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(54) **Title:** METHOD AND DEVICE FOR PLAYING STREAMING MEDIA, AND NON-TRANSITORY STORAGE MEDIUM

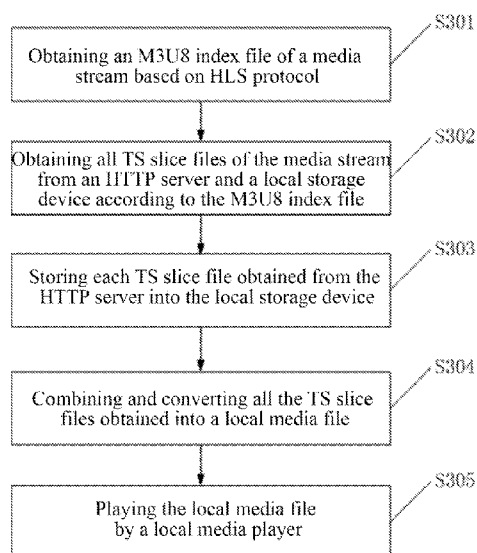


FIG.3

(57) **Abstract:** The present invention discloses a method and a device for playing streaming media, and a non-transitory storage medium, and the method comprises: obtaining an index file of a media stream, wherein the media stream includes the index file and at least two slice files, and time information and address information of each of the at least two slice files are recorded in the index file; obtaining all slice files of the media stream according to the index file; combining and converting all the slice files obtained into a local media file; and playing the local media file by a local media player, wherein the local media file is of a format supported by the local media player. By the present invention, a media stream of a format not supported by the local media player can be played by the local media player.

METHOD AND DEVICE FOR PLAYING STREAMING MEDIA, AND NON-TRANSITORY STORAGE MEDIUM

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of Chinese Application No. 201310246666.0, filed on June 20, 2013 by Tencent Technology (Shenzhen) Co., Ltd., titled “METHOD AND DEVICE FOR PLAYING STREAMING MEDIA”, which is incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

The present invention relates to the field of information technologies, particularly to the field of streaming media technologies, and more particularly to a method and a device for playing streaming media, and a non-transitory storage medium.

BACKGROUND OF THE INVENTION

At present, one of the most important functions of user equipment such as an intelligent mobile phone, a desk-top computer and a laptop computer is to obtain and play streaming media from the Internet. The traditional streaming media transmission is realized based on a special streaming media transmission protocol, for example, Routing Table Maintenance Protocol (RTMP), Real Time Streaming Protocol (RTSP), Multimedia Message Service (MMS) Protocol, etc. However, when the transmission of streaming media is based on these special streaming media transmission protocols in the actual network environment, an efficient network path for data transmission typically cannot be established due to the existence of a firewall and a Network Address Translation (NAT) router.

In view of this, Apple Inc. has put forward the HTTP Live Streaming (HLS) protocol, according to which, a continuous media stream is sliced into multiple Transport Stream (TS) slice files, and an M3U8 index file (i.e. a playlist file) is generated correspondingly, and the TS slice files and the M3U8 index file are stored in an HTTP server. The TS slice files and the M3U8 index file constitute an HLS media stream. In this case, a terminal such as iPhone, iPad, iTouch and Mac computers obtains the M3U8 index file from the HTTP server via the HTTP protocol, and further obtains the TS slice files according to the Uniform Resource Locator (URL) provided in the M3U8 index file, thereby playing the streaming media. Because the streaming media data are transmitted as per the HTTP protocol, the firewall or proxy would not cause any trouble to the transmission; moreover, the time length of a TS slice file is very short, so that the terminal may rapidly select and switch to a code rate so as to adapt to the playing under different bandwidth conditions. At present, however, many widely used terminals other than those from Apple Inc. are incapable of playing a media stream based on HLS protocol; moreover, the media stream based on HLS protocol cannot be played off line by even a terminal capable of playing a media stream based on HLS protocol. As a result, the video watching experience of a user will be severely degraded.

SUMMARY OF THE INVENTION

Therefore, the embodiments of the invention provide a method and a device for playing streaming media, and a non-transitory storage medium, to allow a user terminal to efficiently obtain streaming media.

On a first aspect, an embodiment of the present invention provides a method for playing streaming media, and the method includes:

obtaining an index file of a media stream, wherein the media stream includes the index file and at least two slice files, and time information and address information of each of the at

least two slice files are recorded in the index file;

obtaining all slice files of the media stream according to the index file;

combining and converting all the slice files obtained into a local media file; and

playing the local media file by a local media player;

where, the local media file is of a format supported by the local media player.

On a second aspect, an embodiment of the preset invention further provides a device for playing streaming media, and the device includes:

an index file obtaining module, configured to obtain an index file of a media stream, wherein the media stream includes the index file and at least two slice files, and time information and address information of each of the at least two slice files are recorded in the index file;

a slice file obtaining module, configured to obtain all slice files of the media stream according to the index file;

a converting module, configured to combine and convert all the slice files obtained into a local media file; and

a playing module, configured to play the local media file by a local media player;

where, the local media file is of a format supported by the local media player.

On a third aspect, an embodiment of the preset invention further provides a non-transitory storage medium containing computer-executable instructions, which, when executed by a computer processor, are configured to perform a method for playing streaming media, wherein, the method comprises:

obtaining an index file of a media stream, wherein the media stream includes the index file and at least two slice files, and time information and address information of each of the at least two slice files are recorded in the index file;

obtaining all slice files of the media stream according to the index file;

combining and converting all the slice files obtained into a local media file; and
playing the local media file by a local media player;
where, the local media file is of a format supported by the local media player.

In comparison with the prior art, the embodiments of the preset invention are advantageous in that: all the obtained slice files are combined and converted into a local media file, which may be played by a local media player, so that a media stream of a format not supported by the local media player can be played on the terminal, thus the streaming media watching experience of a user may be improved.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to more clearly illustrate the technical solutions of the embodiments of the preset invention, the drawings used for the description of the embodiments will be briefly introduced below. However, the drawings accompanying to the description below illustrate only some embodiments of the preset invention, and modifications and substitutions may be further made to these drawings by one of ordinary skills in the art without creative work.

Fig.1 is a schematic flow chart of a method for playing streaming media according to a first embodiment of the preset invention;

Fig.2 is a structural representation of a streaming media transmission system based on HLS protocol according to the first embodiment of the preset invention;

Fig.3 is a schematic flow chart of a method for playing streaming media according to a second embodiment of the preset invention;

Fig.4 is a schematic flow chart showing the process of obtaining TS slice files of the media stream from an HTTP server according to the M3U8 index file, according to the second embodiment of the preset invention;

Fig.5 is a structural representation of a device for playing streaming media according to a

third embodiment of the preset invention; and

Fig.6 is a structural representation of a device for playing streaming media according to a fourth embodiment of the preset invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

The preset invention will be illustrated in detail below in conjunction with the drawings and embodiments. It may be understood that the specific embodiments described here are only used to explain the preset invention, rather than limiting the preset invention. In addition, it should be noted that only the parts related to the preset invention, rather than the whole contents, are shown in the drawings, for the sake of brief description.

The method for playing streaming media and the device for playing streaming media according to the embodiments of the preset invention may be applicable to a terminal with an operating system such as Android (i.e. an operating system platform developed by Google Inc. for portable mobile intelligent equipments), iOS (i.e. an operating system platform developed by Apple Inc. for portable mobile intelligent equipments) and Windows Phone (i.e. an operating system platform developed by Microsoft Inc. for portable mobile intelligent equipments), and the terminal, which may be any one of an intelligent mobile phone, a tablet PC, a personal digital assistant, a laptop computer and a desk-top computer, typically includes a combination of a part of all of a central processing unit, a storage device, a switching device, a power supply, a clock signal generator, an image processor and a sound processor. The above combination of a part of all of a central processing unit, a storage device, a switching device, a power supply, a clock signal generator, an image processor and a sound processor is used for embodying the method for playing streaming media and the functions of the device for playing streaming media according to the embodiments of the preset invention.

In the method for playing streaming media and the device for playing streaming media

according to the embodiments of the preset invention, the relevant media stream includes an index file and at least two slice files, and time information and address information of each of the at least two slice files are recorded in the index file. The embodiments below are illustrated based on an illustrative media stream based on HLS protocol, but it may be understood by one skilled in the art that the technical solutions of the embodiments of the preset invention are also applicable to media streams based on other protocols not supported by the terminal. In the case of the media stream based on HLS protocol, the index file is an M3U8 index file, and the slice file is a TS file.

Figs.1-2 show the first embodiment of the preset invention.

Fig.1 is a schematic flow chart of a method for playing streaming media according to the first embodiment of the preset invention. Referring to Fig.1, the method includes the following Steps S101-S104.

Step S101: obtaining an M3U8 index file of a media stream based on HLS protocol.

Fig.2 is a structural representation of a streaming media transmission system based on HLS protocol according to the first embodiment of the preset invention. Referring to Fig.2, a satellite 201 that transmits streaming media or a camera 202 that captures streaming media transfers the streaming media to an encoding and slicing means 203, which encodes and encapsulates the received streaming media to generate a TS file, slices the TS file into a plurality of successive TS segment files each with a fixed length via a slicing tool so as to obtain TS slice files, and generates an M3U8 index file corresponding to the TS slice files; an HTTP server 204 receives and stores the media stream based on HLS protocol that is sent by the encoding and slicing means 203 and includes the TS slice files and the M3U8 index file; and a desk-top computer 205 or an intelligent mobile phone 206 successively downloads the TS slice files from the HTTP server 204 and plays the TS slice files.

In this embodiment, a media play request, which may be an HTTP request, may be sent

wirelessly to the HTTP server storing the TS slice files and the M3U8 index file; then, a reply in response to the media play request is received from the HTTP server, where the reply contains the M3U8 index file of a media stream based on HLS protocol corresponding to the media play request. At least two pieces of time information, as well as time information (i.e. playing time length) and address information (i.e. an URL for locating the TS slice file) of a TS slice file corresponding to each of the at least two pieces of time information are recorded in the M3U8 index file.

Step S102: obtaining all TS slice files of the media stream from the HTTP server according to the M3U8 index file.

In Step S102, the M3U8 index file is parsed according to an M3U format and a UTF-8 character coding format, to determine the address information of each TS slice file of the media stream; then, a TS slice file obtaining request, which includes the address information of all the TS slice files, is sent to the HTTP server; and subsequently each TS slice file sent by the HTTP server according to the request is received.

For example, an M3U8 index file of a media stream based on HLS protocol may be described as:

#EXTM3U

#EXT-X-MEDIA-SEQUENCE:6

#EXT-X-TARGETDURATION:10

#EXTINF:10,

<http://live.example.com/1.ts>

#EXTINF:10,

<http://live.example.com/2.ts>

#EXTINF:10,

<http://live.example.com/3.ts>

By parsing the above M3U8 index file, it may be determined that the M3U8 index file involves 3 TS slice files, the name information of which are respectively *1.ts*, *2.ts* and *3.ts*, the time information (i.e. playing time lengths) of which are respectively 10 second, 10 second and 10 second, and the address information (i.e. URLs) of which are respectively <http://live.example.com/1.ts>, <http://live.example.com/2.ts> and <http://live.example.com/3.ts>.

Step S103: combining and converting all the obtained TS slice files into a local media file.

Specifically, Step S103 may include: after all the TS slice files are obtained from the HTTP server, combining all the TS slice files into a complete TS file according to the time information in the M3U8 index file, then converting the complete TS file into a local media file of a format supported by the local media player. Herein, such conversion may be realized according to the TS encapsulating format standard and a media format standard supported by the local media player. For example, the complete TS file may be converted into a local media file of a FlashVideo (FLV) format supported by the local Flash player. Of course, the local media file may be of another format such as Moving Pictures Experts Group (MPEG), MPG, DAT, Audio Video Interleaved (AVI), MOV and 3GP supported by the local media player.

Step S104: playing the local media file by the local media player.

In this embodiment, the local media player is a streaming media player installed on the terminal, and the local media file is of the format supported by the local media player.

In the first embodiment of the preset invention, all the obtained TS slice files are combined and converted into a local media file which may be played by the local media player, so that widely used terminals in addition to those from Apple Inc. can also play a media stream

based on HLS protocol.

Figs.3-4 show the second embodiment of the preset invention.

Fig.3 is a schematic flow chart of a method for playing streaming media according to the second embodiment of the preset invention. Referring to Fig.3, the method includes the following Steps S301-S305.

Step S301: obtaining an M3U8 index file of a media stream based on HLS protocol.

This Step S301 is the same as Step S101 of the first embodiment, and will not be described again here.

Step S302: obtaining all TS slice files of the media stream from an HTTP server and a local storage device according to the M3U8 index file.

Fig.4 is a schematic flow chart showing the obtaining of all TS slice files of the media stream from an HTTP server and a local storage device according to the M3U8 index file, according to the second embodiment of the preset invention. Referring to Fig.4, Step S302 further includes:

Substep S3021: parsing the M3U8 index file to determine address information of each TS slice file of the media stream and name information contained in the address information;

Substep S3022: scanning the local storage device, and obtaining TS slice files already downloaded to the local storage device, where the TS slice files already downloaded have names the same as those of the TS slice files of the media stream; and

Substep S3023: obtaining, from the HTTP server, other TS slice files except for the TS slice files already downloaded according to the address information.

In Substep S3023, a TS slice file obtaining request, which includes the address information of other TS slice files except for the TS slice files already downloaded, is sent to the HTTP server; then, the TS slice files sent by the HTTP server according to the request are received.

Step S303: storing each TS slice file obtained from the HTTP server in the local storage device.

After all the TS slice files of the media stream are obtained according to the M3U8 index file, each TS slice file obtained from the HTTP server is stored in the local storage device, which may be an external storage device (for example, a local disk) or an internal memory. Because the internal memory is generally used for storing the codes needed for CPU operations, each TS slice file is preferably stored in a local disk, in order to relieve the burden of the internal memory without any negative influence on the operation speed of the CPU.

Step S304: combining and converting all the obtained TS slice files into a local media file.

This Step S304 is the same as Step S103 of the first embodiment, and will not be described again here.

Step S305: playing the local media file by a local media player.

This Step S305 is the same as Step S104 of the first embodiment, and will not be described again here.

In this embodiment, the precedence order of Step S303 and Steps S304-S305 is not limited. That is, Steps S304-S305 may be performed first before Step S303; or, Step S304 is performed before Step S303, and then Step S305 is performed finally.

In the second embodiment of the preset invention, all the obtained TS slice files are combined and converted into a local media file which may be played by a local media player, so that other widely used terminals in addition to terminals from Apple Inc. can also support the playing of a media stream based on HLS protocol; further, all the TS slice files are stored in the local storage device, it is unnecessary to obtain the TS slice files from the HTTP server again to play the HLS media again subsequently, instead, the TS slice files stored in the local storage device may be searched out directly. Thus, the inventive method is not limited by the network

environment, the network traffic may be saved, and the video watching experience of a user may be greatly improved.

Fig.5 shows the third embodiment of the preset invention.

Fig.5 is a structural representation of a device for playing streaming media according to the third embodiment of the preset invention. Referring to Fig.5, the device includes: an index file obtaining module 501, a slice file obtaining module 502, a converting module 503 and a playing module 504.

The index file obtaining module 501 is configured to obtain an index file of a media stream. Here, the media stream includes the index file and at least two slice files, and time information and address information of each of the at least two slice files are recorded in the index file. The slice file obtaining module 502 is configured to obtain each slice file of the media stream according to the index file. The converting module 503 is configured to combine and convert all the obtained slice files into a local media file. The playing module 504 is configured to play the local media file by a local media player. Herein, the local media file is of a format supported by the local media player.

The above embodiment is preferably applicable to a media stream based on HLS protocol, in this case, the index file is an M3U8 index file, and the slice files are TS slice files. The TS slice file may be obtained from an HTTP server.

In this embodiment, the index file obtaining module 501 may send wirelessly a media play request, which is an HTTP request, to an HTTP server storing the TS slice files and the M3U8 index file; then, the index file obtaining module 501 receives a reply provided by the HTTP server in response to the above media play request, where the reply contains an M3U8 index file of a media stream based on HLS protocol corresponding to the media play request. At least two pieces of time information, as well as the time information (i.e. playing time length) and the address information (e.g. an URL for locating the TS slice file) of a TS slice file

corresponding to each of the at least two pieces of time information are recorded in the M3U8 index file.

In this embodiment, the slice file obtaining module 502 may specifically include:

a third parsing submodule 5021, configured to parse the index file to determine the address information of each slice file of the media stream; preferably, the M3U8 index file is preferably parsed according to an M3U format and a UTF-8 character coding format, to determine the address information of each TS slice file of the media stream; and

a third obtaining submodule 5022, configured to obtain all the slice files from the server, preferably the HTTP server, according to the address information of the slice files of the media stream.

Specifically, the third obtaining submodule 5022 sends a TS slice file obtaining request, which includes the address information of all the TS slice files, to the HTTP server, and then receives all the TS slice files sent by the HTTP server according to the request.

In this embodiment, after the slice file obtaining module 502 obtains all the slice files, the converting module 503 specifically combines all the obtained slice files into a complete file according to the time information, and converts the complete file into a local media file of a format supported by the local media player. Preferably, the converting module 503 combines all the TS slice files into a complete TS file according to the time information recorded in the M3U8 index file, and then converts the complete TS file into a local media file of a format supported by the local media player. Herein, the conversion may be realized according to the TS encapsulating format standard and a media format standard supported by the local media player. For example, the converting module 503 converts the complete TS file into a local media file of an FLV format supported by the local Flash player. Of course, the local media file may be another format supported by the local media player, such as MPEG, MPG, DAT, AVI, MOV and 3GP.

In the third embodiment of the preset invention, all the obtained TS slice files are combined and converted into a local media file, which may be played by the local media player, so that other widely used terminals in addition to terminals from Apple Inc. can also support the playing of a media stream based on HLS protocol.

Fig.6 shows the fourth embodiment of the preset invention.

Fig.6 is a structural representation of a device for playing streaming media according to the fourth embodiment of the preset invention. Referring to Fig.6, the device includes: an index file obtaining module 601, a slice file obtaining module 602, a storing module 603, a converting module 604 and a playing module 605.

The index file obtaining module 601 is configured to obtain an M3U8 index file of a media stream based on HLS protocol. The slice file obtaining module 602 is configured to obtain all TS slice files of the media stream from an HTTP server and a local storage device according to the M3U8 index file. The storing module 603 is configured to store TS slice files of the media stream obtained by the slice file obtaining module 602 from the HTTP server in the local storage device. The converting module 604 is configured to combine and convert all the obtained TS slice files into a local media file. The playing module 605 is configured to play the local media file by a local media player. Herein, the local media file is of a format supported by the local media player.

In this embodiment, the function of the index file obtaining module 601 is the same as that of the index file obtaining module 501 in the third embodiment, the function of the converting module 604 is the same as that of the converting module 503 in the third embodiment, and the function of the playing module 605 is the same as that of the playing module 504 in the third embodiment, thus will not be described in detail again here.

In this embodiment, the slice file obtaining module 602 specifically includes:

a first parsing submodule 6021, configured to parse the index file to determine the

address information of each slice file of the media stream and the name information contained in the address information, and preferably configured to parse the M3U8 index file to determine the address information of each TS slice file of the media stream and the name information contained in the address information;

a first obtaining submodule 6022, configured to scan a local storage device to obtain the slice files already downloaded to the local storage device, where the slice files already downloaded have names the same as those of the slice files of the media stream, and these slice files already downloaded are specifically TS slice files; and

a second obtaining submodule 6023, configured to obtain, from the server, other slice files of the media stream except for the slice files already downloaded according to the address information; preferably, said other slice files are downloaded from the HTTP server.

Specifically, the second obtaining submodule 6023 sends a TS slice file obtaining request, which includes the address information of other TS slice files except for the TS slice files already downloaded, to the HTTP server, and then receives the TS slice files sent by the HTTP server according to the request.

The storing module 603 is configured to store each slice file obtained by the slice file obtaining module into the local storage device. In this embodiment, the storing module 603 is configured to store each TS slice file obtained from the HTTP server into the local storage device, which may be an external storage device (for example, a local disk) or an internal memory. Because the internal memory is generally used for storing the codes needed for CPU operations, the storing module 603 preferably stores all the TS slice files to the local disk, in order to relieve the burden of the internal memory without any negative influence on the operation speed of the CPU.

In the fourth embodiment of the preset invention, all the obtained TS slice files are combined and converted into a local media file which may be played by a local media player, so

that other widely used terminals in addition to terminals from Apple Inc. can also support the playing of a media stream based on HLS protocol; further, all the TS slice files are stored in the local storage device, it is unnecessary to obtain the TS slice files from the HTTP server again to play the HLS media again subsequently, instead, the TS slice files stored in the local storage device may be searched out directly. Thus, the inventive method is not limited by the network environment, the network traffic may be saved, and the video watching experience of a user may be greatly improved.

An embodiment of the preset invention further provides a non-transitory storage medium containing computer-executable instructions, which, when executed by a computer processor, are configured to perform a method for playing streaming media, where the method includes:

obtaining an index file of a media stream, where the media stream includes the index file and at least two slice files, and time information and address information of each of the at least two slice files are recorded in the index file;

obtaining all slice files of the media stream according to the index file;

combining and converting all the obtained slice files into a local media file; and

playing the local media file by a local media player.

Herein, the local media file is of a format supported by the local media player.

The executable instructions stored in the storage medium may be instructions that are configured to perform a method for playing streaming media according to any embodiment of the preset invention.

With the description of the above embodiments, one skilled in the art may clearly understand that the preset invention may be implemented by the aid of software and necessary universal hardware; of course, the preset invention may be implemented by hardware merely. However, in many cases, the former is preferred. Based on such an understanding, the essential part of the technical solutions of the preset invention, or in other words, the part that contributes

to the prior art, may be embodied in the form of a software product that is stored in a computer-readable storage medium, for example, floppy disk, Read-Only Memory (ROM), Random Access Memory (RAM), FLASH, hard disk or compact disc of a computer, and includes instructions for instructing a computer device (which may be a personal computer, a server or a network device) to implement the methods according to the above embodiments of the preset invention.

The above description only shows some preferred embodiments of the preset invention, rather than limiting the scope of the preset invention. All modifications, equivalent substitutions and improvements made without departing from the concept and principles of the preset invention should fall within the scope of the preset invention.

WHAT IS CLAIMED IS:

1. A method for playing streaming media, comprising:

obtaining an index file of a media stream, wherein the media stream includes the index file and at least two slice files, and time information and address information of each of the at least two slice files are recorded in the index file;

obtaining all slice files of the media stream according to the index file;

combining and converting all the slice files obtained into a local media file; and

playing the local media file by a local media player;

wherein, the local media file is of a format supported by the local media player.

2. The method for playing streaming media according to claim 1, wherein, combining and converting all the slice files obtained into a local media file comprises:

combining all the slice files obtained into a complete file according to the time information; and

converting the complete file into a local media file of a format supported by the local media player.

3. The method for playing streaming media according to claim 1, wherein, obtaining an index file of a media stream comprises:

sending a media play request to a server; and

obtaining an index file of a media stream from the server.

4. The method for playing streaming media according to claim 3, wherein, obtaining all slice files of the media stream according to the index file comprises:

parsing the index file to determine the address information of each slice file of the media stream; and

obtaining each slice file from the server according to the address information of the slice file of the media stream.

5. The method for playing streaming media according to claim 3, wherein, obtaining all slice files of the media stream according to the index file comprises:

parsing the index file to determine the address information of each slice file of the media stream and name information contained in the address information;

scanning a local storage device, and obtaining slice files already downloaded to the local storage device, wherein the slice files already downloaded have names the same as those of slice files of the media stream; and

obtaining, from the server, other slice files of the media stream except for the slice files already downloaded according to the address information.

6. The method for playing streaming media according to claim 5, wherein, after obtaining all slice files of the media stream according to the index file, the method further comprises:

storing all the slice files obtained from the server into the local storage device.

7. The method for playing streaming media according to any one of claims 1-6, wherein, the media stream is based on Hypertext Transfer Protocol Live Streaming protocol, the index file is an M3U8 index file, and the slice file is a Transport Stream slice file.

8. The method for playing streaming media according to any one of claims 1-6, wherein, the local media file is of an FLV format, and the local media player is a Flash player.

9. A device for playing streaming media, comprising:

an index file obtaining module, configured to obtain an index file of a media stream, wherein the media stream includes the index file and at least two slice files, and time information and address information of each of the at least two slice files are recorded in the index file;

a slice file obtaining module, configured to obtain all slice files of the media stream according to the index file;

a converting module, configured to combine and convert all the slice files obtained into a local media file; and

a playing module, configured to play the local media file by a local media player;

wherein, the local media file is of a format supported by the local media player.

10. The device for playing streaming media according to claim 9, wherein, the converting module is configured to:

combine all the slice files obtained into a complete file according to the time information; and

convert the complete file into a local media file of a format supported by the local media player.

11. The device for playing streaming media according to claim 9, wherein, the index file obtaining module is configured to:

sending a media play request to a server; and

obtaining an index file of a media stream from the server.

12. The device for playing streaming media according to claim 11, wherein, the slice file obtaining module comprises:

a third parsing submodule, configured to parse the index file to determine the address information of each slice file of the media stream; and

a third obtaining submodule, configured to obtain each slice file from the server according to the address information of the slice file of the media stream.

13. The device for playing streaming media according to claim 11, wherein, the slice file obtaining module comprises:

a first parsing submodule, configured to parse the index file to determine the address information of each slice file of the media stream and name information contained in the address information;

a first obtaining submodule, configured to scan a local storage device and obtain slice files already downloaded to the local storage device, wherein the slice files already downloaded have names the same as those of slice files of the media stream; and

a second obtaining submodule, configured to obtain, from the server, other slice files of the media stream except for the slice files already downloaded, according to the address information.

14. The device for playing streaming media according to claim 13, further comprising a storing module, configured to store each slice file obtained by the slice file obtaining module into the local storage device.

15. The device for playing streaming media according to any one of claims 9-14, wherein, the media stream is based on Hypertext Transfer Protocol Live Streaming protocol, the index file is an M3U8 index file, and the slice file is a Transport Stream slice file.

16. The device for playing streaming media according to any one of claims 9-14, wherein, the local media file is of an FLV format, and the local media player is a Flash player.

17. A non-transitory storage medium containing computer-executable instructions, which, when executed by a computer processor, are configured to perform a method for playing

streaming media, wherein, the method comprises:

obtaining an index file of a media stream, wherein the media stream includes the index file and at least two slice files, and time information and address information of each of the at least two slice files are recorded in the index file;

obtaining all slice files of the media stream according to the index file;

combining and converting all the slice files obtained into a local media file; and

playing the local media file by a local media player;

wherein, the local media file is of a format supported by the local media player.

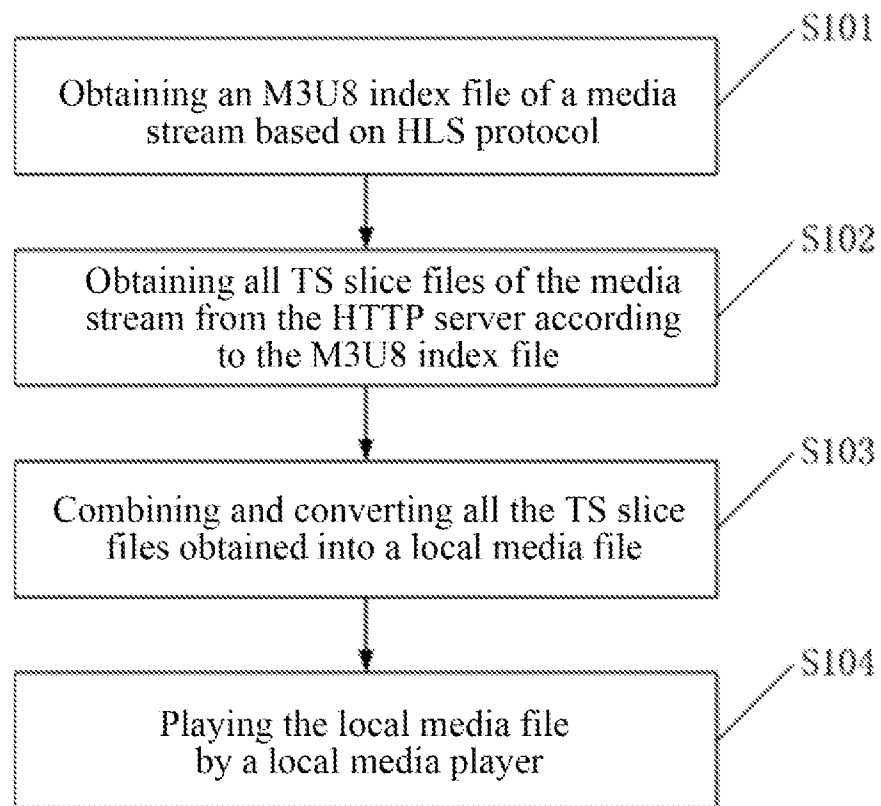


FIG.1

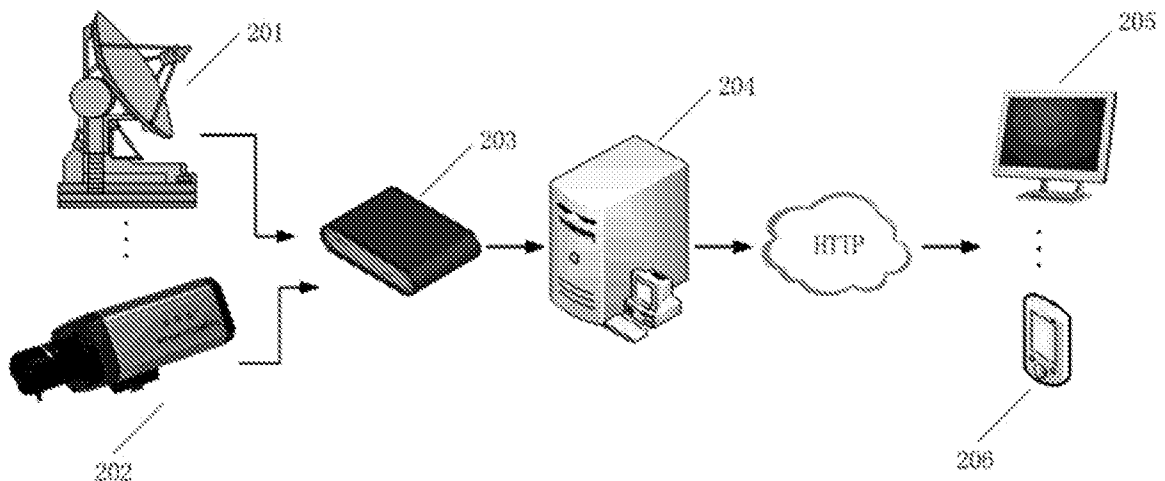


FIG.2

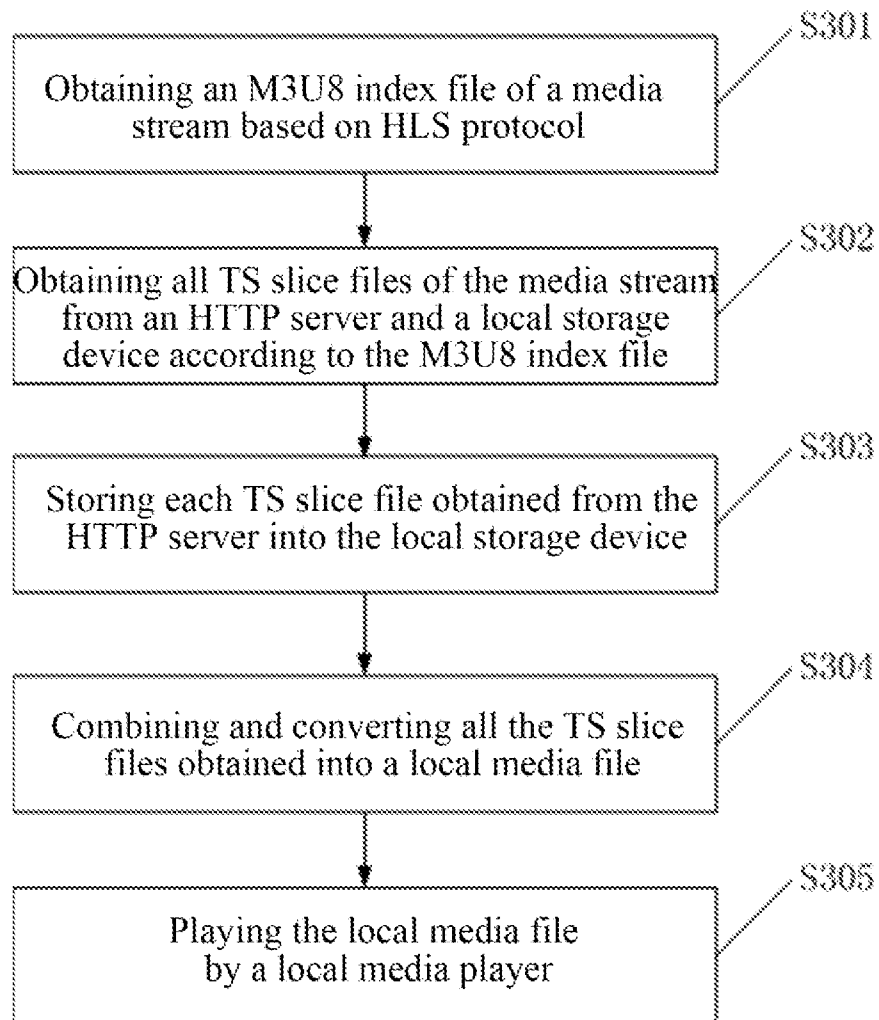


FIG.3

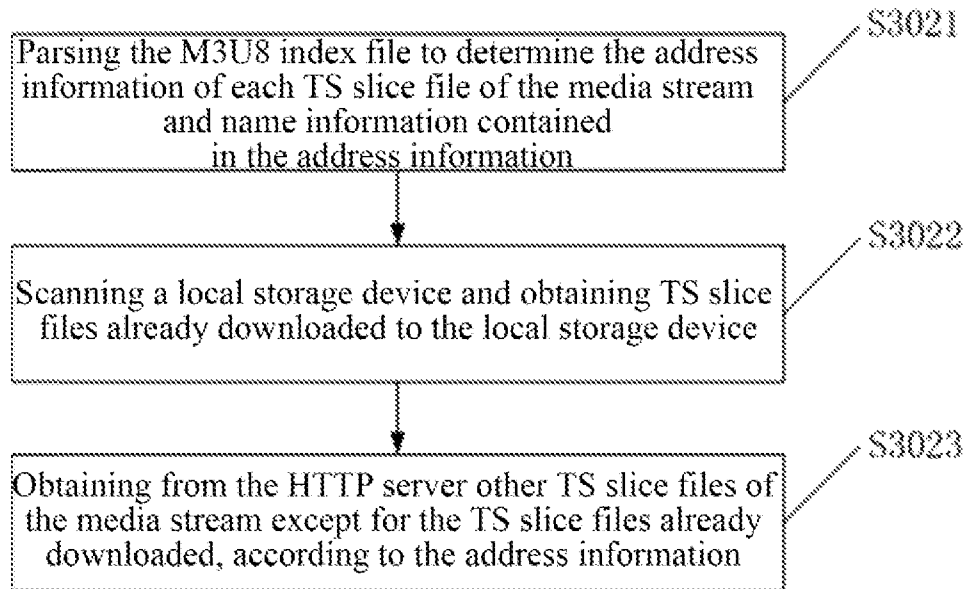


FIG.4

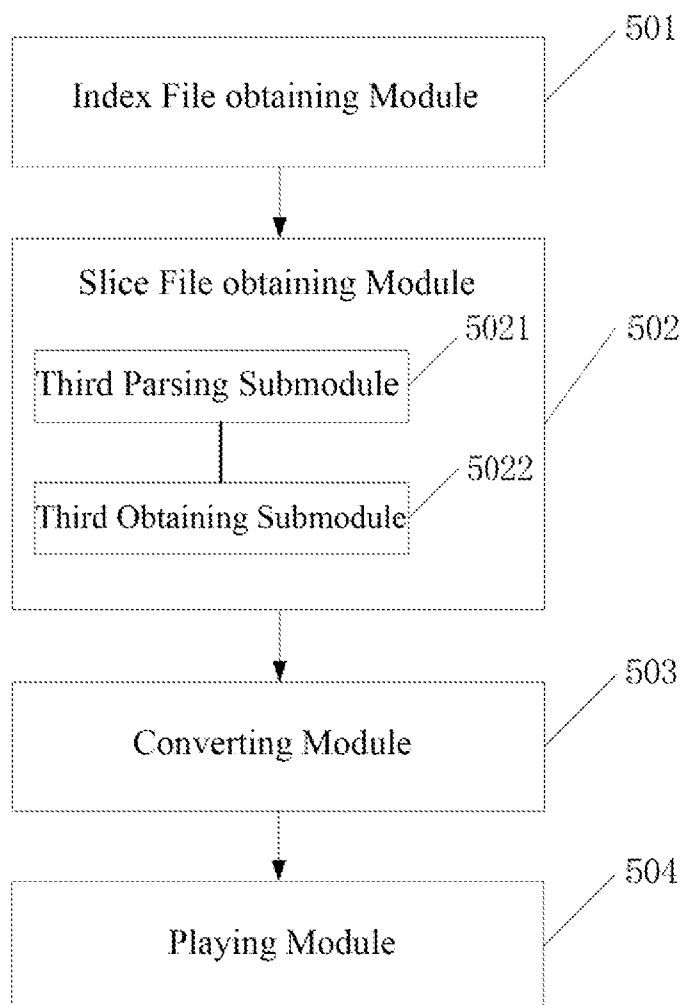


FIG.5

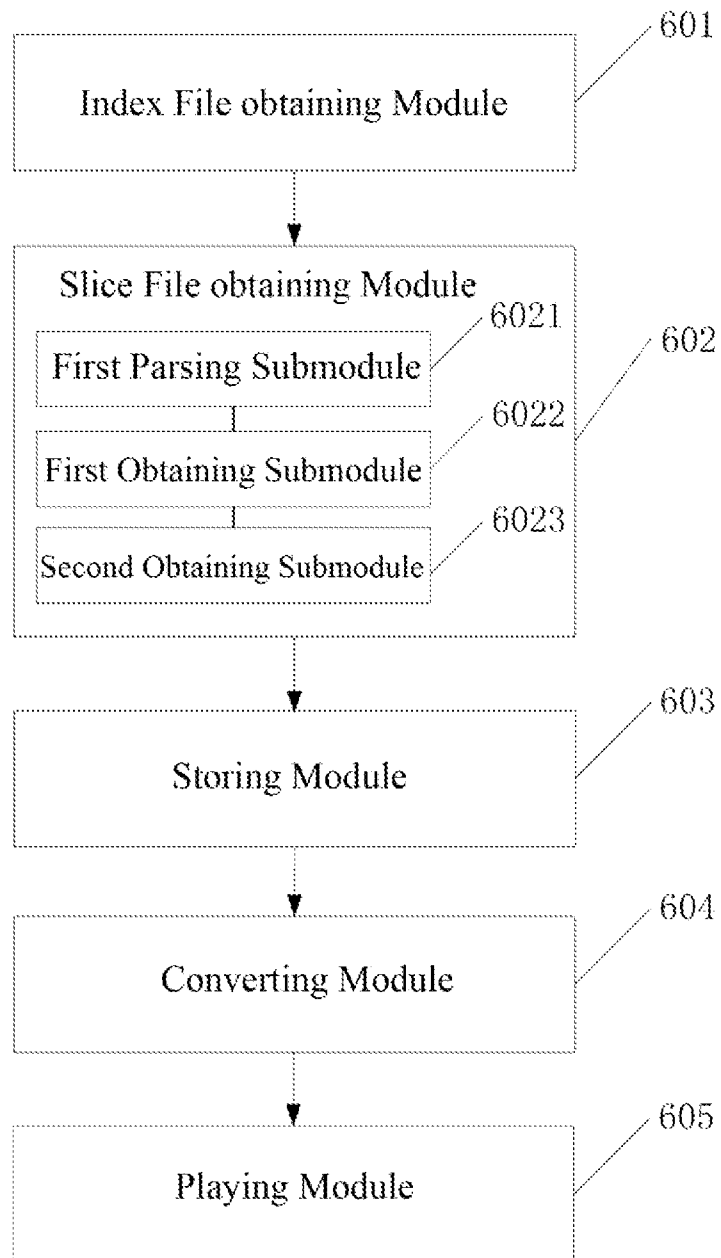


FIG.6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2014/073604

A. CLASSIFICATION OF SUBJECT MATTER

H04L 29/06 (2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04L 29/-

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT,CNKI,WPI,EPODOC:stream+,index,slice,combin+, time,address, m3u8, ts, hls, flash, flv, play+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 102957672A (CHINA TELECOM CORPORATION LTD.) 06 March 2013 (2013-03-06) claims 1, 3 and 4	1-17
Y	CN 103078847A (SHENZHEN LONGSHI MEDIA CO., LTD.) 01 May 2013 (2013-05-01) claims 1-4	1-17
A	CN 103024528A (HANGZHOU PUHE COMMUNICATION TECHNOLOGY CO., LTD.) 03 April 2013 (2013-04-03) the whole document	1-17
A	CN 101917388A (EWAUTO BEIJING VIDEO TECHNOLOGY CO., LTD.) 15 December 2010 (2010-12-15) the whole document	1-17
A	CN 102624752A (TVMINING MEDIA TECHNOLOGY LTD.) 01 August 2012 (2012-08-01) the whole document	1-17
A	CN 102378043A (SHENZHEN XIWEIZHI TECHNOLOGY CO., LTD.) 14 March 2012 (2012-03-14) the whole document	1-17

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance	“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
“E” earlier application or patent but published on or after the international filing date	“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
“O” document referring to an oral disclosure, use, exhibition or other means	“&” document member of the same patent family
“P” document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

16 May 2014

Date of mailing of the international search report

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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/CN2014/073604

Patent document cited in search report		Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN	102957672A	06 March 2013	None	
CN	103078847A	01 May 2013	None	
CN	103024528A	03 April 2013	None	
CN	101917388A	15 December 2010	None	
CN	102624752A	01 August 2012	None	
CN	102378043A	14 March 2012	None	