory area for storing the first portion can be adjusted based on the second available bandwidth measurement." The size of the cache memory depends on the available bandwidth, if there's more bandwidth available, more data can be sent to the set top box from the content provider, if there's less bandwidth available, less data is sent to the set top box from the content provider. It would be
obvious to one ordinary skill in the art the size of first portion of video files (e.g. see step 202 of figure 2) can be less than that of the second portion of video files (e.g. see step 212 of figure 2) when there's less bandwidth available when the first portion of video files is downloaded.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daquan Zhao whose telephone number is (571) 270-1119. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tran Thai Q, can be reached on (571)272-7382. 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.

Daquan Zhao
/Daquan Zhao/
Primary Examiner, Art Unit 2484
Advisory Action
Before the Filing of an Appeal Brief

Application No. 12/882,665
Applicant(s) BAEK ET AL.
Examiner DAQUAN ZHAO
Art Unit 2484

THE REPLY FILED 19 February 2013 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☑ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCES are not permitted in design applications. The reply must be filed within one of the following time periods:
   a. ☑ The period for reply expires 3 months from the mailing date of the final rejection.
   b. ☑ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later.
   In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c. ☑ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires from the mailing date of the prior Advisory Action or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.

Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANT’S FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☑ The Notice of Appeal was filed on ______. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)); or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☑ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because a) ☑ They raise new issues that would require further consideration and/or search (see NOTE below); b) ☑ They raise the issue of new matter (see NOTE below); c) ☑ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or d) ☑ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: ______. (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).

5. ☑ Applicant’s reply has overcome the following rejection(s): ______.

6. ☑ Newly proposed or amended claim(s) ______ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).

7. ☑ For purposes of appeal, the proposed amendment(s): (a) ☑ will not be entered, or (b) ☑ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☑ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).

9. ☑ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).

10. ☑ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☑ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: see next page.

12. ☑ Note the attached Information Disclosure Statement(s). (PTO/SB/08) Paper No(s). ______.

13. ☑ Other: ______.

STATUS OF CLAIMS

14. The status of the claim(s) is (or will be) as follows:
   Claim(s) allowed: 5-7.
   Claim(s) objected to: 10-12.
   Claim(s) rejected: 1-4,8 and 9.
   Claim(s) withdrawn from consideration: ______.

/Daquan Zhao/
Primary Examiner, Art Unit 2484
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Wonjang BAEK et al.

Application No. 12/882,665                                      Group Art Unit: 2484

Confirmation No. 3369

Filed: September 15, 2010                                      Examiner: Daquan ZHAO

For: METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION

RESPONSE AND REQUEST FOR RECONSIDERATION UNDER 37 C.F.R. §1.116

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

Attention: BOX AF

Sir:

This is in response to the Final Office Action mailed December 11, 2012, and having an initial period for response set to expire on March 11, 2013. This response is being filed on February 19, 2013, making the three-month deadline.

Reconsideration of the claims is respectfully requested. The following remarks are respectfully submitted.
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Wonjang BAEK et al.

Application No. 12/882,665

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Group Art Unit: 2484

Examiner: Daquan ZHAO

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P.O. Box 1450
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Sir:

This is in response to the Final Office Action mailed December 11, 2012, and having an initial period for response set to expire on March 11, 2013. This response is being filed on February 19, 2013, making the three-month deadline.

Reconsideration of the claims is respectfully requested. The following remarks are respectfully submitted.
IN THE CLAIMS:

Please AMEND claims 5-7 in accordance with the following:

1. (PREVIOUSLY PRESENTED) A method for providing a progressive download service for an A/V data providing server and a playback apparatus supporting a BD-J specification, the method comprising steps of:

   (a) preparing, by the A/V data providing server, an A/V data;

   (b) dividing, by the A/V data providing server, the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size; and

   (c) transmitting the plurality of clips from the A/V data providing server to the playback apparatus.

2. (ORIGINAL) The method in accordance with claim 1, further comprising, after carrying out the step (b):

   (d) generating a playback sequence information for the plurality of clips so that the one or more first clips are played before the one or more second clips are played; and

   (e) transmitting the playback sequence information from the A/V data providing server to the playback apparatus.

3. (ORIGINAL) The method in accordance with claim 2, further comprising receiving from the playback apparatus a clip request according to the playback sequence information, and wherein the step (c) comprises transmitting the plurality of clips to the playback apparatus in response to the clip request.

4. (ORIGINAL) The method in accordance with claim 1, wherein the clip division information comprises at least one of the first size, the second size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered
5. (CURRENTLY AMENDED) A method for providing a progressive download service for an A/V data providing server and a playback apparatus supporting a BD-J specification, the method comprising steps of:

(a) preparing an A/V data;

(b) dividing the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size; and

(c) transmitting the plurality of clips from the A/V data providing server to the playback apparatus,

wherein the clip division information comprises at least one of the first size, the second size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered clips, and

\[
\text{wherein a first mathematical expression } B_a \times \frac{S_x}{CB} + N \times \frac{S_z}{MB} \geq N \times \frac{S_x}{CB} + \frac{S_c}{CB}
\]

wherein a first mathematical expression \( B_a \times \frac{S_x}{CB} + N \times \frac{S_z}{MB} \geq N \times \frac{S_x}{CB} + \frac{S_c}{CB} \) is satisfied,

where \( S_x \) represents the first size, \( S_c \) represent the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( B_a \) represents the number of buffered clips.

6. (CURRENTLY AMENDED) A method for providing a progressive download service for an A/V data providing server and a playback apparatus supporting a BD-J specification, the method comprising steps of:

(a) preparing an A/V data;

(b) dividing the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size; and
(c) transmitting the plurality of clips from the A/V data providing server to the playback apparatus,

wherein the clip division information comprises at least one of the first size, the second size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered clips, and

wherein the method further comprises:

obtaining the first size, the second size, the media network bandwidth, the customer network bandwidth and the number of buffered clips from the clip division information; and

selecting the number of the one or more first clips satisfying a second mathematical expression \( N \geq \frac{MB \times [S_c - B_a \times S_s]}{S_s \times [CB - MB]} \), where \( S_s \) represents the first size, \( S_c \) represents the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( B_a \) represents the number of buffered clips.

7. (CURRENTLY AMENDED) A method for providing a progressive download service for an A/V data providing server and a playback apparatus supporting a BD-J specification, the method comprising steps of:

(a) preparing an A/V data;

(b) dividing the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size; and

(c) transmitting the plurality of clips from the A/V data providing server to the playback apparatus,

wherein the clip division information comprises at least one of the first size, the second size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered clips, and
wherein the method further comprises:

obtaining the first size, the number of the one or more first clips, the media network bandwidth, the customer network bandwidth and the number of buffered clips; and

selecting the second size satisfying a third mathematical expression

\[ S_c \leq S_s \times \left[ \frac{N(CB - MB) + B_s \times MB}{MB} \right] \]

where \( S_s \) represents the first size, \( S_c \) represent the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( B_s \) represents the number of buffered clips.

8. (ORIGINAL) The method in accordance with claim 4, wherein the customer network bandwidth is obtained by establishing a communication with the playback apparatus.

9. (ORIGINAL) The method in accordance with claim 4, wherein the customer network bandwidth is selected from a customer network bandwidth group.

10. (PREVIOUSLY PRESENTED) The method in accordance with claim 4, wherein a first mathematical expression

\[ B_s \times \frac{S_s}{CB} + N \times \frac{S_s}{MB} \geq N \times \frac{S_s}{CB} + \frac{S_s}{CB} \]

is satisfied, where \( S_s \) represents the first size, \( S_c \) represent the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( B_s \) represents the number of buffered clips.

11. (PREVIOUSLY PRESENTED) The method in accordance with claim 4, further comprising:

obtaining the first size, the second size, the media network bandwidth, the customer network bandwidth and the number of buffered clips from the clip division information; and

selecting the number of the one or more first clips satisfying a second mathematical expression

\[ N \geq \frac{MB \times [S_c - B_s \times S_s]}{S_s \times [CB - MB]} \]

where \( S_s \) represents the first size, \( S_c \) represent the second size and \( N \) is the number of the one or more first clips.
second size, N represents the number of one or more first clips, MB represents the media network bandwidth, CB represents the customer network bandwidth and Ba represents the number of buffered clips.

12. (PREVIOUSLY PRESENTED) The method in accordance with claim 4, further comprising:

obtaining the first size, the number of the one or more first clips, the media network bandwidth, the customer network bandwidth and the number of buffered clips; and

selecting the second size satisfying a third mathematical expression

\[ S_c \leq S_s \times \left[ \frac{N(CB - MB) + B_a \times MB}{MB} \right] \],

where \( S_s \) represents the first size, \( S_c \) represent the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( B_a \) represents the number of buffered clips.
REMARKS

In accordance with the foregoing, claims 5-7 have been amended to recite minor changes in the wording. Currently, claims 1-12 are pending and under consideration. No new matter within the meaning of 35 U.S.C. §132 is presented in this Amendment.

REQUEST FOR CONFIRMATION OF PRIORITY CLAIM:

On page 1 of the Office Action, the Examiner did not check boxes in item 12 related to the applicants’ claims of foreign priority. As indicated in the Application Data Sheet and the first paragraph of the instant application, as well as the Filing Receipt, applicants have claimed priority to Korean Patent Application No. 10-2009-0089058 filed on September 21, 2009. As such, it is respectfully requested that the Examiner confirm this priority claim to prevent confusion.

REJECTIONS UNDER 35 U.S.C. §103:


To establish an obviousness rejection under 35 U.S.C. § 103(a), four factual inquiries must be examined. The four factual inquiries include (a) determining the scope and contents of the prior art; (b) ascertaining the differences between the prior art and the claims in issue; (c) resolving the level of ordinary skill in the pertinent art; and (d) evaluating evidence of secondary consideration. Graham v. John Deere, 383 U.S. 1, 17-18 (1966). In view of these four factors, the analysis supporting a rejection under 35 U.S.C. 103(a) should be made explicit, and should "identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements" in the manner claimed. KSR Int’l. Co. v. Telefex, Inc., 550 U.S. 398 (2007). Furthermore, even if the prior art may be combined, there must be a reasonable expectation of success, and the reference or references, when combined, must disclose or suggest all of the claim limitations. See in re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Assuming arguendo the teachings of Kortum et al. and Dua can be combined and a
reasonable expectation of success exists, this combination of the prior art still does not disclose all of the features recited in claim 1. Claim 1 recites *inter alia*:

(b) dividing, by the A/V data providing server, the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size (emphasis added)

Applicants respectfully note that these claim features are *not* disclosed in Kortum et al. at least because the cited reference fails to disclose that the content provider 107 may determine the sizes of the first and second portions included in a plurality of clips. These deficiencies of Kortum et al. were clearly recognized by the Examiner. In the Office Action, page 2, item 2, paragraph 2, the Examiner states the following:

Paragraph 21 and figure 1 clearly shows that A/V data is downloaded to the set top box 104 from the content provider. Since A/V data comes from the content provider, the content provider has to cooperate with the set top box to set A/V data that has file size which can be handled by the set top box based on the available bandwidth. So, it is obvious that the content provider can perform the "preparing" and "dividing" steps as claimed.

Based on this statement, it is evident that the Examiner *admits* that Kortum et al. fails to disclose step (b) of claim 1, as recited above, while *contending* these missing claim features are essentially present in the cited reference. Applicants respectfully submit that even if the Examiner's contention that "[s]ince A/V data comes from the content provider, the content provider has to cooperate with the set top box to set A/V data that has file size which can be handled by the set top box based on the available bandwidth" is correct, the Office Action still fails to establish a *prima facie* case of obviousness of claim 1 because it does *not* provide *any* reasoning how the cited prior art teaches "wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size," as recited in step (b) of claim 1. In other words, even if the content provider 107 disclosed in Kortum et al. prepares and divides A/V data based on the set top box 104's capability, as asserted by the Examiner, this does *not* necessarily result in dividing the A/V data into the first and second clip groups wherein "the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size," as recited in claim 1. Therefore, it is clear that the Office Action fails to establish a *prima case of*
obviousness of claim 1.

See MPEP §2142. "The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness."

As to claim 5, the Office Action, on page 2, the last paragraph, states the following:

Examiner’s Note: claim 5 is rejected based on the new claim structure that an extra “and” is added before “a first mathematical express ...” and claim 5 is rejected as it is in claim 4 since claim 4 recites “the clip information comprises at least one of ...” (emphasis in original).

Claim 5 is an independent claim. Thus, Applicants respectfully submit that the phrase “at least one of” recited in claim 4 is independent from the corresponding phrase in claim 5 and should not be referred to against claim 5.

Furthermore, the term “and” recited right before “a first mathematical expression” has been removed from claim 5, and the new term “wherein” has been inserted right before “a first mathematical expression” in claim 5. By this amendment, Applicants believe that the reasons for rejection of claim 5, as indicated in the Office Action, are obviated.

The secondary reference, Dua, was cited by the Examiner solely to teach the playback apparatus supporting a BD-j specification, but fails to cure the deficiencies of Kortum et al. as noted above with regard to claim 1. Hence, assuming arguendo Kortum et al. and Dua can be combined and a reasonable expectation of success exists, the combined references still do not teach at least “(b) dividing, by the A/V data providing server, the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size,” as recited in claim 1. Thus, it is respectfully submitted that claim 1 is allowable over Kortum et al. and Dua, whether taken alone or in combination.

Claim 5 recites the features similar to those of claim 1 as discussed above, and is thus allowable for at least this reason. Claim 2-4, 8 and 9 depend directly or indirectly from claim 1, and are thus allowable for at least this reason.
In view of the foregoing, it is respectfully requested that the rejection of claims 1-5, 8 and 9 under 35 U.S.C. §103(a) be withdrawn.

ALLOWABLE SUBJECT MATTER:

Claims 10-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 10-12 have not been amended because Applicants respectfully submit that claims 10-12 depend from an allowable base claim and are thus allowable for at least reason. Applicants appreciate that claims 6-7 are allowed.

CONCLUSION:

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

STEIN MCEWEN, LLP

Date: February 19, 2013

By: Sungyeop Chung
Registration No. 64130

1400 Eye St., N.W.
Suite 300
Washington, D.C. 20005
Telephone: (202) 216-9505
Facsimile: (202) 216-9510
# Electronic Acknowledgement Receipt

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Submitted with Payment  no

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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.
**REPLY/AMENDMENT**

**FEE TRANSMITTAL**

Attorney Docket No. 0366.1003  
Application Number 12/882,665  
Filing Date September 15, 2010  
First Named Inventor Wonjae BAEK et al.  
Group Art Unit 2484

| AMOUNT ENCLOSED | $ 0.00 | Examiner Name | Daquan ZHAO |

### FEE CALCULATION (fees effective 10/5/2012)

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Since an Official Action set an original due date of __, petition is hereby made for an extension to cover the date this reply is filed for which the requisite fee is enclosed (1 month ($150)); (2 months ($570)); (3 months ($1,290)); (4 months ($2,010)); (5 months ($2,730)); __

Notice of Appeal is enclosed (37 CFR 41.20(b)(1): $630.00) $  
Statutory Disclaimer is enclosed (37 CFR 1.20(d): $140.00) $  
Total of above calculations = $ 0.00  
Reduction by 50% for filing by small entity (37 CFR 1.27) $ -  
Reduction by 75% for filing by micro entity (37 CFR 1.29) $ -  
Total of above calculations = $ 0.00  
Information Disclosure Statement is enclosed and fee is required (37 CFR 1.17(p): $180.00) $  
TOTAL FEES DUE = $ 0.00

### METHOD OF PAYMENT

☐ Check enclosed as payment. ☐ Credit Card Payment Form, Form PTO-2038 (attached).

☐ Charge "TOTAL FEES DUE" to the Deposit Account No. below.

☐ Payment is authorized and filed via EFS.

☐ No payment is enclosed and no charges to the Deposit Account are authorized at this time (unless specifically required to obtain a filing date).

### GENERAL AUTHORIZATION

☒ If the above-noted "AMOUNT ENCLOSED" is not correct, the Commissioner is hereby authorized to credit any overpayment or charge any additional fees necessary to:

- Deposit Account No. 503333
- Deposit Account Name STEIN MCEWEN, LLP

☒ The Commissioner is also authorized to credit any overpayments or charge any additional fees required under 37 CFR 1.16 (filing fees) or 37 CFR 1.17 (processing fees) during the prosecution of this application, including any related application(s) claiming benefit hereof pursuant to 35 U.S.C. § 120 (e.g., continuations/divisionals/CIPs under 37 CFR 1.53(b) and/or continuations/divisionals/CPAs under 37 CFR 1.53(d)) to maintain pendency hereof or of any such related application.

SUBMITTED BY: STEIN MCEWEN, LLP

**Typed Name** Sungyeop Chung  
**Reg. No.** 64130  
**Signature**  
**Date** February 19, 2013
**PATENT APPLICATION FEE DETERMINATION RECORD**

**APPLICATION AS FILED – PART I**

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**APPLICATION AS AMENDED – PART II**

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**FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))**

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Legal Instrument Examiner: /BRENDA J. Denny/
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@smiplaw.com
Office Action Summary

Application No. 12/882,665
Applicant(s) BAEK ET AL.
Examiner DAQUAN ZHAO
Art Unit 2484

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 28 November 2012
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) 1-12 is/are pending in the application.
   5a) Of the above claim(s) _____ is/are withdrawn from consideration.
6) ☑ Claim(s) 6 and 7 is/are allowed.
7) ☑ Claim(s) 1-5, 8 and 9 is/are rejected.
8) ☑ Claim(s) 10-12 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 _____ 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).
   a) ☑ All  b) □ Some * c) □ None of:
       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/08)
4) □ Other: ______
   Paper No(s)/Mail Date ______

U.S. Patent and Trademark Office
PTOL-326 (Rev. 09-12) Office Action Summary Part of Paper No./Mail Date 20121205
DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 11/28/2012 have been fully considered but they are not persuasive.

2. Applicant argues, see pages 7-8 of the remark, Kortum et al do not disclose "...(a) preparing, by the A/D data providing server, an AV data; (b) dividing, by the A/V data providing server, the A/V data..." The Examiner disagrees.

   Paragraph 21 and figure 1 clearly shows that A/V data is downloaded to the set top box 104 from the content provider. Since A/V data comes from the content provider, the content provider has to cooperate with the set top box to set A/V data that has file size which can be handled by the set top box based on the available bandwidth. So, it is obvious that the content provider can perform the "preparing" and "dividing" steps as claimed.

Examiner's Note: claim 5 is rejected base on the new claim structure that an extra "and" is added before "a first mathematical express..." and claim 5 is rejected as it is in claim 4 since claim 4 recites "the clip information comprises at least one of..."
Claim Rejections - 35 USC § 103

3. The following is a quotation of 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 negatived by the manner in which the invention was made.

4. Claims 1-5 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kortum et al (US 2006/0026663) and further in view of Dua (US 2010/0095337).

For claim 1, Kortum et al teach a method for providing a progressive download service for an A/V data providing server and a playback apparatus, the method comprising steps of: (a) preparing, by the A/V data providing server, an A/V data; (b) dividing, by the A/V data providing server, the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size; and (c) transmitting the plurality of clips from the A/V data providing server to the playback apparatus (e.g. abstract, paragraph 21). Kortum et al do not further specify the playback apparatus supporting a BD-J specification. Dua teach the playback apparatus supporting a BD-j specification (e.g. paragraph 66). It would have been obvious to one ordinary skill in the art at the time the invention was made to incorporate the teaching of Kortum et al into the teaching of Dua to provide large storage capacity and deliver high-definition experiences (e.g. Dua, paragraph 66).
For claim 2, Kortum et al teach (d) generating a playback sequence information for the plurality of clips so that the one or more first clips are played before the one or more second clips are played; and (e) transmitting the playback sequence information from the A/V data providing server to the playback apparatus (e.g. figure 2, step 210, step 220).

For claim 3, Kortum et al teach receiving from the playback apparatus a clip request according to the playback sequence information, and wherein the step (c) comprises transmitting the plurality of clips to the playback apparatus in response to the clip request (e.g. figure 2, abstract, paragraph 21).

For claim 4, Kortum et al teach the clip division information comprises **at least one of** the first size, the second size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered clips (e.g. paragraph 21).

Claim 5 is rejected for the same reasons as discussed in claim 4 above (e.g. claim 5 is rejected base on the new claim structure that an extra "and" is added before "a first mathematical express..." and claim 5 is rejected as it is in claim 4 since claim 4 recites "the clip information comprises **at least one of...**").

For claim 8, Kortum et al teach the customer network bandwidth is obtained by establishing a communication with the playback apparatus (e.g. paragraph 21, abstract).
For claim 9, Kortum et al teach the customer network bandwidth is selected from a customer network bandwidth group (e.g. paragraph 21, abstract).

**Allowable Subject Matter**

5. Claims 10-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. Claims 6-7 are allowed.

There’s no new ground(s) of rejections. Accordingly, THIS ACTION IS MADE FINAL. See MPEG § 706.07 (a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136 (a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing data of this action. In the event a first reply is filed within TWO MONTHS of the mailing data of this action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period. Then the shortened statutory period will expire on the data the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing data of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the data of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daquan Zhao whose telephone number is (571) 270-1119. If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Tran Thai Q, can be reached on (571)272-7382. 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.
Application/Control Number: 12/882,665
Art Unit: 2484

Daquan Zhao

/Daquan Zhao/

Primary Examiner, Art Unit 2484
### Search Notes

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## EAST Search History (Prior Art)

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**12/5/2012 12:13:13 PM**

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**Index of Claims**

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**Examiner**

DAQUAN ZHAO

**Art Unit**

2484

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

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:
Wonjang BAEK, et al. Confirmation No.: 3369
Application No.: 12/882,665 Group Art Unit: 2484
Filed: September 15, 2010 Examiner: Daquan Zhao
For: METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION

AMENDMENT

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

Sir:

This is in response to the Office Action mailed August 30, 2012, and having a period for response set to expire on November 30, 2012.

Reconsideration of the claims is respectfully requested. The following remarks are respectfully submitted.
IN THE CLAIMS:

Please AMEND claims 1 and 5-7 and ADD claims 10-12 in accordance with the following:

1. (CURRENTLY AMENDED) A method for providing a progressive download service for an A/V data providing server and a playback apparatus supporting a BD-J specification, the method comprising steps of:
   (a) preparing, by the A/V data providing server, an A/V data;
   (b) dividing, by the A/V data providing server, the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size; and
   (c) transmitting the plurality of clips from the A/V data providing server to the playback apparatus.

2. (ORIGINAL) The method in accordance with claim 1, further comprising, after carrying out the step (b):
   (d) generating a playback sequence information for the plurality of clips so that the one or more first clips are played before the one or more second clips are played; and
   (e) transmitting the playback sequence information from the A/V data providing server to the playback apparatus.

3. (ORIGINAL) The method in accordance with claim 2, further comprising receiving from the playback apparatus a clip request according to the playback sequence information, and wherein the step (c) comprises transmitting the plurality of clips to the playback apparatus in response to the clip request.
4. (ORIGINAL) The method in accordance with claim 1, wherein the clip division information comprises at least one of the first size, the second size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered clips.

5. (CURRENTLY AMENDED) The method in accordance with claim 4A method for providing a progressive download service for an A/V data providing server and a playback apparatus supporting a BD-J specification, the method comprising steps of:
   (a) preparing an A/V data;
   (b) dividing the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size; and
   (c) transmitting the plurality of clips from the A/V data providing server to the playback apparatus,
   wherein:
   
   the clip division information comprises at least one of the first size, the second size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered clips, and

   a first mathematical expression \[ B_a \times \frac{S_f}{CB} + N \times \frac{S_f}{MB} \geq N \times \frac{S_f}{CB} + \frac{S_c}{CB} \]

   is satisfied,

   where \( S_a \) represents the first size, \( S_c \) represent the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( B_a \) represents the number of buffered clips.

6. (CURRENTLY AMENDED) The method in accordance with claim 4A method for providing a progressive download service for an A/V data providing server and a playback apparatus supporting a BD-J specification, the method comprising steps of:
   (a) preparing an A/V data;
(b) dividing the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size; and

(c) transmitting the plurality of clips from the A/V data providing server to the playback apparatus.

wherein:

the clip division information comprises at least one of the first size, the second size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered clips, and

the method further comprising:

obtaining the first size, the second size, the media network bandwidth, the customer network bandwidth and the number of buffered clips from the clip division information; and

selecting the number of the one or more first clips satisfying a second mathematical expression \[ N \geq \frac{MB \times [S_c - B_a \times S_s]}{S_s \times [CB - MB]} \], where \( S_s \) represents the first size, \( S_c \) represent the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( Ba \) represents the number of buffered clips.

7. (CURRENTLY AMENDED) The method in accordance with claim 4A method for providing a progressive download service for an A/V data providing server and a playback apparatus supporting a BD-J specification, the method comprising steps of:

(a) preparing an A/V data;

(b) dividing the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size; and

(c) transmitting the plurality of clips from the A/V data providing server to the playback apparatus.
wherein:

the clip division information comprises at least one of the first size, the second size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered clips, and

the method further comprises:

obtaining the first size, the number of the one or more first clips, the media network bandwidth, the customer network bandwidth and the number of buffered clips; and

selecting the second size satisfying a third mathematical expression

\[ S_c \leq S_s \times \left[ \frac{N(CB - MB) + B_a \times MB}{MB} \right] \]

where \( S_s \) represents the first size, \( S_c \) represent the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( Ba \) represents the number of buffered clips.

8. (ORIGINAL) The method in accordance with claim 4, wherein the customer network bandwidth is obtained by establishing a communication with the playback apparatus.

9. (ORIGINAL) The method in accordance with claim 4, wherein the customer network bandwidth is selected from a customer network bandwidth group.

10. (NEW) The method in accordance with claim 4, wherein a first mathematical expression

\[ B_a \times \frac{S_s}{CB} + N \times \frac{S_s}{MB} \geq N \times \frac{S_s}{CB} + \frac{S_c}{CB} \]

is satisfied, where \( S_s \) represents the first size, \( S_c \) represent the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( Ba \) represents the number of buffered clips.
11. (NEW) The method in accordance with claim 4, further comprising:
   obtaining the first size, the second size, the media network bandwidth, the
   customer network bandwidth and the number of buffered clips from the clip division information;
   and
   selecting the number of the one or more first clips satisfying a second
   mathematical expression \( N \geq \frac{MB \times [S_c - B_a \times S_s]}{S_s \times [CB - MB]} \), where \( S_s \) represents the first size, \( S_c \) represents the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( B_a \) represents the number of buffered clips.

12. (NEW) The method in accordance with claim 4, further comprising:
   obtaining the first size, the number of the one or more first clips, the media
   network bandwidth, the customer network bandwidth and the number of buffered clips; and
   selecting the second size satisfying a third mathematical expression
   \( S_c \leq S_s \times \left[ \frac{N(CB - MB) + B_a \times MB}{MB} \right] \), where \( S_s \) represents the first size, \( S_c \) represent the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( B_a \) represents the number of buffered clips.
REMARKS

In accordance with the foregoing, claims 1 and 5-7 have been amended, claims 10-12 have been added and are deemed patentable due at least to their depending from claim 4, and claims 1-12 are pending and under consideration. No new matter is presented in this Amendment.

REQUEST FOR CONFIRMATION OF PRIORITY CLAIM:

On page 1 of the Office Action, the Examiner did not check boxes in item 13 related to the applicants' claims of foreign priority. As indicated in the Application Data Sheet and the first paragraph of the instant application, as well as the Filing Receipt, applicants have claimed priority to Korean Patent Application No. 10-2009-0089058 filed on September 21, 2009. As such, it is respectfully requested that the Examiner confirm this priority claim to prevent confusion.

REJECTIONS UNDER 35 U.S.C. §103:

On pages 2-3 of the Office Action, the Examiner rejects claims 1-4, 8 and 9 under 35 U.S.C. §103(a) in view of Kortum et al. (U.S. Patent Publication No. 2006/0028663) and Dua (U.S. Patent Publication No 2010/0095337). The rejection is respectfully traversed and reconsideration is requested.

By way of review, claim 1 has been amended to recite, among other features, "(a) preparing, by the A/V data providing server, an A/V data" and "(b) dividing, by the A/V data providing server, the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size".

In contrast, Kortum et al. is directed to a settop box 104 which has a memory 114 storing a first portion 120 of video files. A second portion 122 of the video files is stored in a content provider 107. When one of the video files is selected, the first portion 120 is recalled from the memory 114 and is immediately displayed. The second portion 122 is subsequently downloaded when the first portion 120 is being displayed so that there is no interruption in the
playback of the entire video file. (FIGs. 1 and 2; Paragraphs 0018-0020). In order to set up the
settop box 104 and establish the size of the first portion 120, the settop box 104 measures the
broadband connection 108 to the content provider 107 and establishes the precache size of the
first portion 120. (FIG. 3, Paragraph 0021). As such, Kortum et al. relies upon the settop box
104 to determine the size of the first portion 120 and the second portion 122 of each video file,
but does not suggest the content provider 107 making such determination. Since Dua is not
relied upon as disclosing such a feature, it is respectfully submitted that Kortum et al. does not
disclose or suggest the invention as recited in claim 1.

Claims 2-4, 8, and 9 are deemed patentable due at least to their depending from claim 1.

ALLOWABLE SUBJECT MATTER:

Claims 5-7 are objected to as being dependent upon a rejected base claim, but would be
allowable if rewritten in independent form including all of the limitations of the base claim and
any intervening claims. As claims 5-7 have been made independent, it is respectfully requested
that the Examiner reconsider and withdraw the objection.

CONCLUSION:

There being no further outstanding objections or rejections, it is submitted that the
application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is
requested to telephone the undersigned to attend to these matters.
If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

STEIN MCEWEN, LLP

Date: November 28, 2012

By: Sungyeop Chung
Registration No. 64,130

1400 Eye St., N.W., Suite 300
Washington, D.C. 20005
Telephone: (202) 216-9505
Facsimile: (202) 216-9510
**Electronic Patent Application Fee Transmittal**

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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.
REPLY/AMENDMENT
FEE TRANSMITTAL

ATTORNEY DOCKET NO. 0366.1003
APPLICATION NUMBER 12/882,665
FILING DATE September 15, 2010
FIRST NAMED INVENTOR Wonjang BAEK

AMOUNT ENCLOSED $250.00

EXAMINER NAME Daquan Zhao

FEE CALCULATION (fees effective 10/05/2012)

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Since an Official Action set an original due date of _, petition is hereby made for an extension to cover the date this reply is filed for which the requisite fee is enclosed (1 month ($150)); (2 months ($570)); (3 months ($1,290)); (4 months ($2,010)); (5 months ($2,730):

If Notice of Appeal is enclosed, add ($630.00) $ 
If Statutory Disclaimer under Rule 20(d) is enclosed, add fee ($140.00) $ 
Information Disclosure Statement (Rule 1.17(p)) ($180.00) $ 
Total of above Calculations = $250.00 
Reduction by 50% for filing by small entity (37 CFR 1.9, 1.27 & 1.28) $ 
Reduction by 75% for filing by micro entity (37 CFR 1.23(a)(1)) $ 
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(4) If entry (4) is less than entry (5), entry (6) is "0".
(5) If entry (5) is less than 3, change entry (5) to "3".

METHOD OF PAYMENT

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☐ Charge "TOTAL FEES DUE" to the Deposit Account No. below.
☐ No payment is enclosed and no charges to the Deposit Account are authorized at this time (unless specifically required to obtain a filing date).

GENERAL AUTHORIZATION

☒ If the above-noted "AMOUNT ENCLOSED" is not correct, the Commissioner is hereby authorized to credit any overpayment or charge any additional fees necessary to:

Deposit Account No. 503333
Deposit Account Name STEIN MCEWEN, LLP

☒ The Commissioner is also authorized to credit any overpayments or charge any additional fees required under 37 CFR 1.16 (filling fees) or 37 CFR 1.17 (processing fees) during the prosecution of this application, including any related application(s) claiming benefit hereof pursuant to 35 USC § 120 (e.g., continuations/divisions/CPAs under 37 CFR 1.53(b) and/or continuations/divisions/CPAs under 37 CFR 1.53(d)) to maintain pendency hereof or of any such related application.

SUBMITTED BY: STEIN MCEWEN, LLP

Typed Name Sungyeop Chung Reg. No. 64,130

Signature Sungyeop Chung Date 11/28/12
REPLY/AMENDMENT
FEE TRANSMITTAL

Attorney Docket No. 0366.1003
Application Number 12/882,665
Filing Date September 15, 2010
First Named Inventor Wonjang BAEK
Group Art Unit 2484

AMOUNT ENCLOSED $250.00
Examiner Name Daquan Zhao

FEE CALCULATION (fees effective 10/05/2012)

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If Statutory Disclaimer under Rule 20(d) is enclosed, add fee ($140.00) $ \\
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(1) If entry (1) is less than entry (2), entry (3) is "0".
(2) If entry (2) is less than 20, change entry (2) to "20".
(4) If entry (4) is less than entry (5), entry (6) is "0".
(5) If entry (5) is less than 3, change entry (5) to "3".

METHOD OF PAYMENT

☐ Check enclosed as payment. ☒ Credit Card Payment Form, Form PTO-2038(attached).

☐ Charge "TOTAL FEES DUE" to the Deposit Account No. below.

☐ No payment is enclosed and no charges to the Deposit Account are authorized at this time (unless specifically required to obtain a filing date).

GENERAL AUTHORIZATION

☒ If the above-noted "AMOUNT ENCLOSED" is not correct, the Commissioner is hereby authorized to credit any overpayment or charge any additional fees necessary to:

Deposit Account No. 503333
Deposit Account Name STEIN MCEWEN, LLP

☒ The Commissioner is also authorized to credit any overpayments or charge any additional fees required under 37 CFR 1.16 (filing fees) or 37 CFR 1.17 (processing fees) during the prosecution of this application, including any related application(s) claiming benefit hereof pursuant to 35 USC § 120 (e.g., continuations/divisionals/CIPs under 37 CFR 1.53(b) and/or continuations/divisionals/CPAs under 37 CFR 1.53(d)) to maintain pendency hereof or of any such related application.

SUBMITTED BY: STEIN MCEWEN, LLP

Typed Name Sungyeop Chung
Reg. No. 64,130

Signature [Signature]
Date [11/20/12]
**PATENT APPLICATION FEE DETERMINATION RECORD**

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If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 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(g)) |              |                        |

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

**APPLICATION AS AMENDED – PART II**

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| 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 number found in the appropriate box in column 1.

Legal Instrument Examiner: TERRY MALLOY

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.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.
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@smiplaw.com
Office Action Summary

Application No. 12/882,665

Applicant(s) BAEK ET AL.

Examiner DAQUAN ZHAO

Art Unit 2484

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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.

- 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 15 September 2010.

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) 1-9 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) 1-4, 8 and 9 is/are rejected.

8) ☐ Claim(s) 5-7 is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10) ☐ The specification is objected to by the Examiner.

11) ☐ The drawing(s) filed on _____ 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).

12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

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

a) ☐ All  b) ☐ Some * c) ☐ None of:

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)

2) ☐ Notice of Draftsperson’s Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)

Paper No(s)/Mail Date 2/28/2011

4) ☐ Interview Summary (PTO-413)

Paper No(s)/Mail Date _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.
DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 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.

2. Claims 1-4 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kortum et al (US 2006/0026663) and further in view of Dua (US 2010/0095337).

For claim 1, Kortum et al teach a method for providing a progressive download service for an A/V data providing server and a playback apparatus, the method comprising steps of: (a) preparing an A/V data; (b) dividing the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size; and (c) transmitting the plurality of clips from the A/V data providing server to the playback apparatus (e.g. abstract, paragraph 21).

Kortum et al do not further specify the playback apparatus supporting a BD-J specification. Dua teach the playback apparatus supporting a BD-j specification (e.g. paragraph 66). It would have been obvious to one ordinary skill in the art at the time the invention was made to incorporate the teaching of Kortum et al into the teaching of Dua to provide large storage capacity and deliver high-definition experiences (e.g. Dua, paragraph 66).
For claim 2, Kortum et al teach (d) generating a playback sequence information for the plurality of clips so that the one or more first clips are played before the one or more second clips are played; and (e) transmitting the playback sequence information from the A/V data providing server to the playback apparatus (e.g. figure 2, step 210, step 220).

For claim 3, Kortum et al teach receiving from the playback apparatus a clip request according to the playback sequence information, and wherein the step (c) comprises transmitting the plurality of clips to the playback apparatus in response to the clip request (e.g. figure 2, abstract, paragraph 21).

For claim 4, Kortum et al teach the clip division information comprises at least one of the first size, the second size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered clips (e.g. paragraph 21).

For claim 8, Kortum et al teach the customer network bandwidth is obtained by establishing a communication with the playback apparatus (e.g. paragraph 21, abstract).

For claim 9, Kortum et al teach the customer network bandwidth is selected from a customer network bandwidth group (e.g. paragraph 21, abstract).
Allowable Subject Matter

3. Claims 5-7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant’s disclosure. Cho et al (US 2005/0076136); Hung (US 7676142); Deemircin et al (US 7784076); Van Beek et al (US 2005/0188407); Park et al (US 2009/0217331)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daquan Zhao whose telephone number is (571) 270-1119. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tran Thai Q, can be reached on (571)272-7382. 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.

Daquan Zhao

/Daquan Zhao/

Primary Examiner, Art Unit 2484
**Notice of References Cited**

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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.*

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

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**APPLICANTS**
Wonjiang BAEK, Gyeonggi-do, KOREA, REPUBLIC OF;
John Kim, Seoul, KOREA, REPUBLIC OF;

**CONTINUING DATA**

**FOREIGN APPLICATIONS**
REPUBLIC OF KOREA 10-2009-0089058 09/21/2009

**IF REQUIRED, FOREIGN FILING LICENSE GRANTED**
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- ☐ All Fees
- ☐ 1.16 Fees (Filing)
- ☐ 1.17 Fees (Processing Ext. of time)
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- ☐ Other ____________________
- ☐ Credit

BIB (Rev. 05/07)
NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/18/2011.
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.

/mnguyen/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101
NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/18/2011.

• The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record (37 CFR 1.33).

/mnguyen/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Wonjang BAEK et al.

Application No. 12/882,665

Confirmation No. 3369

Filed: September 15, 2010

Examiner: Not yet assigned

For: METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION

LETTER TO THE EXAMINER REQUESTING ENTRY OF CHANGE IN POWER OF ATTORNEY AND CORRESPONDENCE ADDRESS

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

Sir:

In accordance with the enclosed Power of Attorney, it is respectfully submitted that the attorneys of Stein McEwen, LLP, customer number 49,455, are associated with the instant application and all prior powers of attorney have been revoked.

Please direct all correspondence to the address associated with customer number 49,455, which is presently as follows:

Stein McEwen, LLP
1400 Eye St., NW
Suite 300
Washington, D.C. 20005

Respectfully submitted,

STEIN MCEWEN, LLP

Date: August 18, 2011

By: ____________________________

Michael D. Stein
Registration No. 37,240

1400 Eye St. N.W., Suite 300
Washington, D.C. 20005
Telephone: (202) 216-9505
Facsimile: (202) 216-9510
POWER OF ATTORNEY BY ASSIGNEE OF ENTIRE INTEREST
AND REVOCATION OF PRIOR POWERS

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

Sir:

The undersigned corporation is the assignee of record of the entire right, title, and interest of the patent applications and patents identified listed in the enclosed Attachment A:

REVOCATION OF PRIOR POWERS OF ATTORNEY

revokes all powers of attorney previously given, and

NEW POWER OF ATTORNEY

appoints the attorneys and/or agents of STEIN MCEWEN LLP under Customer No. 49,455 to prosecute and transact all business in the United States Patent and Trademark Office connected therewith.

CORRESPONDENCE CHANGE OF ADDRESS

All correspondence and telephone communications should be directed to the address associated with Customer Number 49,455, which is currently:

STEIN MCEWEN LLP
1400 EYE ST., N.W.
SUITE 300
WASHINGTON, D.C. 20005
PHONE: (202) 216-9505
FACSIMILE: (202) 216-9510
STATEMENT AND CERTIFICATION UNDER 37 CFR §3.73(B)

ANYPOINT MEDIA GROUP, a United States corporation, certifies that it is the assignee of the entire right, title and interest in the patent applications and patents identified in the enclosed Attachment A, by way of assignments, and those assignments were recorded in the USPTO with available data identified in the Attachment A and/or are attached hereto as indicated in Attachment A.

The undersigned is empowered to sign this certificate on behalf of the assignee.

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

If there are any fees associated with the filing of this Statement and Certification, please charge and/or credit the same to Deposit Account No. 503333.

Dated 08/16/11

By:  
Name: HAN JUN-SIK  
Title: Managing Director
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METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION

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1 Korean Office Action, date March 7, 2011, three (3) pages.

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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](http://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.
**CERTIFICATION STATEMENT**

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

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

**OR**

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

☐ See attached certification statement.

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

☐ A certification statement is not submitted herewith.

**SIGNATURE**

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

<table>
<thead>
<tr>
<th>Signature</th>
<th>Jerald L. Meyer</th>
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<tbody>
<tr>
<td>Date (YYYY-MM-DD)</td>
<td>2011-03-28</td>
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<tr>
<td>Name/Print</td>
<td>Jerald L. Meyer</td>
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<td>Registration Number</td>
<td>41194</td>
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This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.
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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.
(54) VIDEO DATA TRANSMITTING METHOD FOR PROVIDING HIGH
CHANNEL BANDWIDTH EFFICIENCY BY USING CHANNEL HARMONIC
DIVISION, PROVIDING SERVICES TO PLURAL VIEWERS AND
PREVENTING NECESSARY BANDWIDTH FROM BEING EXTENDED EVEN
THOUGH THE NUMBER OF VIEWERS IS INCREASED

(57) Abstract:

PURPOSE: A method for transmitting video data by using channel harmonic
division is provided to improve channel bandwidth efficiency by using a simple
division structure, and reduce the number of video data segments and the
number channels which are used at once. CONSTITUTION: A video data transmitting method comprises the following steps of: dividing the whole video data(D) into a foregoing part(Da) and a following part(Db); transmitting the Da through a channel harmonic division mode for dividing the Da into N(arbitrary natural number) parts with the same size and dividing N(arbitrary natural number)-numbered divided data into N data in the N-numbered channel, and transmitting the Db through a staggered mode for repeatedly transmitting the Db at certain periods.

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(71) 출원인
한양대학교 산학협력단
서울 성동구 행당동 17번지

(72) 발명자
박승길
서울특별시 강남구 대치4동 910 - 4 번지 풍림아이원
아파트 102동 502호
김종익
경기도 용인시 기흥구 중동 819번지 월드메트리아
아파트 108동 1803호

(74) 대리인
이경한

전체 정구형 수 : 총 16 항

(54) 채널 조화 분할을 이용한 비디오 데터 전송 방법

(57) 요약
비디오 데이터 전송 방법이 개시된다. 본 발명의 비법적인 일 실시예에 따르면, 비디오 데이터 전체 (A)을 선행 부분 (A')과 후행 부분 (A")으로 분할하고, (A')는 '없이의 자연수'개의 동일한 크기로 분할하여 '없이의 자연수'번째 분할된 데이터는 '번째 채널에서 개의 데이터로 분할되어 전송되는 채널 조화 분할 방식으로 전송하고, 상기 (A')는 일정한 주기로 반복해서 전송하는 스테그레이드 (Staggered) 방식으로 전송하는 비디오 데이터의 전송 방법이 제공된다. 본 발명에 따르면, NVoD 비디오 데이터 전송에서 시청자 대기시간과 비파 요구량에서 높은 액정도 효율을 기여하면서, 간단한 구조로 NVoD 서비스가 가능하다는 장점이 있다. 또한 기존 비디오 데이터 분할 전송 방법들에 비해 비디오 데이터 세그먼트 수를 줄이고, 한 번에 사용하는 채널의 수도 줄일 수 있는 장점이 있다.

대표 도표 - 도1

- 1 -

17-1
특허청구의 범위

청구항 1
비디오 데이터의 전송 방법에 있어서,
비디오 데이터 전제 (A) 및 혼업 부분 (A)과 혼업 부분 (A)인 두 부분으로 분할하는 단계 (a) : 및

상기 A는 (업의 자의수)개의 동일한 크기로 분할하고, (업의 자의수)인 번호 분할된 데이터는 번째 재널에서 각의 데이터를 분할하여 전송되는 재널 조합 분할 방식으로 전송하고, 상기 A는 일정한 주기로 반복해서 전송하는 스테이지드 (staggered) 방식으로 전송하는 단계 (b)를 포함하는 것을 특징으로 하는 비디오 데이터 전송 방법.

청구항 2
제1항에 있어서,
상기 A는 상기 A에 비해 짧은 길이인 것을 특정으로 하는 비디오 데이터 전송 방법.

청구항 3
제1항에 있어서,
상기 단계 (a)는,
비디오 데이터의 분할 계수 (b)에 의해 수행되는 것을 특징으로 하는 비디오 데이터 전송 방법.

청구항 4
제3항에 있어서,

상기 비디오 데이터의 최대 시청자 대기시간 (d)은 수학식

\[ d = \frac{D}{hN + N - 1} \]

에 의해 결정되는 것을 특정으로 하는 비디오 데이터 전송 방법.

청구항 5
제1항에 있어서,
상기 단계 (b)는,
상기 A와 A의 전송 주기를 일치하여 수행되는 것을 특정으로 하는 비디오 데이터 전송 방법.

청구항 6
제1항에 있어서,

상기 A에 a (업의 자의수)개의 재널이 할당되면 수학식

\[ m = \frac{N_{\text{max}}}{\left( N_{\text{max}} + 1 \right)} D_a \]

를 만족하는 최대값으로 a값이 결정되는 것을 특정으로 하는 비디오 데이터 전송 방법.
정구항 7
2.7.1에 있어서.
상기 비디오 데이터의 총송에 할당된 대역폭의 크기(€)는 수학식 \( B = \beta X \Delta \) \( \beta \times 1 \) 안 임의의 수이고 \( \beta \)는 비디오 데이터의 재생 소모율임에 의해 결정되는 것을 특정으로 하는 비디오 데이터 전송 방법.

정구항 8
2.7.2에 있어서.
상기 비디오 데이터의 사용자 최대 비례 요구량(€)는 수학식 \( X = c_{\infty} \)에 의해 결정되며, \( d \)는 비디오 데이터의 최대 시청자 대기시간임을 특정으로 하는 비디오 데이터 전송 방법.

정구항 9
비디오 데이터 전송 방법이 구현될 수 있도록 디지털 처리 장치에 의해 실행될 수 있는 명령어들의 프로그램이 유형적으로 구현되어 있으며 디지털 처리 장치에 의해 반복될 수 있는 프로그램을 기록한 기록 메체에 있어서.
비디오 데이터 전체(€)를 선행 부분(€)과 후행 부분(€)이 두 부분으로 분할하는 단계(a) 및
상기 \( d \)은 "임의의 자연수"개의 동일한 크기로 분할하고, "임의의 자연수"개의 분할 단계는 "반복 제어에 서"개의 데이터로 분할되어 전송되는 제어 초와 분할 방식으로 전송하고, 상기 \( d \)는 일정한 주기로 반복해서 전
송하는 스테그먼트(staggered) 방식으로 전송하는 단계(b)를 포함하는 것을 특정으로 하는 비디오 데이터 전송 방
법은 구현한 프로그램을 기록한 기록매체.

정구항 10
2.9.1에 있어서.
상기 \( d \)는 상기 \( d \)에 비해 짧은 길이임을 특정으로 하는 비디오 데이터 전송 방법을 구현한 프로그램을 기록
한 기록매체.

정구항 11
2.9.2에 있어서.
상기 단계(a)는.
비디오 데이터의 분할 계수(€)에 의해 수행되는 것을 특정으로 하는 비디오 데이터 전송 방법을 구현한 프로그
램을 기록한 기록매체.

정구항 12
2.11.1에 있어서.
상기 비디오 데이터의 최대 시청자 대기시간(€)은 수학식 \( d = \frac{B}{hN + N - 1} \)에 의해 결정되는 것을 특정으로 하는
비디오 데이터 전송 방법을 구현한 프로그램을 기록한 기록매체.

청구항 13
제3항에 있어서,
상기 단계(b)는,
상기 \( D \)와 \( D \)의 전송 주기를 일치하여 수행되는 것을 특징으로 하는 비디오 데이터 전송 방법을 구현한 프로그램을 기록한 기록매체.

청구항 14
제3항에 있어서,
상기 \( D \)에 \( \alpha \) (임의의 자연수)계의 개념이 할당되면 수학식 \( m \geq \frac{\alpha + 1}{\beta - 1} D \)를 만족하는 최대값으로 \( \alpha \)값이 결정되는 것을 특징으로 하는 비디오 데이터 전송 방법을 구현한 프로그램을 기록한 기록매체.

청구항 15
제3항에 있어서,
상기 비디오 데이터의 전송에 할당된 대역폭의 크기 \( \beta \)는 수학식 \( \frac{\beta \times \delta \beta}{\beta \delta} \geq 1 \)의 일의 수이고 \( \delta \)는 비디오 데이터의 재생 소모율임에 의해 결정되는 것을 특징으로 하는 비디오 데이터 전송 방법을 구현한 프로그램을 기록한 기록매체.

청구항 16
제15항에 있어서,
상기 비디오 데이터의 사용자 최대 비속 요구량 \( \lambda \)는 수학식 \( \lambda \geq c \times \delta \times \delta \beta \)에 의해 결정되고, \( \delta \)는 비디오 데이터의 최대 시청자 대기시간을 결정하는 것을 특징으로 하는 비디오 데이터 전송 방법을 구현한 프로그램을 기록한 기록매체.

명세서
발명의 상세한 설명
발명의 목적
발명이 속하는 기술 및 그 분야의 종래기술
[0008] 본 발명은 비디오 데이터의 전송 방법에 관한 것으로서, 보다 상세하게는 부분 재널 조화 분할 전송 방식을 이용한 비디오 데이터의 전송 방법에 관한 것이다.

[0009] 비디오 데이터는 동영상과 음성 등의 대용량 데이터의 집합체로써, 이를 네트워크를 통하여 시청자에게 제공하는 경우 큰 재널 대역폭이 필요하며, 큰 재널 대역폭을 확보하기 위해서 많은 비용이 소요된다.

[0010] 그러나 최근 통신 기술과 디지털 처리 장치의 발달로 통신망으로 연결된 컴퓨터 또는 텔레비전을 통해 원하는 프로그램을 언제든지 시청할 수 있는 영상 서비스인 VoD(Video on Demand) 서비스가 점차 널리 보급되고 있으며, 이러한 VoD 서비스에 대한 수요도 증가하고 있다.
이러한 VoD 서비스에서 비디오 데이터를 전송하는 방법은 일반적으로 하나의 가입자 비디오 시청 요청이 있을 때 그 가입자에게 즉시 하나의 채널을 부여함으로써 하나의 채널을 주로 사용하는 TVoD(True Video on Demand) 방식과 방송 일정한 간격으로 특정한 비디오를 방송하고, 여러 명의 가입자들이 하나의 비디오를 동시에 시청할 수 있는 NVoD(Near Video on Demand) 방식으로 구분된다.

NVoD 방식은 TVoD 방식에 비해 간단한 채널 대역폭으로 많은 가입자를 수용할 수 있는 이점이 있어 다수를 대상으로 하는 VoD 서비스에서는 NVoD 방식보다 더 적합한 것으로 인정된다.

따라서 일반적으로 다수를 대상으로 수행되는 VoD의 특성상 주로 NVoD 방식의 성능개선을 위해 많은 연구가 진행되어 왔으며, 이러한 연구는 크게 패치(Patch) 방식과 배치(Batch) 방식으로 구분이 된다.

패치 방식은 비디오 데이터를 정적인 채널(Static Channel)을 통해서 항상 일정한 간격으로 비디오를 반복해서 전송하고 비디오 데이터 반복 주기 시간동안 채널을 부여하는 형태로 구성된다.

패치 방식은 구현이 간단하다는 장점이 있으나, 채널 대역폭 효율이 많이 떨어지며, 인원이 몇천의 가입자에게 미치는 서비스가 가능하며, 시청자 수가 늘어나면 필요한 대역폭도 함께 늘어난다는 문제점이 있다.

반면, 배치방식은 비디오 데이터를 대역폭과 필요를 기준으로 해서 다양한 방법으로 나누고 이를 브로드캐스트(broadcast)하는 방식이다.

패치방식은 채널 대역폭 효율이 우수하다는 장점이 있지만, 비디오 데이터의 전송 방법의 구성에 있어서 복잡성이 증가하기 때문에 실제 구현에는 많은 제약이 따르다는 문제점이 있다.

발명이 이루어져야 하는 기술적 과제

상기한 바와 같은 문제점을 해결하기 위해 본 발명은 채널 대역폭 효율이 높고, 다수의 시청자에게 서비스가 가능하며, 시청자 수가 늘어나도 필요한 대역폭도 함께 늘어나지 않은 이점을 가진 VoD 서비스가 가능한 비디오 데이터의 전송 방식을 제안하는 것이다.

또한, 상기한 이점을 가지면서도 간단한 구성을 가진 비디오 데이터의 전송 방법을 제안하는 것이다.

본 발명의 또 다른 목적들은 이하의 실시예에 대한 설명을 통해 쉽게 이해될 수 있을 것이다.

발명의 구성 및 작용

상기한 바와 같은 목적을 달성하기 위해, 본 발명의 일 실시예에 따르면 비디오 데이터 전송 방법이 제공된다.

본 발명의 바탕작한 일 실시예에 따르면, 비디오 데이터의 전송 방식에 있어서, 비디오 데이터 전체 (λ)를 선정 부분 (λ)과 후행 부분 (λ) 두 부분으로 분할하는 단계 (a): 및 상기 (a)에 (σ)의 지정자 수계의 동일한 크기로 분할하고, (σ)의 지정자 수계 스테그레이드 (staggered) 방식으로 전송하는 단계 (b)를 포함하는 것을 특징으로 하는 비디오 데이터 전송 방법이 제공된다.

본 발명의 다른 측면에 의하면, 비디오 데이터 전송 방법을 구현하기 위한 프로그램을 기록한 기록매체가 제공된다.

본 발명의 바탕작한 일 실시예에 따르면, 비디오 데이터 전송 방법이 구현될 수 있도록 디지털 처리 장치에 의해 실행될 수 있는 명령어들의 프로그램이 유형적으로 구현되어 있으며, 디지털 처리 장치에 의해 판독될 수 있는 프로그램을 기록한 기록매체에 있어서, 비디오 데이터 전체 (λ)를 선정 부분 (λ)과 후행 부분 (λ) 두 부분으로 분할하는 단계 (a): 및 상기 (a)에 (σ)의 지정자 수계 스테그레이드 (staggered) 방식으로 전송하는 단계 (b)를 포함하는 것을 특징으로 하는 비디오 데이터 전송 방법을 제공한다.
일정한 주기로 반복해서 전송하는 스테이거드(Staggered) 방식으로 전송하는 단계(Δ)를 포함하는 것을 투명으로 하는 비디오 데이터 전송 방법을 구현한 프로그램을 기록한 가독매체가 제공된다.

[0026] 상기 Δ는 상기 Δ에 비해 흐린 점이일 수 있다.

[0027] 상기 비디오 데이터 전체(Δ)를 섬행 부분(Δ)과 후행 부분(Δ)의 두 부분으로 분할하는 단계는 비디오 데이터의 분할 계수(Δ)에 의해 수행될 수 있다.

\[ \Delta = \frac{D}{hN+N-1} \]  

[0028] 그리고 상기 비디오 데이터의 최대 시각자 대기시간(\( \Delta \))은 수학식

\[ m = \frac{N^2 - 1}{2} \]  

를 만족하는 최대값으로 \( \Delta \)값이 결정될 수 있다.

[0029] 상기 \( m \)에 의한 "익익의 자연수"개의 채널이 할당되면 수학식

\[ B = \beta \times h (\beta \geq 1 \text{인 익익의 수이고 } B \text{는 비디오 데이터의 채널 소수 길이}) \]  

에 의해 결정될 수 있다.

[0030] 상기 비디오 데이터의 희설에 할당된 대역폭의 크기(\( B \))는 수학식

\[ \beta = \left( \frac{\Delta}{h} \right)^{1/2} \]  

에 의해 결정될 수 있다.

[0031] 그리고 상기 비디오 데이터의 사용자 최대 비해 요구량(\( B \))는 수학식

\[ \Delta = \frac{B}{hN+N-1} \]  

에 의해 결정될 수 있다.

[0032] 본 발명은 다양한 변형을 가할 수 있고 여러 가지 실시예를 가질 수 있는 바, 특정 실시예들을 도면에 예시하고 상세한 설명에 상세하게 설명하고자 한다. 그러나, 이는 본 발명을 특별한 실시 형식에 대해 한정하려는 것이 아니라, 본 발명의 사상 및 기술 범위에 포함되는 모든 변형, 근본을 내지 대체를 포함하는 것으로 이해되어 야 한다.

[0033] 각 도면을 설명하하면서 유사한 접조부제를 유사한 구성요소에 대해 사용하였다. 본 발명을 설명함에 있어서 주로 된 장치 기술에 대한 구체적인 설명이 본 발명의 요지를 흐릴 수 있다고 판단되는 경우 그 상세한 설명을 생략한다.

[0034] 제1, 제2 등의 용어는 다양한 구성 요소들을 설명하는데 사용될 수 있지만, 상기 구성 요소들은 상기 용어들에 의해 한정되어서는 안 된다. 상기 용어들은 하나의 구성요소를 다른 구성요소로부터 구별하는 목적으로만 사용된다.

[0035] 예를 들어, 본 발명의 관리는 범위를 벗어나지 않으면서 제1 구성요소는 제2 구성요소로 명명될 수 있고, 유사하게 제2 구성요소는 제1 구성요소로 명명될 수 있다.

[0036] 및/또는 이라는 용어는 복수의 관련된 기계적 구조의 조합 또는 복수의 관련된 기계적 구조의 조합 또는 어느 항목을 포함한다.

[0037] 어떤 구성요소가 다른 구성요소에 "연결되어" 있다거나 "접속되어" 있다고 언급될 때에는, 그 다른 구성요소에 직접적으로 연결되어 있거나 또는 접속되어 있을 수도 있지만, 중간에 다른 구성요소가 존재할 수도 있다고 이해되어야 할 것이다.

[0038] 반면에, 어떤 구성요소가 다른 구성요소에 "직접 연결되어" 있다거나 "직접 접속되어" 있다고 언급될 때에는, 중간에 다른 구성요소가 존재하지 않으므로 이해되어야 할 것이다.

[0039] 본 출원에서 사용한 용어는 단지 특정한 실시예를 설명하기 위해 사용된 것으로, 본 발명을 한정하려는 의도가 아니다.

[0040] 단수의 표현은 문맥상 명백하게 다르게 뜻하지는 않은, 복수의 표현을 포함한다. 본 출원에서, "포함하다" 또는 "가깝다" 등의 용어는 명세서상에 기재된 특정, 숫자, 단계, 동작, 구성요소, 부품 또는 이들을 조합한 것이 존재함을 지정하려는 것이며, 하나 또는 그 이상의 다른 특징들이나 숫자, 단계, 동작, 구성요소, 부품 또는 이들을 조합한 것의 존재 또는 부가 가능성을 의미 배제하지 않는 것으로 이해되어야 한다.

[0041] 다르게 정의되지 않는 한, 기술적이거나 과학적인 용어를 포함해서 여기서 사용되는 모든 용어들은 본 발명이 속하는 기술 분야에서 통상의 지식을 가진 자에 의해 일반적으로 이해되는 것과 동일한 의미를 가지고 있다.
일반적으로 사용되는 사례에 정의되어 있는 것과 같은 용어들은 관련 기술의 문맥상 가지는 의미와 일치하는 의미를 가지는 것으로 해석되어야 하며, 본 총론에서 명확하게 정의하지 않는 한, 이상적이거나 과도하게 형식적 의미로 해석되지 않는다.

이하, 참보도 도면을 참조하여 본 방법에 따른 바람직한 실시예를 상세히 설명하며, 도면 부호에 관계없이 동일하거나 대응하는 구성 요소는 동일한 참보 번호를 부여하고 이에 대한 종속성은 설명은 생략하여 한다.

이러한 부분 채널 조화 분할 전송 방식에 적용되는 비디오 데이터의 구성은 도 1을 참조하여 살펴본다.

도 1은 본 방법의 바람직한 일 실시예에 따른 채널 조화 분할된 비디오 데이터의 구성을 나타낸 구성도이다.

본 방법에서는 비디오 데이터를 부분 채널 조화 분할 전송 방식으로 전송한다. 본 방법의 바람직한 일 실시예에 따른 부분 채널 조화 분할 전송 방식은 비디오 데이터를 짧은 선행 부분과 긴 후행 부분으로 나누고 짧은 선행 부분에는 채널 조화 분할을 이용한 전송 방식을 적용하여 전송하고 긴 후행 부분에는 종래의 WVoD 방식인 비디오 데이터를 일정한 주기로 반복해서 전송하는 스테이징(Staggered) 방식을 이용하여 전송하는 방식이다.

이때 각 부분은 주기적인 브로드캐스트(broadcast)를 통해서 반복적으로 전송을 하고 스테이징 방식의 반복 주기 동안 데이터를 이용한 전송 방식의 주기와 일치하도록 맞추어서 전송을 하게 된다. 브로드캐스트는 수신에 연결된 통신망으로 모든 페켓 데이터를 한 번에 보내는 것으로, 따라서 다수의 국(station)으로 동시에 정보를 보내지게 된다.

도 1에 도시된 바와 같이 비디오 데이터의 짧은 선행 부분에 적용되는 채널 조화 분할 전송은 비디오 데이터를 주기 동일한 크기로 분할하고, 반복적으로 데이터를 반복된 데이터로 분할되어 반복하여 전송하는 방식이다. 이러한 방식은 비디오 데이터를 동일한 크기로 분할하는 대신 채널 대역폭을 반복 데이터가 사용하는 대역폭을 2배로 할 때 2배 채널의 대역폭 2B로 분할한다. 즉, 데이터의 분할 크기는 고정시키고 채널 대역폭의 분할 크기를 다르게 하는 것이다.

도 1은 24인 경우를 예시하여 도시한 것으로 비디오 데이터를 4개의 동일한 크기로 나누고 4개의 채널에 각각 나누어서 전송하는 것으로, 각 해당 채널과 데이터를 다시 채널과 데이터의 순서에 따라 1, 2, 3, 4개로 다시 분할하여 전송한다.

이러한 본 방법의 바람직한 일 실시예에 따른 비디오 데이터의 선형 부분을 참조하여 부분 채널 조화 분할 방식으로 전송되는 비디오 데이터 전체의 구성은 도 2를 참조하여 살펴본다.

도 2는 본 방법의 바람직한 일 실시예에 따른 채널 조화 분할된 비디오 데이터의 전체 구성을 나타낸 구성도이다.

도 2에 도시된 바와 같이, 본 방법의 바람직한 일 실시예에 따른 비디오 데이터의 전송 방식은 전체 비디오 길이 B를 짧은 전부(A)와 긴 후부(B)로 분할하고, A 부분에서는 채널 조화 분할 전송 방식을 사용하여 전송하고 B는 스테이징 방식을 사용하여 전송한다.

A 부분에 채널 조화 분할 전송 방식을 적용하기 위해서는 A 부분을 다시 동일한 크기로 나누고 분할된 데이터를 채널 순서에 맞게 전송한다. 이때 채널과 데이터를 순서에 따라 그 순번만을 재분할 하여서 전송하며, B는 분할하지 않고 하나의 세그먼트 동일한 간격으로 반복전송을 하는 구조를 가진다.

본 방법의 바람직한 일 실시예에 따라 부분 채널 조화 분할 전송 방식에 의해 서버에서 비디오 데이터를 전송하는 방법에 대해 보다 자세히 살펴본다.

도 2에 도시된 바와 같이, 비디오 데이터를 전송하는 서버에서의 WVoD 서비스로 전송되는 비디오 데이터의 길이 B(단위:분), 비디오 제한 사이클을 (단위:Mbps)라고 가정하면, 전체 비디오의 크기를 B=α로 표현된다.

비디오 전송에 말당된 대역폭의 크기를 α(단위:Mbps)라고 하면, α=β×h(β ≥ 1)로 표현할 수 있다.
먼저 비디오의 길이 \( r \)를 채운 비디오 전부 (前端) \( D_0 \)과 긴 비디오 후부 (後端) \( D_r \)로 나타낸다. 이때 \( D_r \)과 \( D_0 \)의 관계는 다음 [수학식 1]과 같이 표현할 수 있다.

\[ D_r = h(D_0 + D_r), h \geq 1 \]

여기서 \( r \)는 비디오 분할 계수이고, \( r \)는 \( D_r \)에서 동일한 크기로 분할되는 데터 세그먼트 하나의 길이이다. 분할된 채운 비디오 전부 (前端) 크기 \( r \)는 \( r = D_r \) 이고, 긴 후부 (後端) 크기 \( r \)는 \( r = D_r \)이다.

한편, 전체 비디오 길이 \( r \)는 \( n \)개의 세그먼트로 분할되다. 비디오 일부분 \( D_0 \)은 \( \ldots \)개의 동일한 크기로 나누고, 비디오 끝부분 \( D_r \)는 하나로 나누어진다. 따라서 \( D_r \)에 속하는 세그먼트의 길이 \( r \)는 다음 [수학식 2]과 같이 표현할 수 있다.

\[ s - \frac{D_r}{r - 1} \]

분할된 비디오는 \( s \)로 표현할 수 있는데 \( r \)는 \( r \)개의 전체 비디오 세그먼트를 나타내며, 모든 세그먼트는 번호 순서대로 연결되어 있다. 모든 연결된 비디오를 합치면 전체 비디오를 구성할 수 있다. 비디오 일부분 \( D_0 \)에 속하는 \( \ldots \)부터 \( \ldots \)의 길이는 \( s \)로 동일하다.

\[ D_r \]부분에 속하는 \( \ldots \)개의 세그먼트 \( D_r \)는 \( n \)개의 하위 세그먼트로 분할한다. 이때 세그먼트 \( D_r \)의 하위 세그먼트는 \( \ldots \)로 표시한다.

채널 조화 분할 전송 방식에 적합되는 길은 비디오 일부분 \( D_0 \)에서 적합되는 채널의 개수를 \( s \)이라고 가정하고, 스테레오 방식이 적합되는 길 비디오 일부분 \( D_0 \)에 적합되는 채널의 개수를 \( s \)이라고 가정하면, \( (s-1, s-2) \)은 채널 조화 분할 전송 방식이 적용되는 부분의 채널을 표시하고, \( (s-1, s-2) \)는 스테레오 방식이 적용되는 부분의 채널을 나타낸다. \( s \)의 표기법은 \( D_0 \)부분의 \( \ldots \)개 채널을 나타내기 위한 표기 방법이다.

\[ D_0 \]부분에 속하는 세그먼트 \( D_r \)에서 분할된 하위 세그먼트는 채널 \( r \)을 통해서 전송된다. 채널 \( r \)의 채널 대역폭이 \( s \)일 때 채널 \( s \)의 채널 대역폭은 \( s \)이다. 채널 \( s \) 내에는 \( r \)에 분할된 하위 세그먼트들이 주기적으로 브로드캐스트 방식으로 전송된다.

채널 \( s \) (\( 1 \ldots 2 \ldots n \) 내에서는 \( D_0 \)는 세그먼트가 스테레오 방식으로 주기적으로 브로드캐스트되어 전송된다. 이 때 스테레오 방식의 반복 주기는 \( r \)은 \( \ldots \)부분에 적합되는 채널 조화 분할 전송 방식과 주기를 맞추기 위해서 \( D_r \)에 \( D_r \)가 된다. 스테레오 방식에 적합된 채널 \( \ldots \)은 \( n \)의 \( D_0 \)의 \( D_r \)로 표현될 수 있다. 따라서 \( D_r \)의 조화 분할 전송 방식으로 비디오를 전송하기 위해서 필요한 채널 대역폭은 다음 [수학식 3]과 같이 나타낼 수 있다.

\[ B = \sum_{n=1}^{n} \frac{r}{r(n+1)} + nb = mb + nb \]

\[ m = \frac{r}{r(n+1)} \]

[수학식 3]에서 \( m \)은 \( D_0 \)부분에 적합되는 채널의 개수이며, 또한 \( N \)에 대한 부분 채널 조화 분할 수이기도 하다.
이러한 부분 채널 조화 분할에 의한 비디오 데이터가 서비에서 실제로 전송이 이루어지는 경우에는 예시를 통해 설명한다.

도 3은 본 방면의 바람직한 일 실시에 따라 부분 채널 조화 분할 전송 방법에 의해 비디오 데이터의 전송이 이루어지는 경우들 예시로서 나타낸 것이다.

비디오의 길이 $n$는 비디오 분할 개수 $x$에 의해서 $x_0$과 $x_n$으로 분할된다. 여기서 $c^s_1$의 표기법은 $x$ 부분의 1번째 채널을 나타낸다.

도 3은 본 방면의 바람직한 일 실시에 따른 부분 채널 조화 분할 전송 방법에서 비디오 분할 개수 $x$는 3이고 비디오 분할 개수 $x_0$은 5인 경우를 예시로 한다.

또한 $x$을 채널 조화 분할 전송 방식으로 전송하기 위해서 할당된 채널의 개수 $= \frac{x_1}{x_0}$ 채널이고, $x_0$을 스테레오 방식으로 전송하기 위해서 할당된 채널의 개수 $= \frac{x_1}{x_0}$ 경우를 예시한 것이다.

스테레오 방식이 적용되는 $x_0$의 경우 $x_0 = n_0 - n$이고 여기서 $n_0$을 채널 조화 분할 전송 방식으로 전송하기 위해 $x_0 = n_0 - n$ 간격으로 동일하게 분할한 세그먼트의 길이이다.

따라서 비디오 데이터의 전체 길이 $n$는 비디오 분할개수 $x$의 3개에 의해서 $x_0$ 와 $x_n$가 $x_0 = n_0 = 3$개의 경우로 상관관계를 가지며 분할된다.

또한, $s_1 = 5$ 이므로 $x_0$ 부분은 4개의 동일한 크기로 ($c^s_0 = 4$) 분할되어 있고, $x_n$는 하나의 크기로 분할되며, $x$ 부분에서 동일한 크기로 분할된 4개의 데이터 세그먼트들은 $c^s_0$, $c^s_1$, $c^s_2$ 그리고 $c^s_3$에서 전송이 되는데, 이때 채널 $c^s_0$에는 세그먼트 $s$ 데이터가 동일한 크기를 갖는 4개의 하위 세그먼트들로 분할되어 전송되고 채널 $c^s_0$의 대역폭은 $x_0$가 된다.

그리고 $s_1 = 3$ 이므로 $x_n$ 부분은 하나의 세그먼트로 3개 채널에서 스테레오 방식을 사용해서 전송하며, 스테레오 방식에 의한 전송 후기 $x_n$는 5로, $x_0$는 4로, $x_0$는 15가 된다.

시청자 비파 요구량이 최소가 될 때는 시청자가 비디오 데이터 세그먼트를 "에서부터 수신할 경우인데, $x_0$ 부분에 대한 비파가 필요 없게 되는 부분이다.

시청자 비파 요구량이 최대가 될 때는 비디오 데이터 세그먼트를 "에서부터 수신할 경우인데, 이 경우에는 $x_0$을 다음으로 하는 동시에 $x_0$도 함께 다음으로 해야 한다.

이러한 방식에 의해 비디오 데이터를 분할하여 전송하는 경우 클라이언트는 비디오 데이터를 수신하는 표시함으로써 비디오 데이터의 시청이 이루어진다.

전송한 분할 전송 방식에 의해 전송된 비디오 데이터를 수신한 클라이언트에서 수신된 비디오 데이터가 처리되는 과정에 대해 살펴보기로 한다.

먼저 시청자가 비디오의 시청을 원하는 시점을 기준으로 채널 $c^s_0$에서 가장 먼저 시작하는 비디오 데이터 세그먼트 $s$을 다운로드 받으면서 바로 시청할 수 있도록 한다. 비디오 데이터 세그먼트 $s$을 채널 $c^s_0$에서 다운로드 하면서 채널 $c^s_0$과 채널 $c^s_1$ 사이에 있는 데이터 세그먼트들을 ($s_{i_1}$~$s_{i_n}$) 다운로드 받기 시작한다. 이때, 마지막 비디오 데이터 세그먼트 $s_n$의 비디오 전송 시작점과 $s_0$의 비디오 데이터 시작점이 동일한 경우에 $s_n$을 $s_0$의 시작과 동시에 저장을 해야 시청자가 비디오를 단정 없이 시청할 수 있고, $s$과 $s_n$의 시작 점이 다른
경우에는 $^k$의 시작 지점부터 가장 빠르게 나타나는 $^s$을 저장하면 된다.

[0086] 만약 비디오 데이터 세그먼트 $^s$를 $^s$에서 다운로드 하기 시작하고, 채널 $^C^n$ 내의 $^k$의 길이가 $^s$이라고 하면, 채널 $^C^n$에서 저장을 위해 저장이 필요한 구간은 $^n$부터 $^s$을 $^k$까지 이다.

[0087] 저장되어 있는 하위 세그먼트 데이터들은 마지막에 끝나는 하위 세그먼트 데이터와 함께 비디오 재생 소모율을 맞게 함께 재생시킨다. 비디오 데이터 세그먼트들은 다운로드 받으면서 비디오 재생 소모율에 맞게 $^s$부터 $^n$의 순서로 끝까지 지르지 않고 시청이 가능하도록 한다.

[0088] 채널 $^C^n (s-1, \ldots, n-1)$에서는 $^s$의 개의 하위 세그먼트들은 밖에 되면 해당 채널에서는 다운로드를 멈춘다. 채널 $^C^n (s-n, \ldots, n-1)$에서는 마지막 비디오 데이터 세그먼트 $^s$을 해당 채널 한곳에서 수신하게 되면 다운로드를 멈춘다.

[0089] 이하에서는 이러한 본 방법의 향상적인 일부 실시예에 따라 실제 분할 전송 방식에 의해 비디오 데이터의 전송이 이루어지는 경우 관련 대기 시간과 최대 비파 요구량 시간에 대해 살펴본다.

[0090] 먼저 시청자 대기시간은 채널 $^C^n$에서 비디오 데이터 $^s$의 길이이다. 그 이유는 일반 비디오의 첫 번째 데이터 세그먼트 $^s$을 채널 $^C^n$에서 시청자가 늦게지게 되면 비디오의 시작을 위해서 시청자는 $^s$의 길이만큼 기다려야 비디오를 시청할 수 있으므로 최대 시청자 대기시간은 $^s$의 길이이다.

[0091] $^s$의 길이 ($^s$)는 $D<\leq n-1$으로 나타낼 수 있으며, 여기서 비디오 전체 길이 $^s$는 $D<\leq s$로, $D<\leq n-1$으로 이들의 관계를 이용하면 다음 [수학적4]와 같이 표시할 수 있다.

[수학적4]

\[ d = \frac{D}{N+n} \]

[0092] 예를 들어, 비디오의 길이 ($^s$)가 123분, 비디오 분할계수 ($^s$)가 3, 스테이지 방식에 할당된 채널 ($^s$)은 3, $\leq n-1$에 대한 부분 채널 조화 분할 수 ($^s$)는 4로 비디오 데이터의 전송을 위한 조건이 충족할 경우, $^n = 31$, $^s = 30$분, $^s$은 9분이 된다.

[0093] 이러한 환경에서 부분 채널 조화 분할 전송 방식을 사용할 경우에는 최대 시청자 대기시간이 1분 정도이고, 비디오를 전송하기 위해서 필요한 채널은 $^s$이다. 하지만 동일한 조건에서 스테이지 방식의 데이터 전송 방식 최대 시청자 대기시간은 17.6분 정도로 나타난다.

[0094] 이와 같은 간단한 비교에서도 나타나듯이 부분 채널 조화 분할 방식에 의한 비디오 데이터의 전송 방법은 기존의 비디오 데이터 전송 방법과 비교해서 간단한 구조로 대역폭 사용에 대한 효율성을 높일 수 있다.

[0095] 한편, 이러한 계산에 의한 각 채널 채널 전송 방법에 의한 비디오 데이터 전송 방법에서 시청자 대기 시간에 대해 살펴본다.

[0096] 부분 채널 조화 분할 방식에 의한 비디오 데이터의 전송 방법에서는 시청자 측면에서 보면 셋탑박스(set-top box)에서 비디오 데이터 계층 속도가 비디오 데이터의 수신 속도 보다 높기 때문에 시청자 요구에 따라 비디오를 정상적으로 시청하기 위해서는 비파가 필요하게 된다.

[0097] 만약, 부분 채널 조화 분할 전송 방식에서는 세그먼트 $^s$를 채널 $^C^n$로부터 $^s$부터 수신하기 시작했다면 $^s$와 $^s$ 사이에서는 채널 $^C^n$와 $^\ldots$에 있는 데이터 하위 세그먼트들을 저장해야 한다. 이때, 마지막 비디오 데이터 세그먼트 $^s$의 비디오 전송 시작지점과 $^s$의 비디오 데이터 시작 지점이 동일한 경우에는 $^s$을 $^s$의 시작과 동시에 저장을 해야 시청자가 비디오를 단일 없이 시청할 수 있고, $^s$과 $^s$의 시작 지점이 다를 경
우에는 *의 시작 지점에서부터 가장 빠르게 나타나는 *을 저장하면 된다.

[0100] 부분 채널 조화 분할 전송 방식에서 시청자 최대 비파 요구량이 발생하는 경우는 도 3을 참조하여 보면 *에서 비디오가 수신 시작되었음을 경우이다.

[0101] 이때 시청자 최대 비파 요구량이 발생하는 시점을 채널 조화 분할 전송 방식이 적용되는 *에서 발생하는 시점
자 최대 비파 요구량 시점과 차이가 난다. 그 이유는 채널 조화 분할 전송 방식이 적용되는 *에서 시청자 최대 비파 요구량 시점 이후에는 비파는 감소하게 되지만 이 구간에서 채널 조화 분할 전송 방식의 감소율보다 *에 적용되는 스테이지드 방식의 비파 증가율이 더 크기 때문에 비파는 계속적으로 증가하게 된다. 따라서 부분 채널 조화 분할 전송 방식에서 최대 시청자 비파 요구량은 비파의 증가율과 감소율이 같아지는 지점인 (a)에서 (a)로 수신 시작점)가 된다.

[0102] 채널 조화 분할 전송 방식이 적용되는 마지막 채널 **까지 수신하는 데이터의 크기는 **이지만 그 시간 동안 필요한 비디오 데이터의 크기는 **이다. 또한 스테이지드 방식이 적용되는 *의 데이터는 **만의 시간동안 * 데이터를 수신 시작점에서 동시에 수신하여 저장을 한다. 따라서 시청자 최대 비파 요구량 *는 다음 [수학식 5]의 값으로 표시할 수 있다.

[0103] [수학식 5]

[0104] 

[0105] 최대 사용자 비파 요구량은 채널 조화 분할 전송 방식이 적용되는 마지막 채널 **여 채널 **에서 발생하고 그 이후 스테이지드 방식이 적용되는 채널 전송 방식으로 전환되면서 시청자 최대 비파 요구량은 유지되다가 비디오 데이터 *의 수신이 끝나면 줄어든다.

[0106] 이러한 본 발명에 의한 비디오 데이터 전송 방법에 의한 시청자 대기시간과 시청자 최대 비파 요구량을 참조하여 채널 대역폭과 시청자 대기시간 및 시청자 최대 비파 요구량의 관계를 각각 도 4와 도 5를 참조하여 살펴본다.

[0107] 먼저 도 4는 본 발명의 바람직한 일 실시예에 따른 비디오 데이터 전송 방법과 동말의 V旧의 방식의 비디오 데이터 전송 방법에서 채널 대역폭에 따른 시청자 대기 시간을 비교한 그래프를 도시한 도면이다.

[0108] 도 4에서는 비디오의 값 *은 100분이고, 부분 채널 조화 분할 전송 방식의 비디오 전송 계수 *는 3과 5인 경우로 실제 실험을 수행한 결과를 도시한 것이다.

[0109] 부분 채널 조화 분할 전송 방식의 결과는 비디오 전송 계수 *보다 1이 더 증가된 부분부터 나타난다. 비디오 전송 계수 *가 스테이지드 방식의 계수를 정하기 때문에 전달 조화 분할 전송 방식이 적용되는 *구간에 채널이 최소한 하나 이상은 존재해야 부분 채널 조화 분할 전송 방식이 적용될 수 있기 때문이다.

[0110] 도 4에 도시된 바와 같이 기존의 데이터 분할 전송방법인 Harmonic Broadcasting의 시청자 대기 시간이 전송 구간에서 가장 짧게 나타나고 있으나, 채널 대역폭 *가 증가함수록 부분 채널 조화 분할 전송 방식과 거의 동일한 결과를 얻을 수 있다는 것을 나타낸다.

[0111] 비디오 분할 계수 *가 2일 때, 부분 채널 조화 분할 전송 방식의 시청자 대기 시간은 기존의 대표적인 데이터 전송방법인 Pyramid Broadcasting과 Staggered Broadcasting 보다는 높고 Fast Broadcasting과 Staircase Broadcasting과 비교하여서도 채널 대역폭 *가 6.5 정도 쌍지지만 비슷하게 나타났고 그 이후에는 본 발명의 바람직한 일 실시예에 따른 부분 채널 조화 분할 전송 방식의 시청자 대기 시간이 적게 나타났다.

[0112] 또한 부분 채널 조화 분할 전송 방식에서 비디오 분할 계수 *가 감소할수록 시청자 대기 시간 *가 감소가 감

17-11
소하는 것을 확인할 수 있다. 하지만 채널 대역폭이 증가할수록 시청자 최대 대기시간 차이는 거의 없어진다.

[0113] 도 6은 본 방법의 바람직한 일 실시에 따른 비디오 데이터 전송 방법과 함께의 KVd 방식의 비디오 데이터 전송 방법에서 채널 대역폭에 따른 사용자 최대 비피 요구량 *와 필요 채널 대역폭 *와의 관계를 나타낸 그래프이다.

[0114] 도 4에서와 같이 부분 채널 조화 분할 전송 방식의 비디오 분할 계수 *는 3과 5로 실험을 수행한 결과를 도시한 그래프이며, 부분 채널 조화 분할 전송 방식의 최대 비피 요구량도 비디오 분할 계수 *가 스테이드 방식의 채널 수를 정하기 때문에 채널 조화 분할 전송 방식이 적용되는 *구간에 제한이 최소한 하나 이상은 존재해야 부분 채널 조화 분할 전송 방식이 적용될 수 있기 때문에 비디오 분할 계수 *보다 1이 더 증가된 부분부터 나타난다.

[0115] 도 5에 도시된 바와 같이, 실험 결과 최대 비피 요구량은 Past Broadcasting에서 비디오 데이터의 50%, Harmonic Broadcasting은 37%, Staircase Broadcasting은 25%에 수렴하는 것으로 나타난다.

[0116] 한편, 도 5에 도시한 그래프에는 실험 결과 값이 너무 크게 나와 표현되어 있지 않지만 Pyramid Broadcasting은 비디오 데이터의 75% 정도가 비피 요구량이 된다.

[0117] 반면, 부분 채널 조화 분할 전송 방식의 최대 비피 요구량은 비디오 분할 계수 *가 3일 때 Staircase Broadcasting과 거의 동일한 결과로 나타났으나, 부분 채널 조화 분할 전송 방식에서 비디오 분할 계수 *가 증 가할수록 시청자 최대 비피 요구량 *는 감소하는 것을 확인할 수 있다. 따라서 이러한 결과에서 시청자 최대 비피 요구량은 비디오 분할 계수 *에 의해서 조절 가능하다는 것을 확인할 수 있다.

[0118] 본 방법에 바람직한 일 실시에 따른 비디오 데이터 전송 방법에 따른 비디오 분할 계수와 시청자 대기시간 및 시청자 최대 비피 요구량과의 관계를 각각 도 6과 도 7을 참조하여 살펴본다.

[0119] 도면 6은 본 방법의 바람직한 일 실시에 따른 비디오 데이터 전송 방법에 의한 시청자 최대 대기 시간과 비디오 데이터의 분할 계수의 관계를 나타낸 그래프를 도시한 도면이다. 도 7은 본 방법의 바람직한 일 실시에 따른 비디오 데이터 전송 방법에 의한 시청자 최대 비피 요구량과 비디오 데이터의 분할 계수의 관계를 나타낸 그래프를 도시한 도면이다.

[0120] 먼저 도 6은 채널 대역폭 *가 정해져있고, 비디오 길이 *는 100분 일 때, 비디오 분할 계수 *와 시청자 최대 대기 시간과의 관계를 나타낸 그래프이다.

[0121] 정해진 논리 채널 수 안에서는 비디오 데이터의 분할 계수 *가 증가할수록 시청자 최대 대기시간 *도 함께 증가한다. 채널 대역폭 *가 적게 할당되고, 비디오 분할 계수 *가 크게 설정할수록 최대 시청자 대기시간은 빨리 증가한다. 즉 부분 채널 조화 분할 전송 방식이 동일한 환경에서는 채널 조화 분할 전송 방식에 할당되는 채널의 수가 많을수록 시청자 최대 대기 시간이 짧아진다.

[0122] 도 7은 주어진 채널 대역폭 *에서 비디오 분할 계수 *와 시청자 최대 비피 요구량과의 관계를 나타낸 그래프이다.

[0123] 비디오 데이터의 분할 계수 *가 증가할수록 최대 비피 요구량은 줄어들며, 채널 대역폭 *가 적게 할당되고, 비디오 분할 계수 *가 크게 설정할수록 최대 시청자 비피 요구량은 많이 줄어 들 수 있다는 것을 알 수 있다. 다만 비디오 분할 계수 *의 값이 작을 때에는 최대 시청자 비피 요구량은 별다른 차이를 보이지 않는다.

[0124] 이런 결과는 본 방법에 의한 부분 채널 조화 분할 방식에 의한 비디오 데이터의 전송 방법이 동일한 환경에서는 스테이드 방식에 할당되는 채널 수가 많을수록 시청자 최대 비피 요구량은 적어진다는 것을 알 수 있다.

[0125] 따라서 본 방법에 의한 부분 채널 조화 분할 방식에의한 비디오 데이터의 전송 방법을 이용하여 VoD 서비스 시스템을 구축할 경우 동일한 조건(예를 들면, 동일한 채널 대역폭, 동일한 대기시간, 동일한 변경차치 등)에서 채널 대역폭 효율을 현저히 높일 수 있을 뿐만 아니라, 총계의 비디오 데이터 전송 방법에 비해 비디오 데이터
분할 수, 채널 호평 (fallopping) 수, 동시 채널 사용 수 등을 줄일 수 있게 된다.

[0126] 상기한 본 발명의 바람직한 실시에는 예시의 목적을 위해 개시된 것이고, 본 발명에 대해 통상의 지식을 가진 당업자라면 본 발명의 사상과 범위 안에서 다양한 수정, 변경, 부가가 가능함이 있으며, 이러한 수정, 변경 및 부가는 하기의 특허청구범위에 속하는 것으로 보아야 할 것이다.

발명의 효과

[0127] 이상에서 설명한 바와 같이, 본 발명에 의한 비디오 데이터 전송 방법에 의하면, 간단한 분할 구조로 이용해서 채널 데이터 효율을 높이고 기존의 비디오 데이터 분할 방식들과 비교해서 비디오 데이터 제고백트 수를 줄이고, 한 번에 사용하는 채널의 수도 줄일 수 있는 장점이 있다.

[0128] 또한, 시청자 수의 변화에 따라 성능의 변화가 없기 때문에 대규모의 서비스에도 적용 가능한 효과가 있으며, 비디오 데이터의 분할에 따라서 시청자의 대기시간과 필요한 버퍼량을 조절 할 수 있는 장점이 있다.

도면의 간단한 설명

[0001] 도 1은 본 발명의 바람직한 일 실시에 따른 채널 조화 분할된 비디오 데이터의 전송 부분의 구성을 나타낸 구
성도.

[0002] 도 2는 본 발명의 바람직한 일 실시에 따른 부분 채널 조화 분할된 비디오 데이터의 전송 구성의 나타낸 구성
도.

[0003] 도 3은 본 발명의 바람직한 일 실시에 따라 부분 채널 조화 분할 전송 방법에 의해 비디오 데이터의 전송이 이루어지는 경우를 예시한 예시도.

[0004] 도 4는 본 발명의 바람직한 일 실시에 따른 비디오 데이터 전송 방법과 종래의 NVs0 방식의 비디오 데이터 전
송 방법의 시청자의 최대 대기 시간을 비교한 그래프를 도시한 도면.

[0005] 도 5는 본 발명의 바람직한 일 실시에 따른 비디오 데이터 전송 방법과 종래의 NVs0 방식의 비디오 데이터 전
송 방법의 시청자 최대 비디 요구량을 비교한 그래프를 도시한 도면.

[0006] 도 6은 본 발명의 바람직한 일 실시에 따른 비디오 데이터 전송 방법에 의한 시청자 최대 대기시간과 비디오
분할계수의 관계를 표시한 그래프를 도시한 도면.

[0007] 도 7은 본 발명의 바람직한 일 실시에 따른 비디오 데이터 전송 방법에 의한 시청자 최대 비디 요구량과 비디
오 분할계수의 관계 표시한 그래프를 도시한 도면.
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Title: METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION
Publication Date: 03/24/2011

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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This is to certify that the following application annexed hereto is a true copy from the records of the Korean Intellectual Property Office.

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Applicant(s): dreamer

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【발명의 국가명칭】 B D-J 규격을 지원하는 재생 장치를 위한 순차적 다운로드 서비스 제공 방법 및 이를 실현시키기 위한 프로그램을 기록한 컴퓨터로 판독 가능한 기록매체
【발명의 영문명칭】 METHOD OF PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR Playback Apparatus Supporting BD-J SPECIFICATION AND COMPUTER-READABLE MEDIUM HAVING THEREON PROGRAM PERFORMING FUNCTION EMBODYING THE SAME
【발명자】
【성명】 백원정
【성명의 영문표기】 Baek Wonjang
【주민등록번호】 620511-1XXXXX
【우편번호】 463-731
제출 연자 : 2009-09-21

【주소】 경기 성남시 분당구 이매동 아름마을건영아파트 107동 402호

【국적】 KR

【발영자】
【성명】 김동수
【성명의 영문표기】 John Kim
【주민등록번호】 710910-1XXXXX
【우편번호】 152-720
【주소】 서울 구로구 구로1동 650-4번지 SK하브스 B동 1416호

【국적】 KR

【심사참구】 청구

【취지】 위와 같이 특허청장에게 제출합니다.

대리인 특허법인지명 (서명 또는 인)

【수수료】
【출원료】 0 면 38,000 원
【가산출원료】 35 면 0 원
【우선권주창료】 0 건 0 원
【심사청구료】 10 항 530,000 원
【합계】 568,000 원
【요약서】

【요약】

BD-J 규격을 지원하는 재생 장치를 위한 순차적 다운로드 서비스 제공 방법 및 이를 실험하기 위한 프로그램을 기록한 컴퓨터로 판독 가능한 기록 메체가 개시된다. 본 발명에 따르면, BD-J 규격을 지원하는 재생 장치는 클립 크기가 상대적으로 작은 제1 클립 그룹에 포함된 제1 클립을 수신하여 재생을 시작할 수 있으며, 대기 시간을 최소화할 수 있으며, 일반 재생이 시작된 후에는 클립 크기가 상대적으로 큰 제2 클립 그룹에 포함된 제2 클립을 수신하여 재생할 수 있으므로 통신 오버헤드를 최소화할 수 있다.

【대표도】

도 2
발명의 명칭

BD-J 규격을 지원하는 재생 장치를 위한 순차적 다운로드 서비스 제공 방법 및 이를 실행시키기 위한 프로그램을 기록한 컴퓨터로 탐독 가능한 기록 매체

Method of providing progressive download service for playback apparatus supporting BD-J specification and computer-readable medium having thereon program performing function embodying the same

발명의 상세한 설명

기술분야

본 발명은 BD-J 규격을 지원하는 재생 장치를 위한 순차적 다운로드 서비스 제공 방법 및 이를 실행시키기 위한 프로그램을 기록한 컴퓨터로 탐독 가능한 기록 매체에 관한 것으로, BD-J 규격을 지원하는 재생 장치가 컨텐츠를 수신하여 제공하기까지 걸리는 대기 시간을 최소화할 수 있으며, 또한 컨텐츠를 수신하는 것에 따른 통신 오버헤드를 최소화하는 BD-J 규격을 지원하는 재생 장치를 위한 순차적 다운로드 서비스 제공 방법 및 이를 실행시키기 위한 프로그램을 기록한 컴퓨터로 탐독 가능한 기록 매체에 관한 것이다.

배경기술

블루레이(Blu-ray) 규격은 소니, 마쓰시타, 샤프 등의 기업체가 소속한 "블루레이 연합(Blu-ray Disc Association)"에 의해 제정된 것으로 정자색 레이저를 이
용하여 기록하고 관독할 수 있는 광디스크에 관한 규격을 포함한다.

<3> 블루레이 디스크의 직경과 두께는 각각 12cm 및 1.2mm로 종래의 CD 및 DVD의 것과 동일하지만, 그 기록 용량은 CD나 DVD의 그것보다 크다.

<4> 블루레이 디스크는 파장이 650nm인 적색 레이저를 사용하는 DVD에 비해 파장이 405nm인 청자색 레이저를 사용하므로 DVD보다 많은 양의 데이터를 저장할 수 있다.

<5> 구체적으로는, 싱글 레이어 블루레이 디스크의 경우, 25GB의 데이터를 저장할 수 있으며, 듀얼 레이어 블루레이 디스크의 경우, 50GB의 데이터를 저장할 수 있다. 이것은 블루레이 디스크의 기록 용량이 DVD의 그것에 비해 5배 이상의 크다는 것을 의미한다.

<6> 뿐만 아니라, 트위드 레이어(4층) 블루레이 디스크와 윙블 레이어(8층) 블루레이 디스크는 그 기록 용량을 100 GB 내지 200 GB까지 확장시킬 수 있다.

<7> 블루레이 디스크는 동상적으로 DVD에서 사용되는 MPEG-2의 영상 압축 코덱을 지원하며, 특히, BDA(Blu-ray Disc Association) 표준 규약은 MPEG-2보다 향상된 압축율을 갖는 H.264/AVC 또는 VC-1를 블루레이 디스크의 표준으로 규정하고 있다.

<8> 뿐만 아니라, 블루레이 디스크는 음성 저장 포맷으로써 PCM, 돌비 디지털(DD), DTS 뿐만 아니라 돌비디지털플러스(DD+)와 돌비 트루HD(Dolby TrueHD), DTS-HD MA(Master Audio) 등을 지원한다.

<9> BD-J 규격을 지원하는 블루레이 플레이어는 자바 기반의 콘텐츠 서비스를 지원한다.
원한다. 또한, BD-J 규격을 지원하는 블루레이 플레이어는 네트워크 연결, PIP(Picture-In-Picture) 및 국후 저장장치(Local Storage)에 대한 접속을 지원할 수 있다.

BD-Live 규격을 지원하는 블루레이 플레이어는 BD-J 규격을 지원하는 블루레이 플레이어의 기능에 네트워크 통신을 통해 수신한 컨텐츠를 재생할 수 있는 기능을 추가로 지원한다.

가상 파일 시스템(Virtual File System, VFS)은 블루레이 디스크에 기록되지 않은 데이터를 블루레이 플레이어가 재생 가능하도록 한다. 구체적으로는, 가상 파일 시스템은 블루레이 플레이어에 가상 패키지를 설정하여 USB를 통해 수신한 컨텐츠 또는 네트워크 통신을 통해 수신한 컨텐츠를 블루레이 디스크에 기록된 것처럼 재생할 수 있도록 한다.

BD-Live 규격의 네트워크 연결 및 VFS를 이용하면, 컨텐츠 재생 장치는 인터넷 등의 통신 네트워크를 통하여 컨텐츠에 대한 정보를 수신하고, 해당 컨텐츠가 미치 블루레이 디스크 상에 존재하는 것처럼 가상 패키지를 생성한 후 해당 컨텐츠를 다운로드하여 재생할 수 있다.

BD-J 규격은 블루레이 플레이어가 지원하는 양방향 서비스 규격이지만, TV, 게임기, 스마트폰, 휴대용 멀티미디어 재생 장치(PMP), 개인용 컴퓨터 및 PVR(Personal Video Recorder)는 미들웨어를 통하여 BD-J 규격을 지원할 수 있다.

BD-J 규격을 지원하는 컨텐츠 재생 장치는 바람직하게는 블루레이 디스크 판
독 기능을 포함할 수 있다. 그러나, TV 등 BD-J 규격을 미들웨어를 통하여 BD-J 규
격을 지원하는 경우, BD-J 규격을 지원하는 컨텐츠 제생 장치는 블루레이 디스크
반독 기능을 포함하지 않을 수도 있다.

도 1은 종래 기술에 따른 BD-J 규격을 지원하는 제생 장치가 네트워크를 통
해 오디오/비디오 데이터와 같은 컨텐츠를 수신하여 제생하는 구성의 예를 도시한
도면이다.

블루레이 플레이어와 같은 BD-J 규격을 지원하는 제생 장치가 컨텐츠 제공
서버로부터 도 1에 도시된 바와 같이 제1 클럽 내지 제100 클럽으로 구성된 컨텐츠
를 수신하여 제공하려면, 컨텐츠 제공 서버는 BD-Live 규격에 따라 BUMF(Binding
Unit Manifest File) 정보, SF(Signature File) 정보, 플레이리스트(PlayList) 정보
및 클럽 정보를 생성한다.

BUMF(Binding Unit Manifest File) 정보는 가상 패키지의 구성 요소를 XML
형태로 정의하는 정보이다. 예컨대, BUMF 정보는 컨텐츠 제공 서버로부터 수신한
제1 클럽 내지 제100 클럽 각각에 대한 파일 이름 정보 및 바인딩(binding) 정보를
포함할 수 있다.

SF(Signature File) 정보는 BUMF 정보의 유 효성을 검증하기 위한 정보를 포
함한다. SF 정보는 SHA-1 알고리즘을 이용할 수 있다.

플레이리스트(PlayList) 정보는 제생할 컨텐츠에 대한 정보를 포함한다. 예
컨대, 플레이리스트 정보는 제1 클럽 내지 제100 클럽의 제생 순서, PlayItem

36-7
정보, PlayListMark 정보를 포함할 수 있다.

클립 정보(Clip Information)는 대응하는 클립의 재생에 필요한 정보를 포함한다. 예컨대, 클립 정보는 대응하는 클립에 대한 스트림 포맷, 대응하는 클립이 포함하는 패킷의 수, 대응하는 클립의 인코딩 규격 및 타임스탬프(Timestamp) 정보 등을 포함할 수 있다.

제1 클립 내지 제100 클립 각각은 오디오/비디오 데이터를 포함한다. 제1 클립 내지 제100 클립은 컨텐츠를 동일한 크기 또는 동일한 길이로 분할하여 얻은 데이터일 수 있다.

상기 재생 장치는 컨텐츠 제공 서버가 전송한 BUMF 정보, SF 정보, 플레이리스트 정보 및 클립 정보를 수신하여 BUDA(Binding Unit Data Area)에 저장한다. 상기 재생 장치는 BUDA에 저장된 BUMF 정보, SF 정보, 플레이리스트 정보 및 클립 정보를 기초로 디스크 체계에서 가장 체계로 체계적 정성을 수행한다. 즉, 상기 재생 장치가 컴퓨터 디스크에 저장된 컨텐츠를 재생하는 대신에 컨텐츠 제공 서버로부터 수신한 제1 내지 제100 클립을 재생할 수 있도록 상기 재생 장치를 설정한다.

상기 재생 장치의 설정이 완료되면, 상기 재생 장치는 제1 내지 제100 클립을 상기 컨텐츠 제공 서버로부터 순차적으로 수신하여 재생한다. 구체적으로는, 상기 재생 장치는 순차적 다운로드(Progressive Download) 방식을 이용하여 제1 내지 제100 클립을 수신하여 재생한다. 예를 들어, 상기 재생 장치는 제1 클립을 수신한 후, 상기 제1 클립의 수신이 완료되면 제1 클립을 재생함과 동시에 제2 클립을 수
신하고, 제2 클립의 수신이 완료되면, 제2 클립을 제생함과 동시에 제3 클립을 수신할 수 있다.

BD-J 규격을 지원하는 제생 장치가 도 1과 같은 방식을 사용하여 컨텐트를 제공하는 경우 다음과 같은 문제점이 발생할 수 있다.

컨텐트를 구성하는 클립의 개수가 너무 많으면, 각 클립을 BD-J 규격을 지원하는 제생 장치가 통신 네트워크를 통하여 컨텐트를 수신하여 제생하는데 필요한 대기 시간이 증가된다.

예를 들어, 컨텐트가 제1 내지 제100 클립을 포함하고, 각 클립을 수신하는 데 소요되는 시간이 20초인 경우, 제생 장치는 제1 클립을 수신하기 위해서 최소 20초의 대기 시간을 필요로 한다. 추가적으로, 제생 장치는 제1 클립을 디코딩하는 데 필요한 시간을 필요로 한다.

만약, 버퍼링을 위해서 제1 클립 및 제2 클립을 수신하는 경우, 제생 장치는 제1 클립 및 제2 클립의 수신하기 위해서 최소 40초의 대기 시간을 필요로 한다. 따라서 제생 장치의 대기 시간은 더욱 증가하게 된다.

과다한 대기 시간을 개선하기 위하여 클립의 개수를 증가시키면 통신 오버헤드가 컷지는 단점이 발생한다.

예를 들어, 컨텐트가 제1 내지 제1000 클립을 포함하고, 각 클립을 수신하는 데 소요되는 시간이 2초인 경우, 제생 장치는 제1 클립을 수신하기 위해서 최소 2초의 대기 시간을 필요로 한다. 따라서 대기 시간은 대폭 감소하게 된다.
그러나 클립의 개수가 1,000개로 증가하였으므로, 클립의 개수가 100개인 경우에 비하여 클립 정보(Clip Info)의 크기가 증가한다는 단점이 있다.

또한 컨텐츠 제공 시비와의 통신 연결에 따른 통신 오버헤드(overhead)가 커지게 된다. 재생 장치는 각 클립을 수신할 때마다 컨텐츠 제공 서버와 통신 연결을 설정하여야 한다. HTTP 규격을 사용하는 경우라면, 재생 장치는 각 클립을 수신할 때마다 소켓을 오픈(open)하고, HTTP 통신 연결을 수행하고, 스레드를 오픈(open)하여야 한다. 또한, 각 클립의 수신이 완료되면 스레드를 닫고(close), HTTP 통신 연결을 닫고(close), 소켓을 닫는다(close). 따라서 클립의 개수의 증가에 따라 통신 오버헤드가 과도하게 증가하는 문제점이 있다.

【발명의 내용】

【해결하고자 하는 과제】

본 발명의 목적은 BD-J 규격을 지원하는 재생 장치가 컨텐츠를 수신하여 제공하기까지 걸리는 대기 시간을 최소화할 수 있으며, 또한 컨텐츠를 수신하는 것에 따른 통신 오버헤드를 최소화하는 BD-J 규격을 지원하는 재생 장치를 위한 순차적 다운로드 서비스 제공 방법을 제공하는 데 있다.

본 발명의 다른 목적은 상기 BD-J 규격을 지원하는 재생 장치를 위한 순차적 다운로드 서비스 제공 방법의 각 단계를 실현시키기 위한 프로그램을 기득한 컴퓨터에서 작동 가능한 기록 매체를 제공하는데 있다.
【과제 해결 수단】

상기 기술적 과제를 달성하기 위하여, 본 발명은 컨텐츠 제공 서비스 바다-J 규격을 지원하는 재생 장치를 위한 순차적 다운로드 서비스 제공 방법으로서, (a) 컨텐츠를 준비하는 단계와, (b) 클립 분할 정보를 사용하여 상기 컨텐츠를 제1 크기를 가지는 하나 이상의 제1 클립을 구비하는 제1 클립 그룹과 상기 제1 크기보다 큰 제2 크기를 가지는 하나 이상의 제2 클립을 구비하는 제2 클립 그룹을 포함하는 다수의 클립으로 분할하는 단계와, (c) 상기 다수의 클립을 상기 컨텐츠 제공 서비스로부터 상기 재생 장치로 순차적으로 전송하는 단계를 포함하는 순차적 다운로드 서비스 제공 방법을 제공한다.

본 발명에 따른 순차적 다운로드 서비스 제공 방법에 있어서, 상기 단계 (b) 이후에, (d) 상기 하나 이상의 제1 클립을 상기 하나 이상의 제2 클립보다 먼저 재생하도록 상기 다수의 클립에 대한 재생 순서 정보를 생성하는 단계와, (e) 상기 재생 순서 정보를 상기 컨텐츠 제공 서비스로부터 상기 재생 장치로 전송하는 단계를 더 포함할 수 있다.

또한 본 발명에 따른 순차적 다운로드 서비스 제공 방법에 있어서, 상기 재생 순서 정보에 따른 클립 제공 요청을 상기 재생 장치로부터 수신하는 단계를 더 포함하여, 상기 단계 (c)는 상기 클립 제공 요청에 따라서 상기 다수의 클립을 상기 재생 장치로 전송하는 단계를 포함하는 것임을 알 수 있다.

또한 본 발명에 따른 순차적 다운로드 서비스 제공 방법에 있어서, 상기 클...
웹 분할 정보는 상기 제1 크기, 상기 제2 크기, 상기 제1 클립의 개수, 상기 컨텐
트의 미디어 대역폭, 상기 컨텐트를 상기 재생 장치로 전송하기 위한 네트워크 대
역폭 및 버퍼링되는 클립의 개수 중 적어도 하나 이상을 포함하는 것이 될 수 있다.

또한 본 발명에 따른 순차적 다운로드 서비스 제공 방법에 있어서, 상기 클
립 분할 정보는, 수학식

\[ b_n \times \frac{S_s}{CB} + n \times \frac{S_s}{MB} \geq n \times \frac{S_s}{CB} + \frac{S_c}{CB} \]

을 만족하는 것일 수 있다.(단, Ss는 상기 제1 크기, Sc는 상기 제2 크기, n
은 상기 제1 클립의 개수, MB는 상기 컨텐트의 미디어 대역폭, CB는 상기 컨텐트를
상기 재생 장치로 전송하기 위한 네트워크 대역폭 및 ba는 상기 버퍼링되는 클립의
개수).

또한 본 발명에 따른 순차적 다운로드 서비스 제공 방법에 있어서, 상기 제1
크기, 상기 제2 크기, 상기 컨텐트의 미디어 대역폭, 상기 컨텐트를 상기 재생 장
치로 전송하기 위한 네트워크 대역폭 및 상기 버퍼링되는 클립의 개수를 수신하는
단계 및 상기 제1 클립의 개수를 수학식

\[ n \geq \frac{MB \times [S_c - b_n \times S_s]}{S_s \times [CB - MB]} \]

을 만족하도록 설정하는 단계를 더 포함하며, 상기 단계 (b)는 상기 클립 분
할 정보를 이용하여 상기 컨텐트를 상기 다수의 클립으로 분할하는 단계를 포함하
는 것일 수 있다(단, $S_s$는 상기 제1 크기, $S_c$는 상기 제2 크기, $n$은 상기 제1 클립의 개수, $MB$는 상기 클립의 미디어 대역폭, $CB$는 상기 클립트를 상기 제생 장치로 전송하기 위한 네트워크 대역폭 및 $ba$는 베키링되는 클립의 개수).

$$S_s \leq S_s \times \left[ \frac{n(CB-MB) + ba \times MB}{MB} \right]$$

또한 본 발명에 따른 순차적 다운로드 서비스 제공 방법에 있어서, 상기 클립트의 개수, $MB$는 상기 클립트의 미디어 대역폭, $CB$는 상기 클립트를 상기 제생 장치로 전송하기 위한 네트워크 대역폭 및 $ba$는 베키링되는 클립의 개수.

또한 본 발명에 따른 순차적 다운로드 서비스 제공 방법에 있어서, 상기 네트워크 대역폭은 상기 제생 장치와의 통신 연결을 통하여 추출되는 것일 수 있다.

또한 본 발명에 따른 순차적 다운로드 서비스 제공 방법에 있어서, 상기 네트워크 대역폭은 이미 지정된 네트워크 대역폭 그룹 중에서 선택되는 것이 일 수 있다.
또한 본 발명은 상기 BD-J 규격을 지원하는 제생 장치를 위한 순차적 다운로드 서비스 제공 방법의 각 단계를 실현시키기 위한 프로그램을 기록한 컴퓨터로 판독 가능한 기록 매체를 제공한다.

【효과】

본 발명에 따르면, BD-J 규격을 지원하는 제생 장치는 클립 크기가 상대적으로 작은 제1 클립 그룹에 포함된 제1 클립을 수신하여 제생을 시작할 수 있으므로 대기 시간을 최소화할 수 있으며, 일반 재생이 시작된 후에는 클립 크기가 상대적으로 큰 제2 클립 그룹에 포함된 제2 클립을 수신하여 제생할 수 있으므로 동신 오버헤드를 최소화할 수 있다는 장점이 있다.

【발명의 실시를 위한 구체적인 내용】

이하, 본 발명의 BD-J 규격을 지원하는 제생 장치를 위한 순차적 다운로드 서비스 제공 방법 및 이를 실현시키기 위한 프로그램을 기록한 컴퓨터로 판독 가능한 기록 매체의 실시예를 참조한 도면을 참조로 보다 구체적으로 설명한다.

도 2는 본 발명에 따른 BD-J 규격을 지원하는 제생 장치를 위한 순차적 다운로드 서비스 제공 방법의 예시적인 흐름도이다.

본 발명에 따른 BD-J 규격을 지원하는 제생 장치를 위한 순차적 다운로드 서비스 제공 방법은 BD-J 규격을 지원하는 제생 장치로 순차적 다운로드 서비스를 제공하는 컨텐트 제공 서버에서 수행된다.

컨텐트 제공 서버는 컨텐트를 준비한다(S100). 컨텐트 제공 서버는 예컨대
유무선 네트워크를 통하여 컨텐츠를 저장하는 장치로부터 컨텐츠를 수신할 수 있다. 또한, 컨텐츠 제공 서비스는 디지털 캡코더와 같은 촬영 장치로부터 컨텐츠를 수신할 수도 있다.

다음에는, 컨텐츠 제공 서비스는 클립 분할 정보를 이용하여 단계 S100에서 준비한 컨텐츠를 제1 클립 그룹과 제2 클립 그룹을 포함하는 다수의 클립으로 분할한다(S110). 제1 클립 그룹은 제1 크기를 가지는 하나 이상의 제1 클립을 포함하며, 제2 클립 그룹은 상기 제1 크기보다 큰 제2 크기를 가지는 하나 이상의 제2 클립을 포함한다. 하나 이상의 제1 클립은 서로 크기만 동일할 뿐이며, 서로 다른 오디오/비디오 데이터를 포함할 수 있다. 마찬가지로, 하나 이상의 제2 클립은 서로 크기만 동일할 뿐이며, 서로 다른 오디오/비디오 데이터를 포함할 수 있다.

도 3은 본 발명에 따른 컨텐츠를 제1 클립 그룹과 제2 클립 그룹을 포함하는 다수의 클립으로 분할하는 예를 도시한 도면이다.

도 3을 참조하면, 제1 클립 그룹은 실질적으로 동일한 크기(제1 크기, Ss로 표시)를 가지는 제1 클립을 n개 포함한다(단, n은 자연수).

또한 제2 클립 그룹은 실질적으로 동일한 크기(제2 크기, Sc로 표시)를 가지는 제2 클립을 m개 포함한다(단, m은 자연수).

버전적해제는 제2 크기(Sc)는 제1 크기(Ss)보다 10배 이상이다.

본 발명은 컨텐츠를 재생하는데 필요한 대기 시간 및 통신 오버헤드를 최소화하는 것을 그 목적으로 한다.
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제2 크기(Sc)를 제1 크기(Ss)보다 10배 이상으로 설정하면, 상기 대기 시간 및 통신 오버헤드를 최소화할 수 있다.

클립 분할 정보에 대해서 좀 더 상세히 설명하면 다음과 같다.

클립 분할 정보는 제1 크기(Ss), 제2 크기(Sc), 제1 클립의 개수(n), 상기 컨텐츠의 미디어 대역폭(MB), 상기 컨텐츠를 BD-J 지원 재생 장치로 전송하기 위한 네트워크 대역폭(CB) 및 버퍼링되는 클립의 개수(ba) 중 적어도 하나 이상을 포함할 수 있다.

제1 크기(Ss) 및 제2 크기(Sc)는 Mb(Megabit) 단위로 표시될 수 있다.

컨텐츠의 미디어 대역폭(Media bandwidth, MB)은 컨텐츠를 재생하기 위해서 필요로 하는 대역폭을 의미한다. 예컨대 컨텐츠를 재생하는 데 초당 2 Mb(Megabit)의 정보가 필요하다면 해당 컨텐츠의 미디어 대역폭(MB)은 2 Mbps이다.

컨텐츠를 BD-J 지원 재생 장치로 전송하기 위한 네트워크 대역폭(Customer Bandwidth, CB)은 컨텐츠 제공 서버와 BD-J 지원 재생 장치 사이의 통신 속도이다. 네트워크 대역폭은 Mbps 단위로 표시될 수 있다.

버퍼링되는 클립의 개수(ba)는 BD-J 지원 재생 장치가 컨텐츠를 수신하여 재생하는 경우 버퍼링해야 할 클립의 최소 개수이다. 예컨대 BD-J 지원 재생 장치에서 사용하는 컨텐츠 재생 에플리케이션이 최소 2개의 클립을 수신한 이후에 컨텐츠 재생을 시작하는 경우 버퍼링되는 클립의 개수(ba)는 2이다. 버퍼링을 수행하지 않
는 경우에는 비례되어 있는 클립의 개수(ba)는 0이다.

클립 분할 정보에 포함되는 제1 크기(Ss), 제2 크기(Sc), 제1 클립의 개수(n), 상기 미디어 대역폭(MB), 상기 네트워크 대역폭(CB) 및 비례되어 있는 클립의 개수(ba)는 다음 수학식 1을 만족한다.

[수학식 1]

\[ b_a \times \frac{S_s}{CB} + n \times \frac{S_s}{MB} \geq n \times \frac{S_s}{CB} + \frac{S_c}{CB} \]

BD-J 지원 재생 장치는, n개의 제1 클립을 모두 재생할 때까지 재생할 m개의 제2 클립 중에서 첫 번째로 재생할 클립을 수신해야 한다.

따라서 비례되어 있는 클립의 개수(ba)에 따른 클립을 수신하는 시간 \( b_a \times \frac{S_s}{CB} \)과 n개의 제1 클립을 모두 재생하는데 걸리는 시간 \( n \times \frac{S_s}{MB} \)의 합은 n개의 제1 클립을 모두 수신하는데 걸리는 시간 \( n \times \frac{S_s}{CB} \) 및 m개의 제2 클립 중에서 첫 번째로 재생할 클립을 수신하는데 걸리는 시간 \( \frac{S_c}{CB} \)의 합보다는 커야 한다.

수학식 1을 만족하지 않는 경우, BD-J 지원 재생 장치는 n개의 제1 클립을 모두 재생한 이후에 다음으로 재생할 m개의 제2 클립 중에서 첫 번째로 재생할 클립을 수신하지 못할 상태이다. 따라서 컨텐츠의 재생이 중단 또는 정지된다.
<73> 콘텐트 제공 서버는 제1 크기(Ss), 제2 크기(Sc), 제1 클립의 개수(n), 미디어 대역폭(MB), 네트워크 대역폭(CB) 및 비파링되는 클립의 개수(ba) 중에서 제1 클립의 개수(n) 또는 제2 크기(Sc)를 수학식 1을 만족하도록 설정할 수 있다.

<74> 도 4는 콘텐트를 다수의 클립으로 분할하는 과정의 일 실시에를 나타내는 흐름도이다.

<75> 도 4를 참조하면, 우선 콘텐트 재생 장치는 제1 크기(Ss), 제2 크기(Sc), 미디어 대역폭(MB), 네트워크 대역폭(CB) 및 비파링되는 클립의 개수(ba)를 수신한다 (S200).

<76> 이후 콘텐트 재생 장치는 수학식 1을 만족하도록 제1 클립의 개수(n)를 설정한다(S210).

<77> 수학식 1로부터 제1 클립의 개수(n)를 구하면 수학식 2와 같다.

【수학식 2】

\[
    n \geq \frac{MB \times [S'_c - b_a \times S'_s]}{S_s \times [CB - MB]}
\]

<78> 콘텐트 재생 장치는 상기 수학식 2에 따라 제1 클립의 개수(n)를 설정할 수 있다.

<79> 다음에는, 콘텐트 재생 장치는 수학식 2를 통하여 수학식 1을 만족하는 클립 분할 정보를 설정한 후, 클립 분할 정보를 이용하여 콘텐트를 다수의 클립으로 분할한다(S220).
도 5는 컨텐트를 다수의 클립으로 분할하는 과정의 다른 실시예를 나타내는

호름도이다.

도 5를 참조하면, 컨텐트 제생 장치는 우선 제1 크기(Ss), 제1 클립의 개수
(n), 미디어 대역폭(MB), 네트워크 대역폭(CB) 및 버퍼링되는 클립의 개수(ba)를
수신한다(S800).

다음에는, 컨텐트 제생 장치는 수학식 1을 만족하도록 제2 크기(SC)를 설정
한다(S310).

수학식 1로부터 제2 크기(SC)를 구하면 수학식 3과 같다.

【수학식 3】

\[
S_c \leq S_s \times \left[ \frac{n(CB - MB)}{MB} + b_a \times MB \right]
\]

컨텐트 제생 장치는 상기 수학식 3에 따라 제2 크기(SC)를 설정할 수 있다.

다음에는, 컨텐트 제생 장치는 수학식 3을 통하여 수학식 1을 만족하는 클립
분할 정보를 설정한 후, 클립 분할 정보를 이용하여 컨텐트를 다수의 클립으로 분
할한다(S320).

한편 네트워크 대역폭(CB)은 다음과 같은 방법으로 구할 수 있다.

컨텐트 제공 시비는 BD-J 규격을 지원하는 제생 장치와 통신을 하여 네트워
크 대역폭(CB)을 구할 수 있다.

그러나 상기 방법은 네트워크 대역폭(CB)을 추출한 이후에 컨텐트를 분할해
아 한다는 문제점이 있다.

상기 문제점을 극복하기 위하여, 컨텐트 제공 서버는 컨텐트를 미리 저장된 네트워크 대역폭 그룹에 포함된 네트워크 대역폭(CB)에 따라 분할하고, 재생 장치와 통신을 하여 구해진 네트워크 대역폭(CB)에 따라 컨텐트를 전송할 수 있다.

예를 들어, 네트워크 대역폭 그룹이 4Mbps, 10 Mbps, 100 Mbps의 네트워크 대역폭(CB)을 포함하는 경우, 컨텐트 제공 서버는 컨텐트를 4Mbps, 10 Mbps, 100 Mbps의 네트워크 대역폭(CB)에 따라 클립 분할 정보를 각각 생성하고, 상기 생성된 클립 분할 정보에 따라 컨텐트를 각각 분할한다.

다음에는, 재생 장치와 통신을 수행하여 실제 네트워크 대역폭(CB)은 구한 후, 구해진 네트워크 대역폭(CB)에 해당하는 컨텐트를 재생 장치로 전송한다.

다시 도 2를 완료하면, 컨텐트 제공 서버는 상기 다수의 클립에 대한 재생 순서 정보를 생성(S120).

n개의 제1 클립이 n개의 제2 클립보다 먼저 재생되도록 재생 순서 정보를 설정하는 것이 바람직하다.

다음에는, 컨텐트 제공 서버는 재생 순서 정보를 BD-J 규격을 지원하는 재생 장치로 전송한다(S130).

BD-J 규격을 지원하는 재생 장치는 컨텐트 제공 서버로부터 수신한 재생 순서 정보를 참조로 하여 클립 제공 요청을 생성하여 컨텐트 제공 서버로 전송하고, 컨텐트 제공 서버는 클립 제공 요청을 수신한다(S140).
<98> 컨텐트 제공 서버는 재생 장치로부터 수신한 클립 제공 요청에 따라 단계 S110에서 분할된 다수의 클립을 BD-J 규격을 지원하는 재생 장치로 전송한다 (S150).

<99> 도 6은 본 발명에 따른 BD-J 규격을 지원하는 재생 장치를 위한 순차적 다운로드 서비스 제공 방법에 따라서 생성된 다수의 클립을 BD-J 규격을 지원하는 재생 장치에서 수신하여 재생하는 예를 도시한 도면이다.

<100> 도 6을 참조하면, BD-J 규격을 지원하는 재생 장치는 컨텐트 제공 서버로부터 전송한 BUMF 정보, SF 정보, 플레이리스트 정보 및 클립 정보를 수신한다. 이후 BD-J 규격을 지원하는 재생 장치는 BUMF 정보, SF 정보, 플레이리스트 정보 및 클립 정보를 BUDA(Binding Unit Data Area)에 저장한다. 이후 상기 재생 장치는 BUMF 정보, SF 정보, 플레이리스트 정보 및 클립 정보를 이용하여 디스크 페키지가 아닌 가상 페키지를 재생하는 것으로 페키지를 제공한다.

<101> 다음으로, 상기 재생 장치는 재생 순서 정보, 즉 플레이리스트 정보를 참조하여 컨텐트를 재생한다. 보다 구체적으로 상기 재생 장치는 컨텐트 제공 서버로부터 제1 클립 그룹 및 제2 클립 그룹을 포함하는 다수의 클립을 순차적으로 수신하여 재생한다.

<102> 상기 재생 장치는 제1 클립 그룹에 속하는 n개의 제1 클립을 순차적으로 수신하여 재생한다. n개의 제1 클립의 재생이 종료되면, BD-J 규격을 지원하는 재생 장치는 제2 클립 그룹에 포함된 m개의 제2 클립을 순차적으로 재생한다.
상기 재생 장치는 따라서 클립 크기가 상대적으로 작은 제1 클립 그룹을 먼저 재생할 수 있으므로 대기 시간을 최소화할 수 있다. 또한, 제1 클립 그룹이 재생되기 시작한 후에는 클립 크기가 상대적으로 큰 제2 클립 그룹을 수신할 수 있으므로 통신 오버헤드를 최소화할 수 있다.

한편 제1 클립 그룹에 포함된 n개의 제1 클립의 재생이 완료된 후 제2 클립 그룹에 포함된 제2 클립을 끝까지 재생하기 위해서는, 상기 재생 장치는 적어도 제1 클립 그룹에 포함된 n개의 제1 클립의 재생이 완료될 때까지 제2 클립 그룹의 첫 번째 제2 클립을 수신하여야 한다.

도 7은 본 발명의 순차적 다운로드 서비스 제공 방법에 있어서, 시간에 따른 클립의 상태를 도시한 표로서, 제1 크기(Ss)는 4 Mb, 제2 크기(SC)는 40 Mb, 미디어 대역폭(MB)은 2 Mbps, 네트워크 대역폭(CB)은 4 Mbps, 버퍼링되는 클립의 개수(ba)는 2인 경우이다.

각 클립의 상태는 R, W, P로 구분될 수 있다.

R은 클립이 컨텐츠 서비스로부터 수신되는 상태이고, W는 수신된 클립이 재생을 위해서 대기하는 상태이고, P는 클립이 재생되는 상태를 나타낸다.

제1 크기(Ss)는 4 Mb, 제2 크기(SC)는 40 Mb, 미디어 대역폭(MB)은 2 Mbps, 네트워크 대역폭(CB)은 4 Mbps, 버퍼링되는 클립의 개수(ba)는 2인 경우, 수학적 2에 따라 제1 클립의 개수(n)는 8 이상이어야 한다.

제1 클립의 개수(n)가 8, 상기 재생 장치가 클립 #1 내지 클립 #8을 수신하
네트워크 장치의 필요 시간이 각각 1초, 클립 #1 내지 클립 #3의 재생 시간은 각각 2초, 재생 장치가 동작하는데 필요로 하는 시간은 무시한다고 가정하면, 1초가 경과하면 클립 #1은 R 상태이다. 또한, 2초가 경과하면, 클립 #1은 R 상태이고, 클립 #2는 P 상태이다. 또한, 3초가 경과하면, 클립 #1 및 클립 #2의 비파리기 완료되었으므로 클립 #1은 P 상태이고, 클립 #2은 W 상태이고, 클립 #3은 W 상태이다.

4초가 경과하면, 클립 #1은 P 상태이고, 클립 #2는 W 상태이고, 클립 #3은 W 상태이고, 클립 #4는 R 상태이다.

5초가 경과하면, 클립 #1은 재생이 종료되고, 클립 #2는 P 상태이고, 클립 #3은 W 상태이고, 클립 #4는 W 상태이고, 클립 #5는 R 상태이다.

우리한 방식으로, 8초가 경과하면 클립 #3은 R 상태이며, 18초가 경과하면 클립 #8의 재생이 완료된다.

클립 #9의 크기가 40Mb이고 네트워크 대역폭(CB)이 4 Mbps이므로, 클립 #9를 수신하기 위해서는 10초가 필요하다. 클립 #8의 수신이 완료된 후 클립 #9를 수신하여야 하므로, 클립 #9는 9초부터 수신이 시작된다.

18초가 경과하면, 클립 #8의 재생 및 클립 #9의 수신이 완료되므로, 클립 #8에 이어 클립 #9를 끈길없이 재생할 수 있다.

또한 본 발명은 전술한 본 발명에 따른 DD-J 규격을 지원하는 재생 장치를 위한 순차적 다운로드 서비스 제공 방법의 각 단계를 실현시키기 위한 프로그램을
기록한 컴퓨터로 관독 가능한 기록 메체를 제공한다.

컴퓨터로 관독 가능한 기록 메체는 컴퓨터 시스템에 의하여 읽어질 수 있도록 데이터, 즉 코드 또는 프로그램 형태의 데이터가 저장되는 모든 종류의 기록 장치를 지칭한다. 이러한 컴퓨터로 관독 가능한 기록 메체는 예컨대 ROM, RAM 등의 메모리와, CD-ROM, DVD-ROM 등의 저장 메체, 자기 테이프, 플로피 디스크 등의 자기 저장 메체, 팽 테이터 저장 장치 등이며, 예컨대 인터넷을 통한 전송 형태로 구현되는 경우도 포함한다. 또한 이러한 컴퓨터로 관독 가능한 기록 메체는 네트워크로 연결된 컴퓨터 시스템에 분산되어 분산 방식으로 컴퓨터가 관독 가능한 데이터가 저장되고 실행될 수 있다.

그러나 이러한 컴퓨터로 관독 가능한 기록 메체에 대한 상세한 설명은 도 2 내지 도 7을 참조로 설명한 본 발명에 따른 BD-J 규격을 지원하는 재생 장치를 위한 순차적 다운로드 서비스 제공 방법과 종복되므로 생략한다.

비록 본 발명의 구성이 구체적으로 설명되었지만 이는 단지 본 발명을 예시적으로 설명한 것에 불과한 것으로, 본 발명이 속하는 기술분야에서 통상의 지식을 가진 자라면 본 발명의 본질적인 특성에서 벗어나지 않는 범위 내에서 다양한 변형이 가능할 것이다.

따라서 본 명세서에 개시된 실시예들은 본 발명을 한정하기 위한 것이 아니라 설명하기 위한 것이고, 이러한 실시예에 의하여 본 발명의 사상과 범위가 한정되는 것은 아니다. 본 발명의 범위는 아래의 청구범위에 의해 해석되어야 하며, 그와 동등한 범위 내에 있는 모든 기술은 본 발명의 권리범위에 포함되는 것으로 해
석되어야 할 것이다.

【산업상이용가능성】

이상 설명한 바와 같이, 본 발명에 따르면 BD-J 규격을 지원하는 재생 장치가 컨텐츠를 수신하여 제공하기까지 걸리는 대기 시간을 최소화할 수 있으며, 또한 컨텐츠를 수신하는 것에 따른 통신 오버헤드를 최소화할 수 있다.
【특허청구범위】

【청구항 1】

컨텐츠 제공 시비와 BD-J 규격을 지원하는 재생 장치를 위한 순차적 다운로드 서비스 제공 방법으로서,

(a) 컨텐츠를 준비하는 단계와,

(b) 클립 분할 정보를 사용하여 상기 컨텐츠를 제1 크기를 가지는 하나 이상의 제1 클립을 구비하는 제1 클립 그룹과 상기 제1 크기보다 큰 제2 크기를 가지는 하나 이상의 제2 클립을 구비하는 제2 클립 그룹을 포함하는 다수의 클립으로 분할하는 단계와,

(c) 상기 다수의 클립을 상기 컨텐츠 제공 시비로부터 상기 재생 장치로 순차적으로 전송하는 단계

를 포함하는 순차적 다운로드 서비스 제공 방법.

【청구항 2】

제1항에 있어서,

상기 단계 (b) 이후에,

(d) 상기 하나 이상의 제1 클립을 상기 하나 이상의 제2 클립보다 먼저 재생하도록 상기 다수의 클립에 대한 재생 순서 정보를 생성하는 단계와.

(e) 상기 재생 순서 정보를 상기 컨텐츠 제공 시비로부터 상기 재생 장치로 전송하는 단계
## 첨부 3

제2항에 있어서,

상기 제생 순서 정보에 따른 클립 제공 요청을 상기 제생 장치로부터 수신하는 단계를 더 포함하며,

상기 단계 (c)는 상기 클립 제공 요청에 따라서 상기 다수의 클립을 상기 제생 장치로 전송하는 단계

를 포함하는 것인 순차적 다운로드 서비스 제공 방법.

## 첨부 4

제1항에 있어서,

상기 클립 분할 정보는 상기 제1 크기, 상기 제2 크기, 상기 제1 클립의 개수, 상기 클립트의 미디어 대역폭, 상기 클립트를 상기 제생 장치로 전송하기 위한 네트워크 대역폭 및 비롯되는 클립의 개수 중 적어도 하나 이상을 포함하는 것인 순차적 다운로드 서비스 제공 방법.

## 첨부 5

제4항에 있어서,

상기 클립 분할 정보는, 수학식

\[ b_a \times \frac{S_s}{CB} + n \times \frac{S_s}{MB} \geq n \times \frac{S_s}{CB} + \frac{S_c}{CB} \]
온 양측하는 순차적 다운로드 서비스 제공 방법(단, $S_s$는 상기 제1 크기, $S_c$는 상기 제2 크기, $n$은 상기 제1 클립의 개수, $MB$는 상기 컨텐츠의 미디어 대역폭, $CB$는 상기 컨텐츠를 상기 재생 장치로 전송하기 위한 네트워크 대역폭 및 $ba$는 상기 비롯되는 클립의 개수).

【정구항 6】

제4항에 있어서,

상기 제1 크기, 상기 제2 크기, 상기 컨텐츠의 미디어 대역폭, 상기 컨텐츠를 상기 재생 장치로 전송하기 위한 네트워크 대역폭 및 상기 비롯되는 클립의 개수를 수신하는 단계 및

상기 제1 클립의 개수를 수학식

$$n \geq \frac{MB \times [S_c - b_a \times S_s]}{S_s \times [CB - MB]}$$

을 만족하도록 설정하는 단계를 더 포함할 수 있다. 상기 단계 (b)는 상기 클립 분할 정보를 이용하여 상기 컨텐츠를 상기 다수의 클립으로 분할하는 단계

를 포함하는 것인 순차적 다운로드 서비스 제공 방법(단, $S_s$는 상기 제1 크기, $S_c$는 상기 제2 크기, $n$은 상기 제1 클립의 개수, $MB$는 상기 컨텐츠의 미디어 대역폭, $CB$는 상기 컨텐츠를 상기 재생 장치로 전송하기 위한 네트워크 대역폭 및 $ba$는 비롯되는 클립의 개수).
[정구항 7]

제4항에 있어서,

상기 제1 크기, 상기 제1 클립의 개수, 상기 컨텐츠의 미디어 대역폭, 상기 컨텐츠를 상기 제생 장치로 전송하기 위한 네트워크 대역폭 및 상기 버퍼링되는 클립의 개수를 수신하는 단계 및 상기 제2 크기를 수학식

\[ S_c \leq S_s \times \left[ \frac{n \times (CB - MB) + ba \times MB}{MB} \right] \]

은 반복적으로 설정하는 단계를 더 포함하며.

상기 단계 (b)는 상기 클립 분할 정보를 이용하여 상기 컨텐츠를 상기 단계의 클립으로 분할하는 단계

를 포함하는 것인 순차적 다운로드 서비스 제공 방법(단, Ss는 상기 제1 크기, Sc는 상기 제2 크기, n은 상기 제1 클립의 개수, MB는 상기 컨텐츠의 미디어 대역폭, CB는 상기 컨텐츠를 상기 제생 장치로 전송하기 위한 네트워크 대역폭 및 ba는 버퍼링되는 클립의 개수).

[정구항 8]

제4항에 있어서,

상기 네트워크 대역폭은 상기 제생 장치와의 통신 연결을 통하여 추출되는 것인 순차적 다운로드 서비스 제공 방법.
【장구항 9】

제4항에 있어서,

상기 네트워크 대역폭은 미래 지정된 네트워크 대역폭 그룹 중에서 선택되는 것인 순차적 다운로드 서비스 제공 방법.

【장구항 10】

제1항 내지 제9항 중 어느 한 항에 따른 BD-J 규격을 지원하는 재생 장치를 위한 순차적 다운로드 서비스 제공 방법의 각 단계를 실현시키기 위한 프로그램을 기록한 컴퓨터로 합득 가능한 기록 메체.

【도면의 간단한 설명】

<121> 도 1은 통합 기술에 따른 BD-J 규격을 지원하는 재생 장치가 네트워크를 통해 오디오/비디오 데이터와 같은 컨텐츠를 수신하여 재생하는 구성의 예를 도시한 도면.

<122> 도 2는 본 발명에 따른 BD-J 규격을 지원하는 재생 장치를 위한 순차적 다운로드 서비스 제공 방법의 예시적인 화면도.

<123> 도 3은 본 발명에 따른 컨텐츠를 제1 클립 그룹과 제2 클립 그룹을 포함하는 다수의 클립으로 분할하는 예를 도시한 도면.

<124> 도 4는 컨텐츠를 다수의 클립으로 분할하는 과정의 일 실시예를 도시한 화면도.

<125> 도 5는 컨텐츠를 다수의 클립으로 분할하는 과정의 다른 실시예를 도시한 화면도.
도 6은 본 발명에 따른 BD-J 규격을 지원하는 재생 장치를 위한 순차적 다운로드 서비스 제공 방법에 따라서 생성된 다수의 클립을 BD-J 규격을 지원하는 재생 장치에서 수신하여 재생하는 예를 도시한 도면.

도 7은 본 발명의 순차적 다운로드 서비스 제공 방법에 있어서, 시간에 따른 클립의 상태를 도시한 표.
【도면】

【도 1】

가상 패키지

블립 다운로드 및 재생

g1 블립

BUDA

패키지 검사

패키지 검사 결과에
다운로드

SF

플래이리스트

블립 정보

【도 2】

시작

컨텐츠를 준비

S100

컨텐츠를 제1 블립 그룹과 제2 블립 그룹을 포함하는 다수의 블립으로 분할

S110

제1 블립 그룹 속하는 블립을 제2 블립 그룹 속하는
블립보다 먼저 재생하도록 재생 순서 정보를 생성

S120

재생 순서 정보를 BD-J 지원 컨텐츠 재생 장치로 전송함

S130

BD-J 지원 컨텐츠 재생 장치로부터 블립 제공 요청을 수신함

S140

블림 제공 요청에 따라 다수의 블립을 BD-J 지원 컨텐츠
재생 장치로 전송함

S150

종료
상호

제1 크기(Ss), 제2 크기(Sc), 미디어 대역폭(MB), 네트워크 대역폭(CB) 및 버퍼링 설정 개수(ba)를 수신

S200

제1 클립 그룹 내의 클립 개수(n)를 설정

S210

설정된 클립 분할 정보를 사용하여 컨텐츠를 다수의 클립으로 분할

S220

종료

【도 5】

시작

제1 크기(Ss), 제1 클립 그룹 내의 클립 개수(n), 미디어 대역폭(MB), 네트워크 대역폭(CB) 및 버퍼링 설정 개수(ba)를 수신

S300

제2 크기(Sc)를 설정

S310

설정된 클립 분할 정보를 사용하여 컨텐츠를 다수의 클립으로 분할

S320

종료
## 도 7

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(표 설명)

제출일자: 2009-09-21

36-36
Reception 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.**

Applicant(s)
Wonjang BAEK, Gyeonggi-do, KOREA, REPUBLIC OF;
John Kim, Seoul, KOREA, REPUBLIC OF;

Assignment For Published Patent Application
DREAMER, Burbank, CA

Power of Attorney: The patent practitioners associated with Customer Number 20529

Domestic Priority data as claimed by applicant

Foreign Applications
REPUBLIC OF KOREA 10-2009-0089058 09/21/2009

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If Required, Foreign Filing License Granted: 09/24/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US 12/882,665

Projected Publication Date: 03/24/2011

Non-Publication Request: No

Early Publication Request: No

** SMALL ENTITY **
Title

METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION

Preliminary Class

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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# Patent Application Transmittal

**APPLICATION ELEMENTS**

See MPEP chapter 600 concerning utility patent application contents.

1. Fee Transmittal Form (e.g., PTO/SB/17)
2. Applicant claims small entity status. See 37 CFR 1.27.
3. Specification [Total Pages 22]
   - Both the claims and abstract must start on a new page
   - For information on the preferred arrangement, see MPEP 606.01(e)
4. Drawing(s) (35 U.S.C. 113) [Total Sheets 7]
5. Oath or Declaration [Total Sheets 2]
   - Newly executed (original or copy)
   - A copy from a prior application (37 CFR 1.63(d))
   - Signed statement attached deleting inventor(s)
8. Nucleotide and/or Amino Acid Sequence Submission
   - (if applicable, items a. – c. are required)
   - Computer Readable Form (CRF)
   - Specification Sequence Listing:
     - CD-ROM or CD-R (2 copies); or
     - Paper
   - Statements verifying identity of above copies

If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:

- **Continuation**
- **Divisional**
- **Continuation-in-part (CIP)**

Prior application information:

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**ADDRESS TO:**

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

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**ACCOMPANYING APPLICATION PARTS**

9. Assignment Papers (cover sheet & document(s))
   - Name of Assignee: DREAMER

10. 37 CFR 3.73(b) Statement
    - When there is an assignee

11. English Translation Document (if applicable)

12. Information Disclosure Statement (PTO/SB/08 or PTO-1449)
    - Copies of citations attached

13. Preliminary Amendment

14. Return Receipt Postcard (MPEP 503)
    - Should be specifically itemized

15. Certified Copy of Priority Document(s)
    - (if foreign priority is claimed)

    - Applicant must attach form PTO/SB/35 or equivalent.

17. Other:

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**CORRESPONDENCE ADDRESS**

The address associated with Customer Number: 20529

OR Correspondence address below

Name

Address

City, State Zip Code

Country Telephone Email

Signature / Jerald L. Meyer / Date 09/16/2010

Name (Print/Type) Jerald L. Meyer Registration No. (Attorney/Agent) 41,194

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METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION

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.

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.)

Applicant Information:

Applicant 1

Applicant Authority: Inventor

Prefix: Wonchang

Given Name: BAEK

Middle Name: 

Family Name: 

Suffix: 

Residence Information (Select One): Non US Residency

City: Gyeonggi-do

Country of Residence: KR

Citizenship under 37 CFR 1.41(b): KR

Mailing Address of Applicant:

Address 1: 501-401 AreumMaeul Kunyoung Apts. 107-402,

City: Imae-dong, Bundang-gu, Seongnam-si

State/Province: 

Postal Code: 463-731

Country: KR

Applicant 2

Applicant Authority: Inventor

Prefix: John

Given Name: Kim

Middle Name: 

Family Name: 

Suffix: 

Residence Information (Select One): Non US Residency

City: Seoul

Country of Residence: KR

Citizenship under 37 CFR 1.41(b): KR

Mailing Address of Applicant:

Address 1: SK HUB SU B-1416, 650-4, Guro 1-dong,Guro-gu

City: Seoul

State/Province: 

Postal Code: 152-720

Country: KR

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.

Correspondence Information:

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An Address is being provided for the correspondence Information of this application.
Application Data Sheet 37 CFR 1.76

Title of Invention: METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION

Customer Number: 20529

Application Information:

Title of the Invention: METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION

Attorney Docket Number: 31047U

Application Type: Nonprovisional

Subject Matter: Utility

Small Entity Status Claimed: ✗

Suggested Class (if any)

Sub Class (if any)

Suggested Technology Center (if any)

Total Number of Drawing Sheets (if any): 7

Suggested Figure for Publication (if any)

Publication Information:

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.

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Please Select One: ☐ Customer Number ☐ US Patent Practitioner ☐ Limited Recognition (37 CFR 11.9)

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Prior Application Status

Application Number

Continuity Type

Prior Application Number

Filing Date (YYYY-MM-DD)

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.

Foreign Priority Information:
**Application Data Sheet 37 CFR 1.76**

**Title of Invention:** METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. 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(a).

<table>
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<th>Application Number</th>
<th>Country</th>
<th>Parent Filing Date (YYYY-MM-DD)</th>
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**Assignee Information:**

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

**Assignee 1**

If the Assignee is an Organization check here. [X]

**Organization Name** DREAMER

**Mailing Address Information:**

<table>
<thead>
<tr>
<th>Address 1</th>
<th>3500 W. Olive Avenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address 2</td>
<td>Suite 990</td>
</tr>
<tr>
<td>City</td>
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</tr>
<tr>
<td>Country</td>
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<tr>
<td>Postal Code</td>
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</tr>
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</table>

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<table>
<thead>
<tr>
<th>Signature</th>
<th>Jerald L. Meyer/</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Name</td>
<td>Jerald</td>
</tr>
<tr>
<td>Last Name</td>
<td>Meyer</td>
</tr>
<tr>
<td>Date (YYYY-MM-DD)</td>
<td>2010-09-16</td>
</tr>
<tr>
<td>Registration Number</td>
<td>41194</td>
</tr>
</tbody>
</table>

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METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION

This application claims the benefit of Korean Patent Application No. 10-2009-0089058 filed on September 21, 2009, which is hereby incorporated for reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a method for providing a progressive download service for a playback apparatus supporting a BD-J specification, and more particularly to a method for providing a progressive download service for a playback apparatus supporting a BD-J specification wherein a standby time and a communication overhead necessary for receiving and playing a A/V data by a playback apparatus supporting a BD-J specification are minimized by dividing and receiving the A/V data according to a size of clips using a clip division information.

2. Description of the Related Art

A Blu-ray specification is designed by Blu-ray Disc Association ("BDA"), whose members include Sony, Hitachi and Sharp. The Blu-ray specification includes a specification of a Blu-ray disk which is an optical disc that may be read and recorded using a blue laser.

While a diameter and a thickness of the Blu-ray disk, which are 12 cm and 1.2 mm,
respectively, are same as those of conventional CD (Compact Disc) and DVD (Digital Versatile Disc), a storage capacity thereof is larger than those of the conventional CD and DVD.

Because the blue laser having a wavelength of 405 nm is used for reading the Blu-ray disk instead of a red laser having a wavelength of 650 nm used for reading the DVD, more data can be stored in the Blu-ray disk than the DVD.

Specifically, a single layer Blu-ray disk is capable of storing up to 25 GB of a data and a dual layer Blu-ray disk is capable of storing up to 50 GB of the data. This means that the Blu-ray disk can store five times more data than the DVD.

Moreover, a quad layer Blu-ray disk and an octal layer Blu-ray disk can store up to 100 GB and 200 GB, respectively.

The Blu-ray disk supports a video compression codec of MPEG-2 which is widely used in the DVD. Moreover, BDA standard specification requires the Blu-ray disk to use H.264/AVC or VC-1 as the video compression codec which provides improved compression ratio compared to MPEG-2.

In addition, the Blu-ray disk supports audio formats such as Dolby Digital Plus, Dolby TrueHD and DTS-HD Master Audio as well as PCM (Pulse-code modulation), Dolby Digital and DTS.

A Blu-ray player supporting a BD-J specification supports an interactive service based on JAVA. Moreover, the Blu-ray player supporting the BD-J specification supports a network connectivity, a PIP(Picture-In-Picture) and a connection to a local storage.

A Blu-ray player supporting a BD-Live specification is capable of playing the
streaming data received through a network communication in addition to the above-described capabilities.

A Virtual File System ("VFS") enables a playback of the streaming data which is not stored in the Blu-ray disk. Specifically, the VFS configures a virtual package on the Blu-ray player to enable the Blu-ray player to play the streaming data received through a USB port or the network communication as if the streaming data is stored in the Blu-ray disk.

Hereinafter, "a playback apparatus supporting the BD-J specification" includes the Blu-ray player supporting the BD-J specification or an apparatus using a middleware supporting the BD-J specification such as a TV, a set-top box, a PMP (Portable Multimedia Player), a video game console, a PC (Personal Computer ) and a PVR(Personal Video Recorder).

The apparatus using the middleware supporting the BD-J specification is not required to have a Blu-ray disk reading capability.

Fig. 1 is a diagram illustrating a configuration for providing an audio/video data in accordance with a conventional method.

The audio/video data, which will be referred to as A/V data hereinafter, may include one of an audio data, a video data and combinations thereof.

An A/V data providing server generates a BUMF (Binding Unit Manifest File) information, an SF (Signature File) information, a playlist information, a clip information and a movie clip according to the BD-J specification.

The BUMF information defines a configuration of a virtual package in XML
(Extensible Markup Language) format. For instance, the BUMF information includes a file name information and a binding information on the movie clip included in the A/V data received from the A/V data providing server.

The SF information is used for verifying a validity of the BUMF information. The SF information uses SHA (Secure Hash algorithm)-1.

The playlist information includes an information on the A/V data to be played. For instance, the playlist information includes a playback sequence information, a PlayItem information and a PlayListMark information of clips #1 through #100.

The clip information includes an information required for playing the movie clip. For instance, the clip information includes a stream format information of the corresponding clip, a number of packets included in the corresponding clip, an encoding specification of the corresponding clip and a time stamp information.

The A/V data included in each of the clips #1 through #100 may be different from one another. However, the clips #1 through #100 may have a same size or a same length which is obtained by dividing one large clip or one long clip into smaller or shorter clips.

The playback apparatus stores in a BUDA (Binding Unit Data Area) the BUMF information, the SF information, the playlist information and the clip information received from the A/V data providing server. The playback apparatus carries out a package update from a disk package to the virtual package based on the BUMF information, the SF information, the playlist information and the clip information stored in the BUDA. That is, the playback apparatus is configured to play the clips #1 through #100 received from the A/V data providing server instead of playing a data stored in the Blu-ray disk.
When a configuration of the playback apparatus is complete, the playback apparatus receives from the A/V data providing server and progressively plays the clips #1 through #100. Specifically, the playback apparatus receives the clips #1 through #100 using a progressive download scheme. For instance, when the playback apparatus starts receiving and finishes receiving the clip #1, the playback apparatus starts playing the clip #1 and starts receiving the clip #2 simultaneously. Moreover, when the playback apparatus finishes receiving the clip #2, the playback apparatus starts playing the clip #2 and starts receiving the clip #3 simultaneously.

However, there are certain disadvantages when the playback apparatus employs the progressive download scheme.

When the number of the clips that are to be played is small, a standby time necessary for downloading the clips increases. For instance, when the clips #1 through #100 having a size of 2 GB in total are to be is received, and a time necessary for downloading each of the clips is 20 seconds, the standby time is about 20 seconds. Moreover, if two clips are buffered by the playback apparatus, the standby time is about 40 seconds. Therefore, when the number of the clips is small, the standby time increases.

Increasing the number of the clips in order to overcome above disadvantages also has some disadvantages.

For instance, when the clips #1 through #1000 having a size of 2 GB in total are to be received, and a time necessary for receiving each of the clips is 2 seconds, the standby time is about 2 seconds.

That is, when the number of the clips is increased, the standby time decreases.
However, a size of a clip information increases as the number of the clips is increased. Moreover, a communication overhead increases because a communication should be established between the A/V data providing server and the playback apparatus for every clip.

**SUMMARY OF THE INVENTION**

It is an object of the present invention to provide a method for providing a progressive download service for a playback apparatus supporting a BD-J specification wherein a standby time and a communication overhead necessary for receiving and playing a A/V data by a playback apparatus supporting a BD-J specification are minimized by dividing and receiving the A/V data according to a size of clips using a A/V data division information.

In order to achieve above-described object of the present invention, there is provided a method for providing a progressive download service for an A/V data providing server and a playback apparatus supporting a BD-J specification, the method comprising steps of: (a) preparing an A/V data; (b) dividing the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size; and (c) transmitting the plurality of clips from the A/V data providing server to the playback apparatus.

The method in accordance with the present invention may further comprise after
carrying out the step (b): (d) generating a playback sequence information for the plurality of clips so that the one or more first clips are played before the one or more second clips are played; and (e) transmitting the playback sequence information from the A/V data providing server to the playback apparatus.

The method in accordance with the present invention may further comprise receiving from the playback apparatus a clip request according to the playback sequence information, and wherein the step (c) comprises transmitting the plurality of clips to the playback apparatus in response to the clip request.

Preferably, the clip division information comprises at least one of the first size, the second size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered clips.

Preferably, a first mathematical expression $B_a \times \frac{S_f}{CB} + N \times \frac{S_s}{MB} \geq N \times \frac{S_f}{CB} + \frac{S_c}{CB}$ is satisfied, where $S_f$ represents the first size, $S_c$ represent the second size, $N$ represents the number of one or more first clips, $MB$ represents the media network bandwidth, $CB$ represents the customer network bandwidth and $B_a$ represents the number of buffered clips.

The method in accordance with the present invention may further comprise obtaining the first size, the second size, the media network bandwidth, the customer network bandwidth and the number of buffered clips from the clip division information; and selecting the number of the one or more first clips satisfying a second mathematical expression $N \geq \frac{MB \times [S_c - B_a \times S_f]}{S_f \times [CB - MB]}$, where $S_f$ represents the first size, $S_c$ represent the
second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( B_a \) represents the number of buffered clips.

The method in accordance with the present invention may further comprise obtaining the first size, the number of the one or more first clips, the media network bandwidth, the customer network bandwidth and the number of buffered clips; and selecting the second size satisfying a third mathematical expression

\[
S_c \leq S_s \times \left[ \frac{N(CB - MB) + B_a \times MB}{MB} \right],
\]

where \( S_s \) represents the first size, \( S_c \) represent the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( B_a \) represents the number of buffered clips.

Preferably, the customer network bandwidth is obtained by establishing a communication with the playback apparatus.

Preferably, the customer network bandwidth is selected from a customer network bandwidth group.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Fig. 1 is a diagram illustrating a configuration for providing an audio/video data in accordance with a conventional method.

Fig. 2 is a flow diagram illustrating a method for providing a progressive download service for a playback apparatus supporting a BD-J specification in accordance with the
present invention.

Fig. 3 is a diagram exemplifying a configuration of the A/V data divided into the plurality of clips including a first clip group and a second clip group in accordance with the present invention.

Fig. 4 is a flow diagram illustrating a process for dividing the A/V data by a A/V data providing server in accordance with an embodiment of the present invention.

Fig. 5 is a flow diagram illustrating a process for dividing the A/V data by a A/V data providing server in accordance with another embodiment of the present invention.

Fig. 6 is a diagram exemplifying a configuration for receiving a A/V data via a network in a playback apparatus supporting the BD-J specification in accordance with the present invention.

Fig. 7 is a diagram illustrating states of clips according to time in accordance with the present invention.

**DETAILED DESCRIPTION OF THE INVENTION**

A method for providing a progressive download service for a playback apparatus supporting a BD-J specification in accordance with the present invention will be described in detail with reference to accompanied drawings.

Fig. 2 is a flow diagram illustrating a method for providing a progressive download service for a playback apparatus supporting a BD-J specification in accordance with the present invention.

The method for providing the progressive download service for the playback
apparatus supporting the BD-J specification in accordance with the present invention is carried out in an A/V data providing server and the progressive download service is provided to the playback apparatus.

Referring to Fig. 2, the A/V data providing server prepares an A/V data (S100). Specifically, the A/V data providing server may receive the A/V data from a separate A/V data storage device through wired/wireless network. Moreover, the A/V data providing server may receive the A/V data from an imaging device such as a video camera.

Thereafter, the A/V data providing server divides the A/V data received in the step S100 into a plurality of clips including a first clip group and a second clip group using a clip division information (S110).

The first clip group includes one or more first clips each having a first size, and the second clip group includes one or more second clips each having a second size which is larger than the first size.

While the one or more first clips are of a same size, i.e., the first size, the A/V data included in each of the one or more first clips may be different from one another.

Moreover, while the one or more second clips are of a same size, i.e., the second size, the A/V data included in each of the one or more second clips may be different from one another.

Fig. 3 is a diagram exemplifying a configuration of the A/V data divided into the plurality of clips including the first clip group and the second clip group in accordance with the present invention.

Referring to Fig. 3, the first clip group includes N first clips of substantially the
same size, i.e., the first size which is denoted as $S_a$, where $N$ is a natural number representing the number of the first clips. Moreover, the second clip group includes $M$ second clips of substantially the same size, i.e., the second size denoted as $S_b$, where $M$ is a natural number representing the number of the second clips.

It is preferable that the second size is more than ten times larger than the first size in order to minimize a standby time and a communication overhead necessary for a playback of the A/V data.

The clip division information is described hereinafter in greater detail.

The clip division information may include at least one of $S_a$ which may be expressed in unit of Mb (Megabit), $S_b$ which may also be expressed in unit of Mb, $N$, a media bandwidth MB which may be expressed in unit of Mbps (Megabits per second), a customer network bandwidth CB which may also be expressed in unit of Mbps and the number of buffered clips $B_a$. When the A/V data providing server communicates with the playback apparatus and receives the clip division information, the A/V data providing server may obtain $S_a$, $S_b$, $N$, CB and $B_a$ from the clip division information.

The media network bandwidth MB defines a minimum customer network bandwidth necessary for the playback of the A/V data. For instance, when a bitrate of the A/V data is 10 Mbps, the media network bandwidth MB may be about 10 Mbps.

The customer network bandwidth CB defines a communication speed between the A/V data providing server and the playback apparatus.

The number of buffered clips $B_a$ defines a minimum number of clips to be buffered by the playback apparatus. For instance, when the number of buffered clips $B_a$ is two, two
clips are always buffered in a buffer of the playback apparatus.

In order to for the playback apparatus to play the A/V data without interruption, one of the second clip of the M second clips should be received before all of the N first clips are played.

That is, one of M second clips which is to be played first must be received by the playback apparatus before all of the N first clips are played.

Therefore, a sum of a time \( = B_a \times \frac{S_s}{CB} \) necessary for receiving the N first clips buffered according to the number of buffered clips \( B_a \) and a time \( = N \times \frac{S_s}{MB} \) necessary for playing all of the N first clips should be larger than a sum of a time \( = N \times \frac{S_s}{CB} \) necessary for receiving all of the N first clips and a time \( = \frac{S_c}{CB} \) necessary for receiving one of the M second clips which is to be played first.

This may be expressed as mathematical expression #1.

[Mathematical expression #1]

\[
B_a \times \frac{S_s}{CB} + N \times \frac{S_s}{MB} \geq N \times \frac{S_s}{CB} + \frac{S_c}{CB}
\]

A process for dividing the A/V data by the A/V data providing server is described hereinafter in greater detail.

Fig. 4 is a flow diagram illustrating a process for dividing the A/V data by the A/V data providing server in accordance with an embodiment of the present invention wherein the number N is obtained from the mathematical expression #1.
Referring to Fig. 4, the playback apparatus receives the clip division information and obtains $S_a$, $S_c$, MB, CB and $B_a$ from the clip division information (S200).

Thereafter, the A/V data providing server selects the number N that satisfies the mathematical expression #1 (S210).

That is, the number N is determined from mathematical expression #2 which is obtained from the mathematical expression #1 by expressing the number N in function of MB, $S_c$, $S_a$ and $B_a$.

[Mathematical expression #2]

$$N \geq \frac{MB \times (S_c - B_a \times S_a)}{S_a \times (CB - MB)}$$

The A/V data providing server selects the number N according to mathematical expression #2.

Thereafter, the A/V data providing server divides the A/V data into the N first clips and the M second clips according to N, $S_c$ and $S_a$ (S220).

Fig. 5 is a flow diagram illustrating a process for dividing the A/V data by the A/V data providing server in accordance with another embodiment of the present invention wherein the second size $S_c$ is obtained from the mathematical expression #1.

Referring to Fig. 5, the A/V data providing server receives the clip division information and obtains $S_a$, N, MB and $B_a$ from the clip division information (S300).

Thereafter, the A/V data providing server selects $S_c$ that satisfies the mathematical expression #1 (S310).

That is, the second size $S_c$ is determined from mathematical expression #3 which is
obtained from the mathematical expression #1.

[Mathematical expression #3]

\[ S_c \leq S \times \left[ \frac{N(CB - MB) + B_o \times MB}{MB} \right] \]

The A/V data providing server selects \( S_c \) according to the mathematical expression #3.

Thereafter, the A/V data providing server divides the A/V data into the \( N \) first clips and the \( M \) second clips according to \( N, S_c \) and \( S_3 \) (S320).

In another embodiment, the A/V data providing server may divide the A/V data based on the customer network bandwidth \( CB \) obtained by establishing a communication with the playback apparatus.

Specifically, the A/V data providing server divides the A/V data based on the clip division information configured according to one of customer network bandwidths \( CB \) included in a customer network bandwidth group. The A/V data providing server may then and transmits the divided A/V data to the playback apparatus according to the customer network bandwidth \( CB \) obtained by establishing the communication with the playback apparatus.

For instance, when the customer network bandwidth group includes the customer network bandwidths \( CB \) of 4Mbps, 10Mbps and 100Mbps, the A/V data providing server generates multiple sets of divided A/V data that are within the range of the customer network bandwidths of 4Mbps, 10Mbps and 100Mbps. One of the sets of the divided A/V data corresponding to an actual customer network bandwidth \( CB \) obtained by establishing
the communication between the A/V data providing server and the playback apparatus is then transmitted.

Referring back to Fig. 2, the A/V data providing server generates a playback sequence information for the plurality of clips (S120). Preferably, the A/V data providing server generates the playback sequence information so that the N first clips are played before the M second clips are played.

Thereafter, the A/V data providing server transmits the playback sequence information to the playback apparatus (S130).

Thereafter, when the playback apparatus generates a clip request according to the playback sequence information received from the A/V data providing server and transmits the clip request to the A/V data providing server (S140). Specifically, the playback apparatus generates the clip request for requesting the clip to be received according to a list and a sequence of the clips included in the playback sequence information.

Thereafter, the A/V data providing server transmits the plurality of clips divided in the step S110 to the playback apparatus in response to the clip request (S150).

Fig. 6 is a diagram exemplifying a configuration for receiving the A/V data via a network in the playback apparatus supporting the BD-J specification in accordance with the present invention.

Referring to Fig. 6, the playback apparatus stores in a BUDA (Binding Unit Data Area) a BUMF information, a SF information, a playlist information and a clip information received from the A/V data providing server. The playback apparatus carries out a package update from a disk package to the virtual package based on the BUMF information, the SF
information, the playlist information and the clip information stored in the BUDA.

When a configuration of the playback apparatus is complete, the playback apparatus plays the A/V data based on the playback sequence information, i.e., the playlist information. Specifically, the playback apparatus progressively receives the plurality of clips including the first clip group and the second clip group.

The playback apparatus progressively receives and plays the N first clips included in the first clip group. When the playback of the N first clips are finished, the playback apparatus progressively plays the M second clips included in the second clip group. The playback apparatus must receive the one of the M second clips which is to be played first before all of the N first clips are played in order to play the N first clips and the M second clips without interruption.

Fig. 7 is a diagram illustrating states of the clips according to time in accordance with the present invention.

The state of each clip may be one of R, W and P. Specifically, R represents that the corresponding clip is being received from the A/V data providing server, i.e., is in a receiving state. W represents the corresponding clip is waiting for playback, i.e., is in a waiting state. P represents the corresponding clip is being played in the playback apparatus, i.e., is in a playback state.

If the first size \( S_s \) is 4 Mb, the second size \( S_c \) is 40 Mb, the media network bandwidth MB is 2 Mbps, the customer network bandwidth CB is 4 Mbps and the number of buffered clips \( B_s \) is 2, the number \( N \) must be 8 or higher according to the mathematical expression #2.
Therefore, assuming that the number N is 8, clip #1 through clip #8 are included in the first clip group and clip #9 and clip #10 are included in the second clip group.

The table in Fig. 7 will be described under an assumption that a time necessary for receiving each of the clips #1 through #8 from the A/V data providing server is 1 second, a time necessary for playing each of the clips #1 through #8 is 2 seconds and a time necessary for decoding each clips received by the playback apparatus is ignored.

From 0 to 1 second, the clip #1 is in the receiving state.

When 1 second lapses, the clip #1 is in the waiting state, and the clip #2 is in the receiving state.

When 2 seconds lapse, the clip #1 is in the playback state, the clip #2 is in the waiting state, and the clip #3 is in the receiving state.

When 3 seconds lapse, the clip #1 is in the playback state, the clip #2 is in the waiting state, the clip #3 is in the waiting state, and the clip #4 is in the receiving state.

When 4 seconds lapse, the clip #1 has finished playing, the clip #2 is in the playing state, the clip #3 is in the waiting state, the clip #4 is in the waiting state and the clip #5 is in the receiving state.

When 5 seconds lapse, the clip #2 is in the playback state, the clips #3, #4 and #5 are in the waiting state and the clip #6 is in the receiving state.

Similarly, the clip #8 is in the receiving state after 7 seconds and has finished playing after 18 seconds.

10 seconds are necessary for receiving the clip #9, because sizes of the clips #9 and #10 are 40 Mb each and the customer network bandwidth CB is 4 Mbps.
Therefore, in order to play the first clip group and the second clip group, the clip #9 should be in the receiving state when 8 seconds lapse.

In accordance with the present invention, the standby time is minimized as the playback apparatus supporting the BD-J specification receives and plays the one or more first clips having the first size included in the first clip group. In addition, the communication overhead is minimized as the playback apparatus receives and plays, during the playback of the one or more first clips, the one or more second clips having the second size larger than the first size.

While the present invention has been particularly shown and described with reference to the preferred embodiment thereof, it will be understood by those skilled in the art that various changes in form and details may be effected therein without departing from the spirit and scope of the invention as defined by the appended claims.
What is claimed is:

1. A method for providing a progressive download service for an A/V data providing server and a playback apparatus supporting a BD-J specification, the method comprising steps of:
   (a) preparing an A/V data;
   (b) dividing the A/V data into a plurality of clips including a first clip group and a second clip group using a clip division information, wherein the first clip group includes one or more first clips each having a first size and the second clip group includes one or more second clips each having a second size larger than the first size; and
   (c) transmitting the plurality of clips from the A/V data providing server to the playback apparatus.

2. The method in accordance with claim 1, further comprising, after carrying out the step (b):
   (d) generating a playback sequence information for the plurality of clips so that the one or more first clips are played before the one or more second clips are played; and
   (e) transmitting the playback sequence information from the A/V data providing server to the playback apparatus.

3. The method in accordance with claim 2, further comprising receiving from the playback apparatus a clip request according to the playback sequence information, and wherein the step (c) comprises transmitting the plurality of clips to the playback apparatus
in response to the clip request.

4. The method in accordance with claim 1, wherein the clip division information comprises at least one of the first size, the second size, a number of the one or more first clips, a media network bandwidth of the A/V data, a customer network bandwidth necessary for transmitting the A/V data to the playback apparatus and a number of buffered clips.

5. The method in accordance with claim 4, wherein a first mathematical expression

\[ B_a \times \frac{S_s}{CB} + N \times \frac{S_s}{MB} \geq N \times \frac{S_s}{CB} + \frac{S_c}{CB} \]

is satisfied, where \( S_s \) represents the first size, \( S_c \) represent the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media network bandwidth, \( CB \) represents the customer network bandwidth and \( B_a \) represents the number of buffered clips.

6. The method in accordance with claim 4, further comprising:

obtaining the first size, the second size, the media network bandwidth, the customer network bandwidth and the number of buffered clips from the clip division information; and

selecting the number of the one or more first clips satisfying a second mathematical expression

\[ N \geq \frac{MB \times [S_c - B_a \times S_s]}{S_s \times [CB - MB]} \]

where \( S_s \) represents the first size, \( S_c \) represent the second size, \( N \) represents the number of one or more first clips, \( MB \) represents the media
network bandwidth, CB represents the customer network bandwidth and $B_a$ represents the number of buffered clips.

7. The method in accordance with claim 4, further comprising:

obtaining the first size, the number of the one or more first clips, the media network bandwidth, the customer network bandwidth and the number of buffered clips; and

selecting the second size satisfying a third mathematical expression

$$S_c \leq S_2 \times \left[ \frac{N(CB-MB) + B_a \times MB}{MB} \right],$$

where $S_2$ represents the first size, $S_c$ represent the second size, $N$ represents the number of one or more first clips, $MB$ represents the media network bandwidth, $CB$ represents the customer network bandwidth and $B_a$ represents the number of buffered clips.

8. The method in accordance with claim 4, wherein the customer network bandwidth is obtained by establishing a communication with the playback apparatus.

9. The method in accordance with claim 4, wherein the customer network bandwidth is selected from a customer network bandwidth group.
ABSTRACT OF DISCLOSURE

A method for providing a progressive download service for a playback apparatus supporting a BD-J specification is disclosed. In accordance with the present invention, a standby time and a communication overhead necessary for receiving and playing a A/V data by a playback apparatus supporting a BD-J specification are minimized by dividing and playing a first clip and a second clip according to a size of clips.
START

PREPARE A/V DATA ~ S100

DIVIDE A/V DATA INTO PLURALITY OF CLIPS INCLUDING 1ST CLIP GROUP AND 2ND CLIP GROUP ~ S110

GENERATE PLAYBACK SEQUENCE INFORMATION ~ S120

TRANSMIT PLAYBACK SEQUENCE INFORMATION TO PLAYBACK APPARATUS ~ S130

RECEIVE CLIP REQUEST FROM PLAYBACK APPARATUS ~ S140

TRANSMIT PLURALITY OF CLIPS TO PLAYBACK APPARATUS IN RESPONSE TO CLIP REQUEST ~ S150

END

Fig. 2
size of clip

\[ S_s \quad S_s \quad S_s \quad S_c \quad S_c \]

1\textsuperscript{st} clip \quad 1\textsuperscript{st} clip \quad \ldots \quad 1\textsuperscript{st} clip \quad 2\textsuperscript{nd} clip \quad \ldots \quad 2\textsuperscript{nd} clip

1\textsuperscript{st} clip group
N 1\textsuperscript{st} clips

2\textsuperscript{nd} clip group
M 2\textsuperscript{nd} clips

A/V data

Fig. 3
START

RECEIVE $S_s$, $S_c$, MB, CB AND $B_a$ ~ S200

SELECT N ~ S210

DIVIDE A/V DATA INTO PLURALITY OF CLIPS ACCORDING TO CLIP DIVISION INFORMATION ~ S220

END

Fig. 4
START

RECEIVE $S_8$, $N$, $MB$, $CB$ AND $B_a$  \[S_{300}\]

SELECT $S_c$  \[S_{310}\]

DIVIDE A/V DATA INTO PLURALITY OF CLIPS ACCORDING TO CLIP DIVISION INFORMATION  \[S_{320}\]

END

Fig. 5
Fig. 6
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DECLARATION FOR PATENT APPLICATION

As a below-named inventor(s), I/we hereby declare that:

My/Our residence(s), post office address(es) and citizenship(s) is/are as stated below next to my/our name(s).

I/We believe I/we am/are the original inventor, first and sole (if only one name is listed below) or the original, first and joint inventors (if plural names are listed below) of the subject matter which is claimed, and for which a patent is sought on the invention entitled:

the specification of which: (check one)

[X] was filed on ____________, as Serial No. ________________.

and was amended on ________________ (if applicable).

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

I/We acknowledge the duty to disclose information which is material to the patentability of this application as defined by 37 CFR § 1.56.

I/We hereby claim foreign priority benefits under 35 U.S.C. § 119 of any foreign application(s) for patent or inventor's certificate listed below, and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Applications:

10-2009-0089058 Rep. of Korea 21/9/2009 [ ] [X]
(Application No.) (Country) (Day/Month/Year Filed) Yes No

(Application No.) ___________ ___________ [ ] [ ]
(Country) (Day/Month/Year Filed) Yes No

(Application No.) ___________ ___________ [ ] [ ]
(Country) (Day/Month/Year Filed) Yes No

I/We hereby appoint the Practitioners associated with the following Customer Number:

Customer Number 20529

Direct Telephone Calls to:

Gary M. Nath
(703) 548-6284

Send Correspondence to:

Customer Number 20529
THE NATH LAW GROUP
112 South West Street
Alexandria, VA 22314
U.S.A.

I/We hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by 35 U.S.C. § 112, first paragraph, I/we acknowledge the duty to disclose material information as defined in 37 CFR § 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(U.S. Application Serial No.) (U.S. Filing Date) (Status—patented, pending, abandoned)

(U.S. Application Serial No.) (U.S. Filing Date) (Status—patented, pending, abandoned)
DECLARATION FOR PATENT APPLICATION

I/we hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below:

Application Number(s)                  Filing Date

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

Full name of sole or first inventor: BAEK Noniung
Inventor's Signature: [Signature]
Country of Citizenship: Republic of Korea
Post Office Address: 501-401 Areum Maeul Runyoung Apts. 107-402, Imae-dong, Bundang-gu, Seongnam-si, Gyeonggi-do 463-731, Republic of Korea
Date: 9/12/09

Full name of second inventor: KIM, John
Inventor's Signature: [Signature]
Residence: SK HUB SU B-1416, 650-4, Guro 1-dong, Guro-gu, Seoul 152-720, Republic of Korea
Country of Citizenship: Republic of Korea
Post Office Address: SK HUB SU B-1416, 650-4, Guro 1-dong, Guro-gu, Seoul 152-720, Republic of Korea
Date: 9/12/09
**Electronic Patent Application Fee Transmittal**

**Application Number:**

**Filing Date:**

**Title of Invention:** METHOD FOR PROVIDING PROGRESSIVE DOWNLOAD SERVICE FOR PLAYBACK APPARATUS SUPPORTING BD-J SPECIFICATION

**First Named Inventor/Applicant Name:** Wonjiang BAEK

**Filer:** Stanley Protigal/Nicole Wanty

**Attorney Docket Number:** 31047U

Filed as Small Entity

### Utility under 35 USC 111(a) Filing Fees

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### Miscellaneous-Filing:

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<td><strong>First Named Inventor/Applicant Name:</strong></td>
<td>Wonjang BAEK</td>
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<td><strong>Customer Number:</strong></td>
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<td>Stanley Protigal/Nicole Wanty</td>
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## Payment information:

- **Submitted with Payment:** yes
- **Payment Type:** Credit Card
- **Payment was successfully received in RAM:** $462
- **RAM confirmation Number:** 2201
- **Deposit Account**
- **Authorized User**

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**Warnings:**

**Information:**

| Total Files Size (in bytes): | 2307140 |
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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.
**PATENT APPLICATION FEE DETERMINATION RECORD**

Substitute for Form PTO-875

<table>
<thead>
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<th>APPLICATION AS FILED – PART I</th>
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**APPLICATION AS AMENDED – PART II**

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* 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.

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.

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