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Lin

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(54) **SET TOP BOX ADDRESS DETECTION SYSTEM AND METHOD THEREOF**

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H04L 12/28 (2006.01)
H04L 12/56 (2006.01)

(52) **U.S. Cl.** **370/392**; 370/216; 370/248; 370/254

(58) **Field of Classification Search** 370/392; 725/25; 726/4; 709/245, 250, 203, 208, 709/209, 222, 221, 211
See application file for complete search history.

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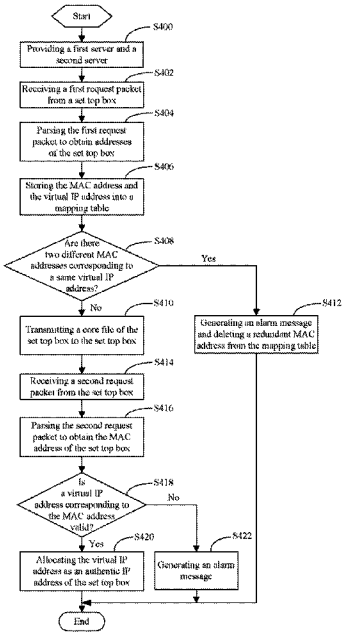
(57) **ABSTRACT**

An address detection system for detecting an address of a set top box is provided; the address detection system includes a first server and a second server. The first server includes a first parsing module and a storage module. The first parsing module parses a first request packet from the set top box, to obtain a media access control (MAC) address and a virtual Internet protocol address (IP) of the set top box. The storage module has a mapping table for storing the MAC address and the virtual IP address therein. The second server includes a second parsing module and an authenticating module. The second parsing module parses a second request packet from the set top box, to acquire the MAC address of the set top box. The authenticating module checks the mapping table for the virtual IP address corresponding to the MAC address, to authenticate validity of the virtual IP address. An address detection method is also provided.

18 Claims, 5 Drawing Sheets



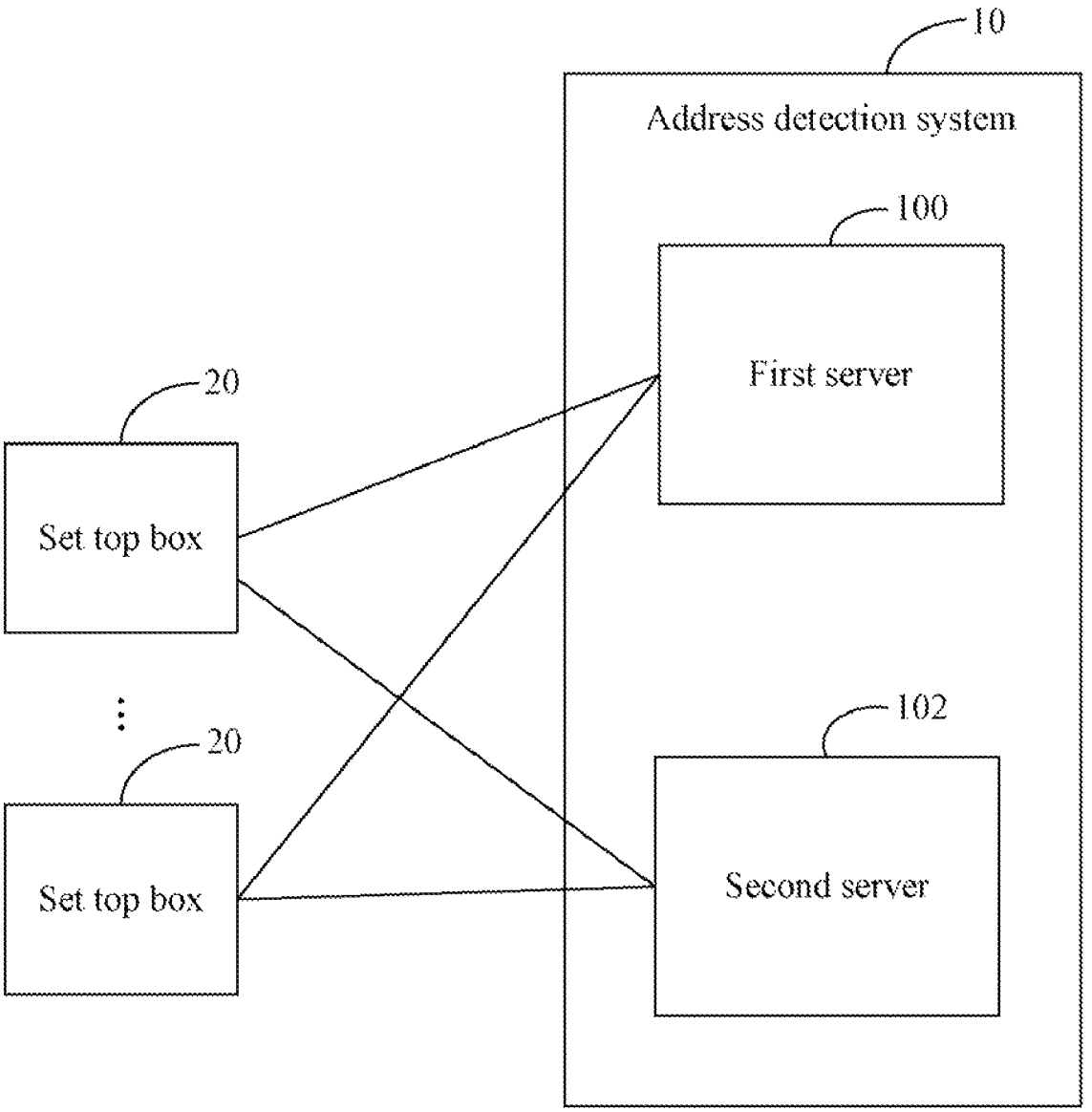

10
Address detection system
100
First server
20
Set top box
20
Set top box
102
Second server

Fig. 1

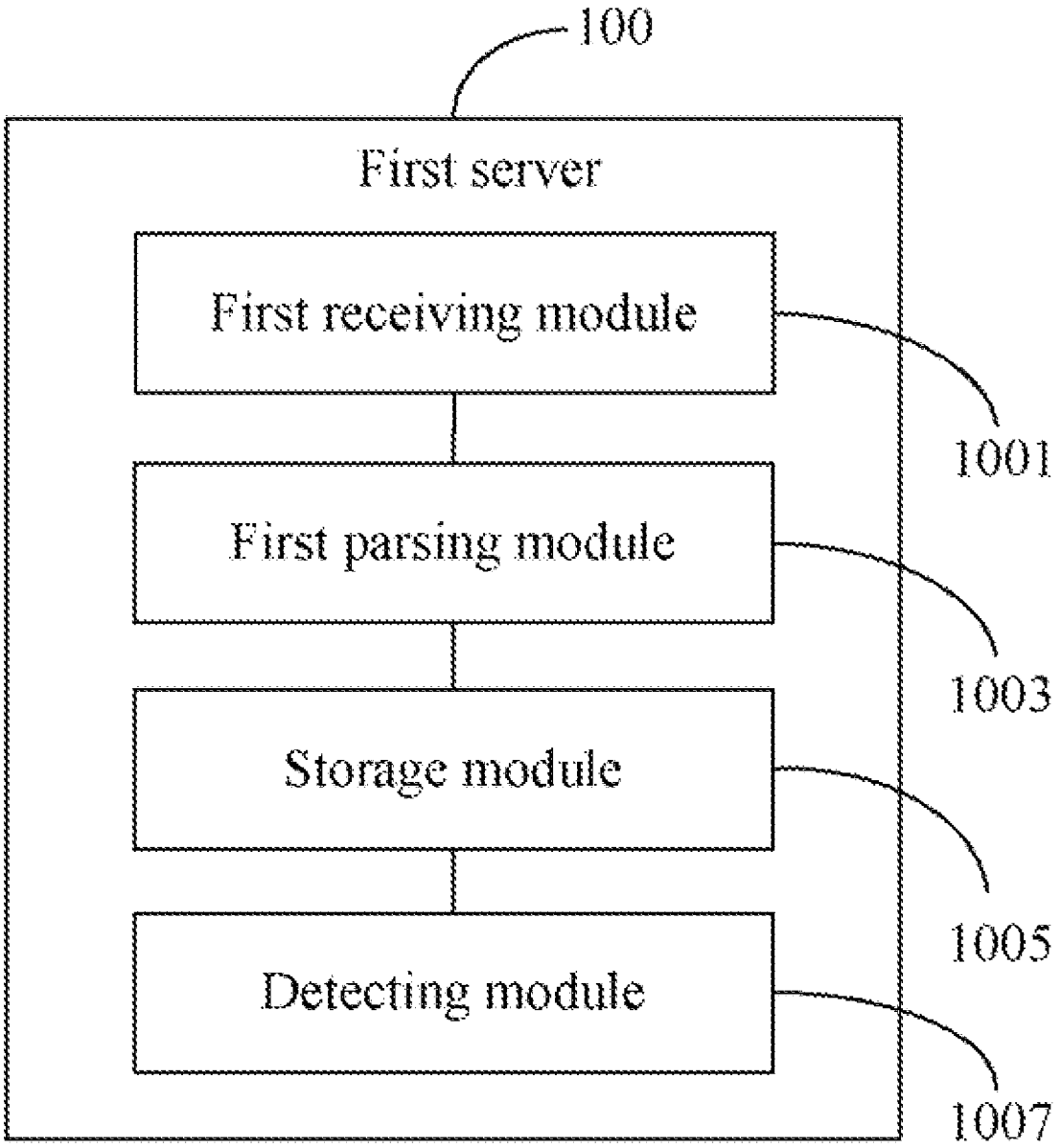

100
First server
First receiving module
1001
First parsing module
1003
Storage module
1005
Detecting module
1007

Fig. 2

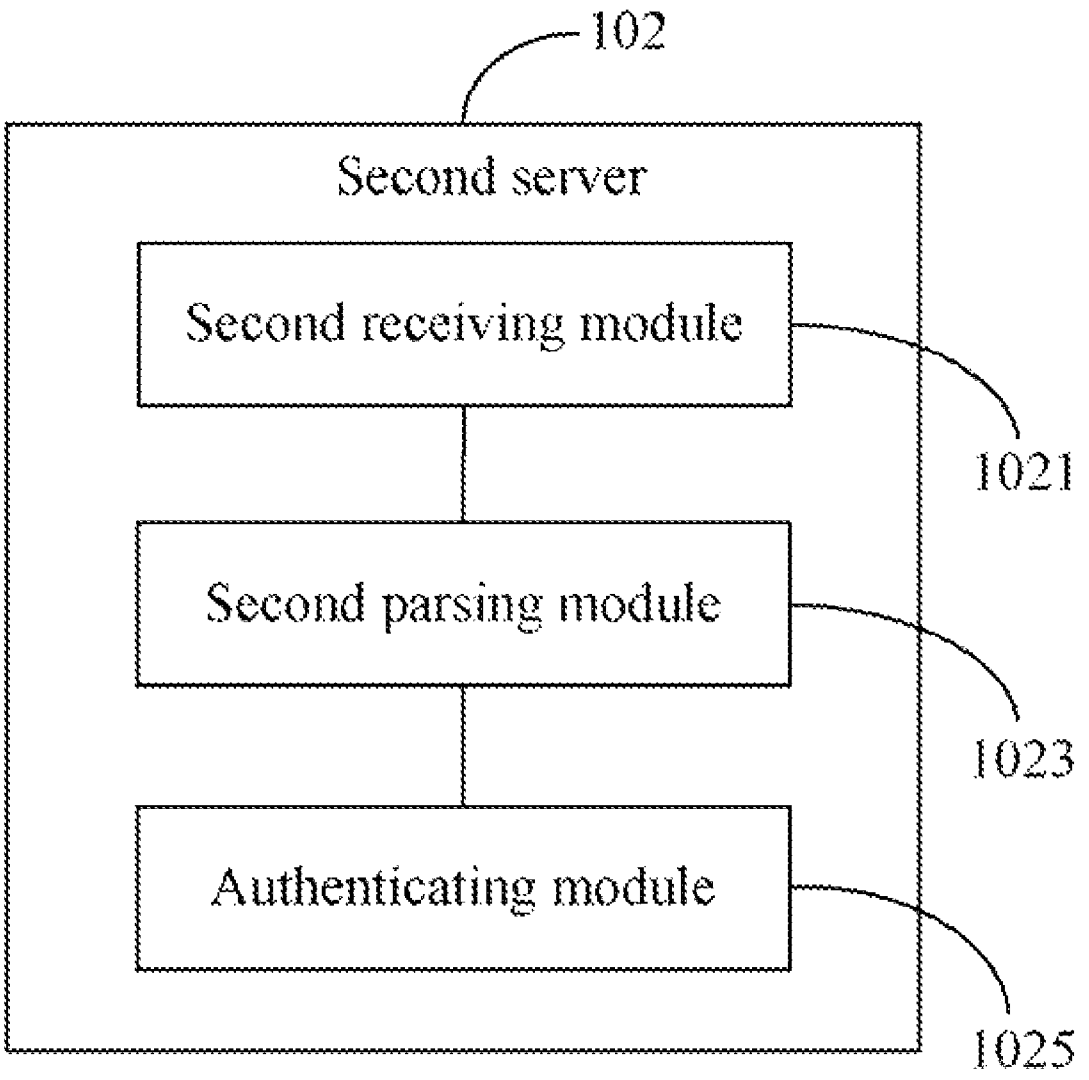

102
Second server
Second receiving module
1021
Second parsing module
1023
Authenticating module
1025

Fig. 3

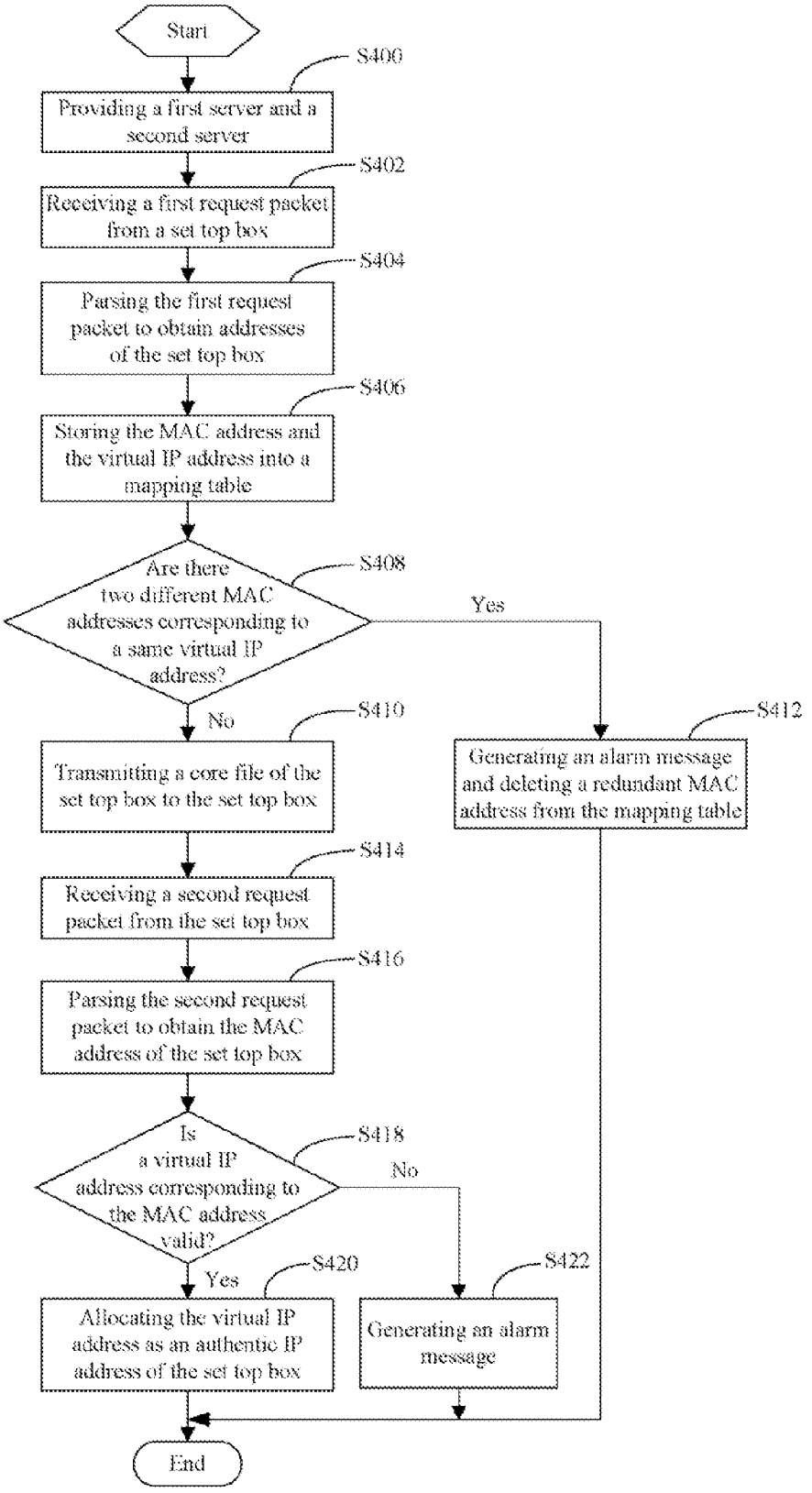

Start
S400
Providing a first server and a second server
S402
Receiving a first request packet from a set top box
S404
Parsing the first request packet to obtain addresses of the set top box
S406
Storing the MAC address and the virtual IP address into a mapping table
S408
Are there two different MAC addresses corresponding to a same virtual IP address?
Yes
No
S410
Transmitting a core file of the set top box to the set top box
S412
Generating an alarm message and deleting a redundant MAC address from the mapping table
S414
Receiving a second request packet from the set top box
S416
Parsing the second request packet to obtain the MAC address of the set top box
S418
Is a virtual IP address corresponding to the MAC address valid?
No
Yes
S420
Allocating the virtual IP address as an authentic IP address of the set top box
S422
Generating an alarm message
End

Fig. 4

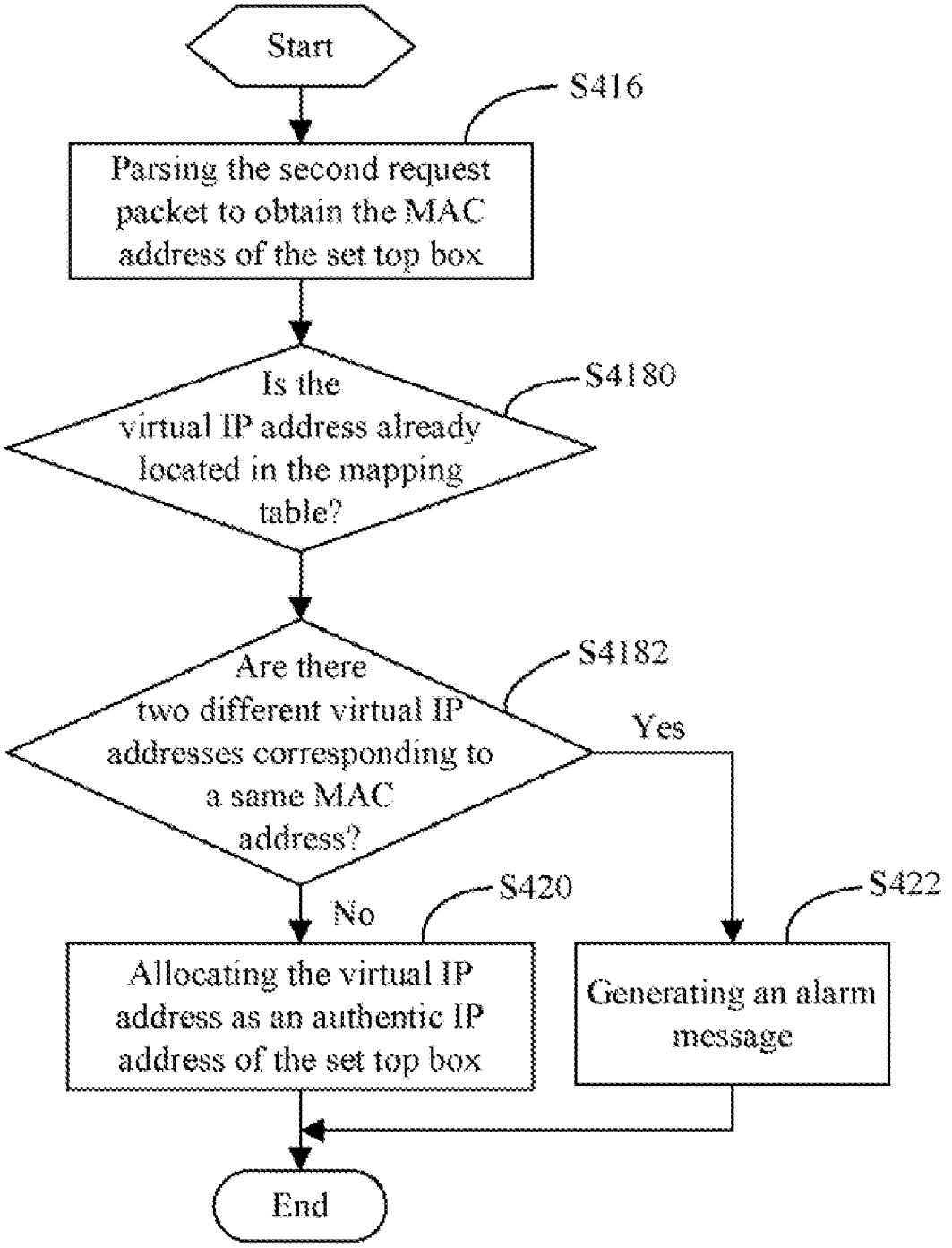

Start
S416
Parsing the second request packet to obtain the MAC address of the set top box
S4180
Is the virtual IP address already located in the mapping table?
S4182
Are there two different virtual IP addresses corresponding to a same MAC address?
Yes
No
S420
Allocating the virtual IP address as an authentic IP address of the set top box
S422
Generating an alarm message
End

Fig. 5

SET TOP BOX ADDRESS DETECTION SYSTEM AND METHOD THEREOF

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention generally relates to an address detection system and method thereof, and particularly to a set top box address detection system and method thereof.

2. Description of Related Art

During production of a set top box (STB), a kernel has to be downloaded from a remote trivial file transfer protocol (TFTP) server to the STB, and some root system files have to be to mounted from a network file system (NFS) to the STB before the STB is started. The TFTP server transmits the kernel to the STB according to a virtual Internet protocol (IP) address preset during production of the STB. Prior to receiving the root system files, the STB first requests a remote dynamic host configuration protocol (DHCP) server to allocate an authentic IP address, and then the NFS transmits the root system files according to the authentic IP address.

However, in a typical product line composed of a plurality of STBs, virtual IP addresses of some of the STBs may inevitably be the same as authentic IP addresses of other STBs allocated by the DHCP server, thus, an address conflict occurs, and some of the STBs may malfunction without correctly receiving the root system files.

Therefore, a heretofore unaddressed need exists in the industry to overcome the aforementioned deficiencies and inadequacies.

SUMMARY OF THE INVENTION

An address detection system for detecting an address of a set top box is provided, the address detection system includes a first server and a second server. The first server includes a first parsing module and a storage module. The first parsing module parses a first request packet from the set top box, to obtain a media access control (MAC) address and an IP address of the set top box. The storage module has a mapping table for storing the MAC address and the virtual IP address therein. The second server includes a second parsing module and an authenticating module. The second parsing module parses a second request packet from the set top box, to acquire the MAC address of the set top box. The authenticating module checks the mapping table for the virtual IP address corresponding to the MAC address, to authenticate validity of the virtual IP address.

An address detection method for detecting an address of a set top box, comprising: providing a first server and a second server, the first server comprising a first parsing module and a storage module, and the second server comprising a second parsing module and an authenticating module; parsing a first request packet from the set top box by the first parsing module, to acquire a MAC address and a virtual IP address of the set top box; storing the MAC address and the virtual IP address in a mapping table; parsing the second request packet, to obtain the MAC address of the set top box; checking the mapping table for the virtual IP address of the set top box according to the MAC address thereof, to authenticate validity of the virtual IP address; and allocating the virtual IP address as an authentic IP address to the set top box if the virtual IP address is valid.

Other advantages and novel features will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic diagram of an address detection system of an exemplary embodiment of the invention;

FIG. **2** is a block diagram of a first server;

FIG. **3** is a block diagram of a second server;

FIG. **4** is a flowchart of an address detection method of another embodiment of the invention; and

FIG. **5** is a detailed flowchart of step S**418** in FIG. **4**.

DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** is a schematic diagram of an address detection system **10** of an exemplary embodiment of the invention.

The address detection system **10** detects addresses of a plurality of set top boxes **20**, and includes a first server **100** and a second server **102**. In this embodiment, the first server **100** is a trivial file transfer protocol (TFTP) server, the second server **102** is a dynamic host configuration protocol (DHCP) server, and addresses of the set top box **20** include a media access control (MAC) address and a virtual Internet protocol (IP) address thereof.

FIG. **2** is a block diagram of the first sever **100**.

The first server **100** includes a first receiving module **1001**, a first parsing module **1003**, a storage module **1005** and a detecting module **1007**.

The first receiving module **1001** receives a first request packet from the set top box **20**. In this embodiment, the first request packet is a DHCP request packet.

The first parsing module **1003** parses the first request packet, to obtain the MAC address and the virtual IP address of the set top box **20**. In this embodiment, the virtual IP address is preset during manufacture of the set top box **20**, and is unique to the MAC address thereof.

The storage module **1005** has a mapping table for storing the MAC address and the virtual IP address of the set top box **20** therein. As can be seen from the mapping table "Table 1" below, a virtual IP address of 168.84.59.1 is unique to a MAC address of 5E-AB-BF-68-EC-4A, a virtual IP address of 168.84.59.2 is unique to a MAC address of 5E-AB-BF-68-EC-4B, and so on.

TABLE 1

Virtual IP address	MAC address
168.84.59.1	5E-AB-BF-68-EC-4A
168.84.59.2	5E-AB-BF-68-EC-4B
168.84.59.3	5E-AB-BF-68-EC-4C
...	...

The storage module **1005** further stores a core file of the set top box **20**. In this embodiment, the core file is kernel software.

The detecting module **1007** detects whether there are two different MAC addresses corresponding to a same virtual IP address.

The detecting module **1007** further generates an alarm message if there are two different MAC addresses corresponding to a same virtual IP address, and deletes a redundant MAC address from the mapping table.

FIG. **3** is a block diagram of the second server **102**.

The second server **102** includes a second receiving module **1021**, a second parsing module **1023** and an authenticating module **1025**.

The second receiving module **1021** receives a second request packet from the set top box **20**. In this embodiment, the second request packet is a TFTP request packet.

The second parsing module **1023** parses the second request packet, to obtain the MAC address of the set top box **20**.

The authenticating module **1025** checks the mapping table for the virtual IP address corresponding to the MAC address, to authenticate validity of the virtual IP address, and allocates the virtual IP address as an authentic IP address to the set top box **20** if the virtual IP address is valid.

In detail, the authenticating module **1025** first checks the mapping table for the virtual IP address of the set top box **20** according to the MAC address thereof, and determines whether the virtual IP address is already listed in the mapping table. If the virtual IP address of the set top box **20** is not listed in the mapping table, the authenticating module **1025** generates an alarm message, otherwise the authenticating module **1025** checks to determine whether there are two IP addresses corresponding to the MAC address. If there are two IP addresses corresponding to the MAC address, the authenticating module **1025** generates an alarm message, otherwise the authenticating module **1025** allocates the virtual IP address as an authentic IP address to the set top box **20**.

FIG. **4** is a flowchart of an address detection method of another embodiment of the invention.

In step S**400**, a first server **100** and a second server **102** are provided. The first server **100** includes a first receiving module **1001**, a first parsing module **1003**, a storage module **1005** and a detecting module **1007**. The second server **102** includes a second receiving module **1021**, a second parsing module **1023** and an authenticating module **1025**. In this embodiment, the first server **100** is a trivial file transfer protocol (TFTP) server, and the second server **102** is a dynamic host configuration protocol (DHCP) server.

In step S**402**, the first receiving module **1001** receives a first request packet from a set top box **20**. In this embodiment, the first request packet is a TFTP request packet.

In step S**404**, the first parsing module **1003** parses the first request packet, to obtain addresses of the set top box **20**. In this embodiment, the addresses include a media access control (MAC) address and a virtual Internet protocol (IP) address.

In step S**406**, the storage module **1005** stores the MAC address and the virtual IP address in a mapping table therein.

In step S**408**, the detecting module **1007** checks the mapping table, to detect whether there are two different MAC addresses corresponding to a same virtual IP address. If there are two different MAC addresses corresponding to a same virtual IP address, the process proceeds to step S**412**, otherwise the process proceeds to step S**410**.

In step S**410**, the detecting module **1007** transmits a core file for the set top box **20** to the set top box **20**.

In step S**412**, the detecting module **1007** generates an alarm message, and deletes a redundant MAC address from the mapping table.

In step S**414**, the second receiving module **1021** receives a second request packet from the set top box. In this embodiment, the second request packet is a DHCP request packet.

In step S**416**, the second parsing module **1023** parses the second request packet, to obtain the MAC address of the set top box **20**.

In step S**418**, the authenticating module **1025** checks the mapping table for the virtual IP address corresponding to the MAC address, to authenticate validity of the virtual IP address. If the virtual IP address is valid, the process proceeds to step S**420**, otherwise the process proceeds to step S**422**.

In step S**420**, the authenticating module **1025** allocates the virtual IP address as an authentic IP address of the set top box **20**.

In step S**422**, the authenticating module **1025** generates an alarm message.

FIG. **5** is a detailed flowchart of step S**418**.

In step S**4180**, the authenticating module **1025** checks the mapping table, to determine whether the virtual IP address is already located therein. IF the virtual IP address is not located in the mapping table, the process proceeds to step S**4182**, otherwise the process proceeds to step S**422**.

In step S**4182**, the authenticating module **1025** checks the mapping table, to determine whether there are two IP addresses corresponding to the same MAC address. If there are two IP addresses corresponding to the same MAC address, the process proceeds to step S**422**, otherwise the process proceeds to step S**420**.

It is believed that the present embodiments and their advantages will be understood from the foregoing description, and it will be apparent that various changes may be made thereto without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the examples hereinbefore described merely being preferred or exemplary embodiments.

What is claimed is:

1. An address detection system for detecting an address of a set top box, comprising:

a first server, comprising:

a first parsing module for parsing a first request packet from the set top box, to obtain a media access control (MAC) address and a virtual Internet protocol (IP) address of the set top box; and

a storage module having a mapping table, for storing the MAC address and the virtual IP address therein; and

a second server, comprising:

a second parsing module for parsing a second request packet from the set top box, to acquire the MAC address of the set top box; and

an authenticating module for checking the mapping table for the virtual IP address corresponding to the MAC address, to authenticate validity of the virtual IP address.

2. The address detection system in accordance with claim **1**, wherein the authenticating module is further for allocating the virtual IP address as an authentic IP address of the set top box if the virtual IP address is valid.

3. The address detection system in accordance with claim **1**, wherein the first server further comprises a detecting module for checking the mapping table, to determine whether there are two different MAC addresses corresponding to a same virtual IP address.

4. The address detection system in accordance with claim **3**, wherein the detecting module is further for generating an alarm message and deleting a redundant MAC address from the mapping table if there are the two different MAC addresses corresponding to a same virtual IP address.

5. The address detection system in accordance with claim **1**, wherein the storage module is further for storing kernel software of the set top box.

6. The address detection system in accordance with claim **1**, wherein the first server further comprises a first receiving module for receiving the first request packet from the set top box.

7. The address detection system in accordance with claim **6**, wherein the first server is a trivial file transfer protocol server.

8. The address detection system in accordance with claim **7**, wherein the first request packet is a trivial file transfer protocol packet.

9. The address detection system in accordance with claim 1, wherein the second server further comprises a second receiving module for receiving the second request packet from the set top box.

10. The address detection system in accordance with claim 9, wherein the second server is a dynamic host configuration protocol server.

11. The address detection system in accordance with claim 10, wherein the second request packet is a dynamic host configuration protocol packet.

12. An address detection method for detecting an address of a set top box, comprising:

providing a first server and a second server, the first server comprising a first parsing module and a storage module, and the second server comprising a second parsing module and an authenticating module;

parsing a first request packet from the set top box by the first parsing module, to acquire a media access control (MAC) address and a virtual Internet protocol (IP) address of the set top box;

storing the MAC address and the virtual IP address in a mapping table;

parsing a second request packet, to obtain the MAC address of the set top box;

checking the mapping table for the virtual IP address of the set top box according to the MAC address thereof, to authenticate validity of the virtual IP address; and

allocating the virtual IP address as an authentic IP address of the set top box if the virtual IP address is valid.

13. The address detection method in accordance with claim 12, further comprising generating an alarm message if the virtual IP address is invalid.

14. The address detection method in accordance with claim 12, wherein the step of checking the mapping table for the virtual IP address of the set top box according to the MAC address thereof, to authenticate validity of the virtual IP address comprises checking the mapping table, to determine whether the virtual IP address is already located therein.

15. The address detection method in accordance with claim 14, wherein the step of checking the mapping table for the virtual IP address of the set top box according to the MAC address thereof, to authenticate validity of the virtual IP address further comprises generating an alarm message if the virtual IP address is already in the mapping table.

16. The address detection method in accordance with claim 15, wherein the step of checking the mapping table for the virtual IP address of the set top box according to the MAC address thereof, to authenticate validity of the virtual IP address further comprising checking the mapping table, to determine whether there are two IP addresses corresponding to the MAC address.

17. The address detection method in according with claim 16, wherein the step of checking the mapping table for the virtual IP address of the set top box according to the MAC address thereof, to authenticate validity of the virtual IP address further comprises generating the alarm message if there are the two IP address corresponding to the MAC address.

18. The address detection method in according with claim 12, further comprising:

providing a detecting module in the first server;

checking the mapping table by the detecting module, to determine whether there are two different MAC addresses corresponding to a same virtual IP address; and

transmitting kernel software of the set top box to the set top box if there are not two different MAC addresses corresponding to the same virtual IP address.

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