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(54) **METHOD FOR DETECTING A POSSIBILITY OF AN UNAUTHORIZED TRANSMISSION OF A SPECIFIC DATUM**

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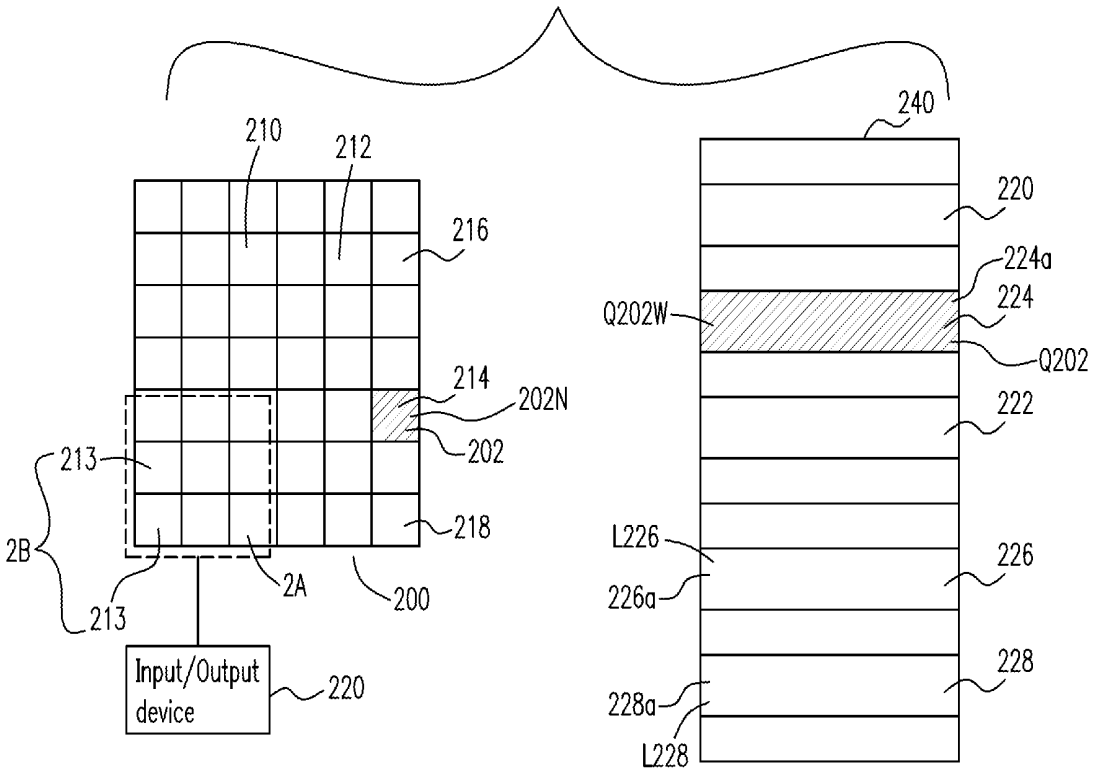
(57) **ABSTRACT**

A tracing device for detecting whether a specific attribute datum has a possibility of being stolen is provided. The tracing device includes a label map and a first processing device, wherein the label map has a specific label attached on the specific attribute datum and a buffer region, and the first processing device is coupled to the label map and determines whether there is the specific label in the buffer region.



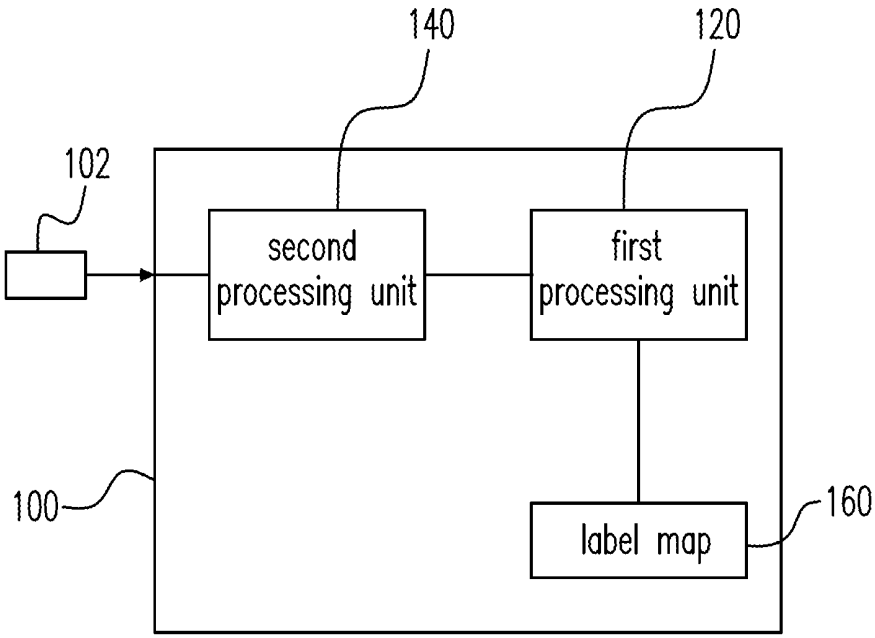

140
120
102
second processing unit
first processing unit
100
label map
160

Fig. 1

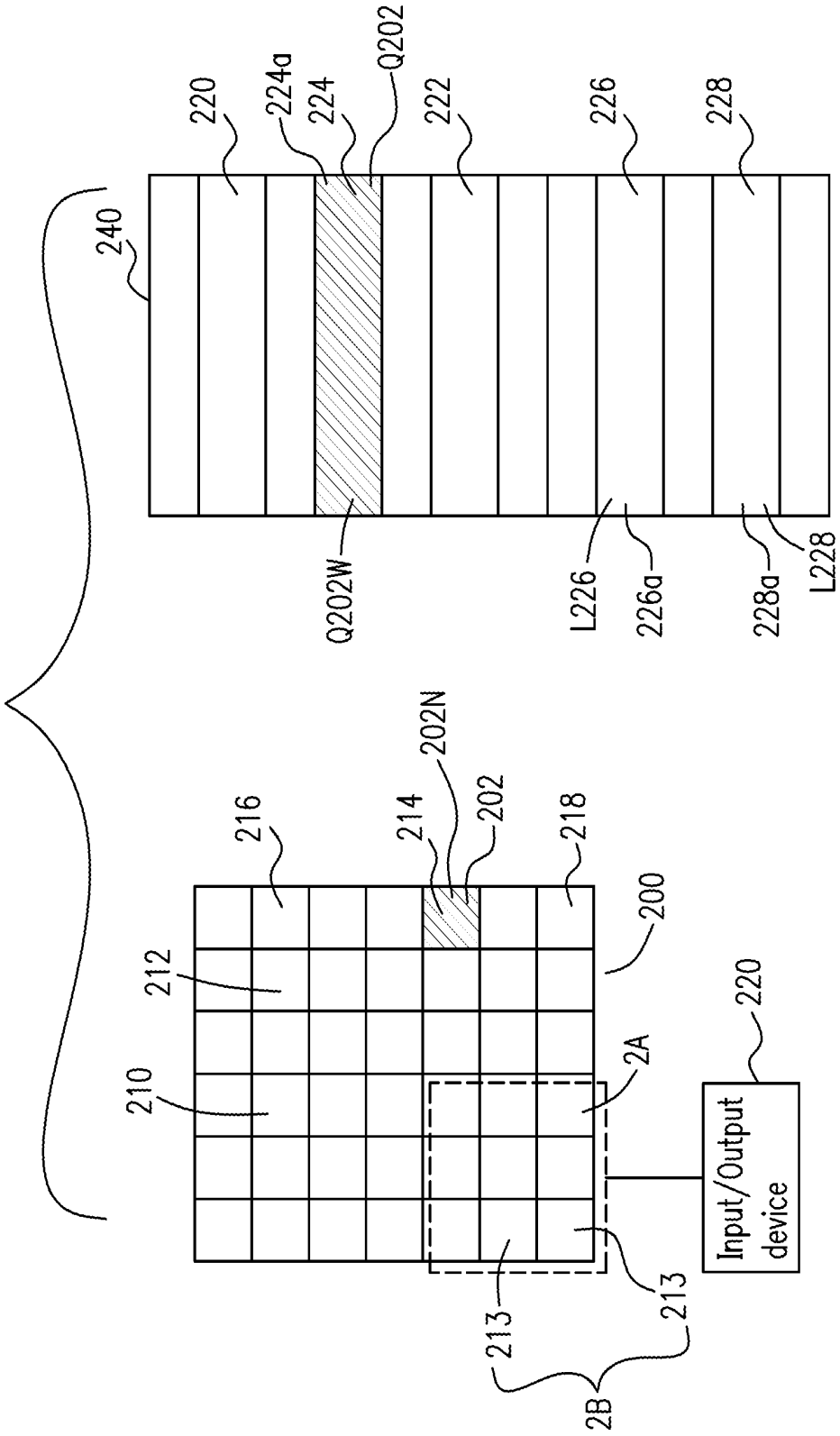

240
220
224a
224
Q202
222
226
228
Q202W
L226
226a
228a
L228
216
214
202N
202
218
200
212
210
2A
220
Input/Output device
213
213
2B

Fig. 2(a)

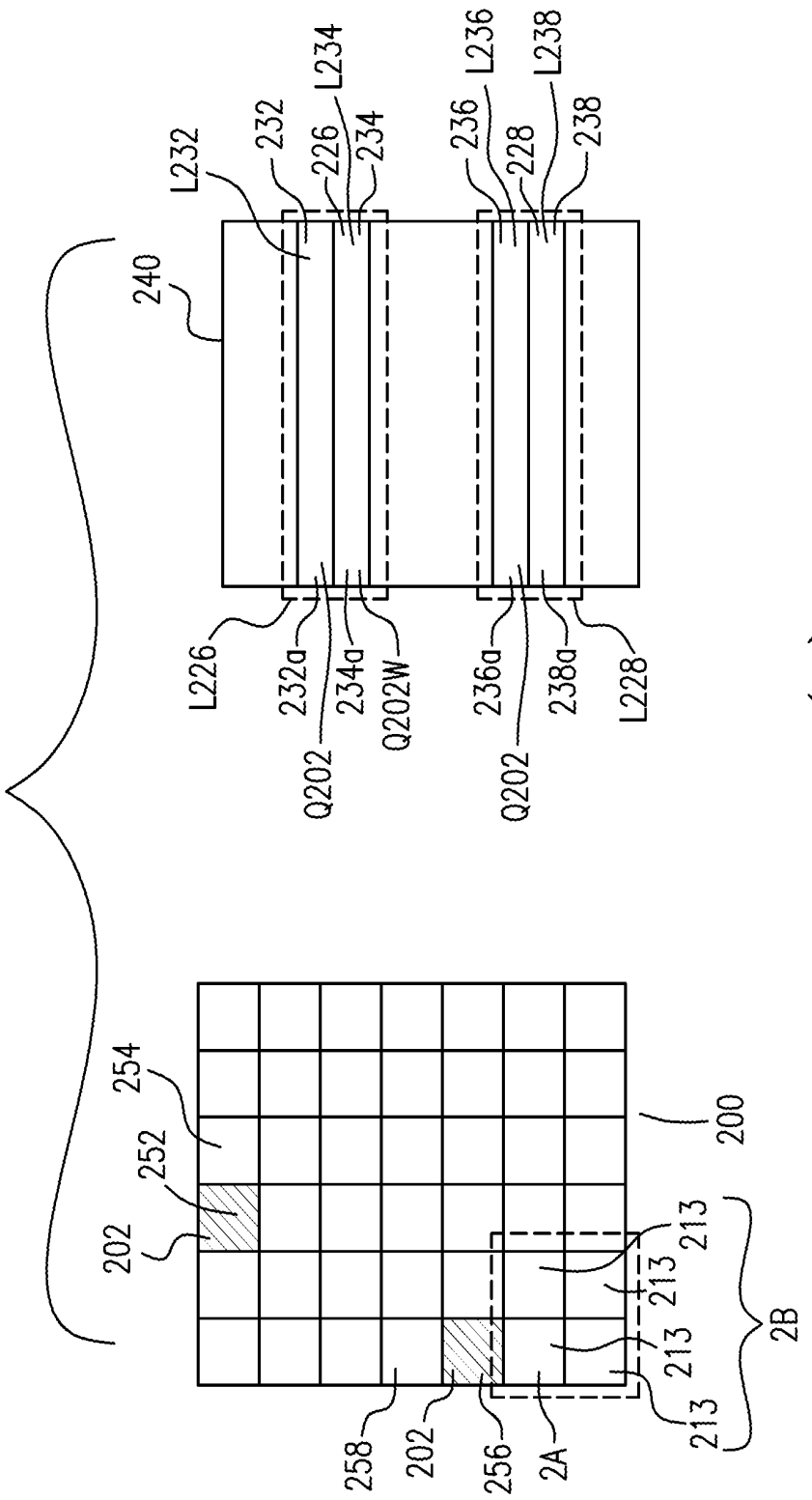

L232
232
L234
226
234
L236
236
228
L238
238
240
L226
232a
Q202
234a
Q202W
236a
Q202
238a
L228
254
252
202
200
213
213
213
213
2B
258
202
256
2A

Fig. 2(b)

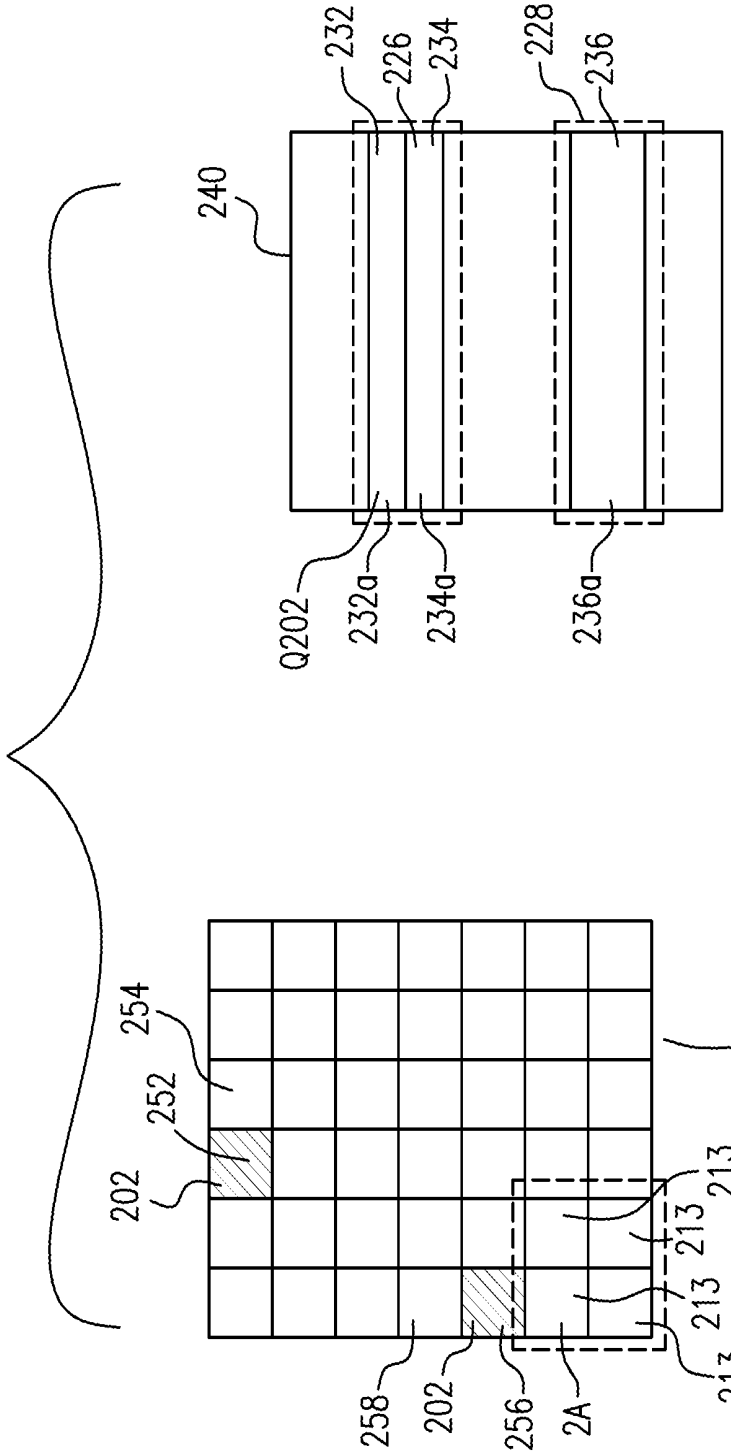

232
226
234
228
236
240
Q202
232a
234a
236a
254
252
202
200
213
213
213
213
2B
258
202
256
2A

Fig. 2(c)

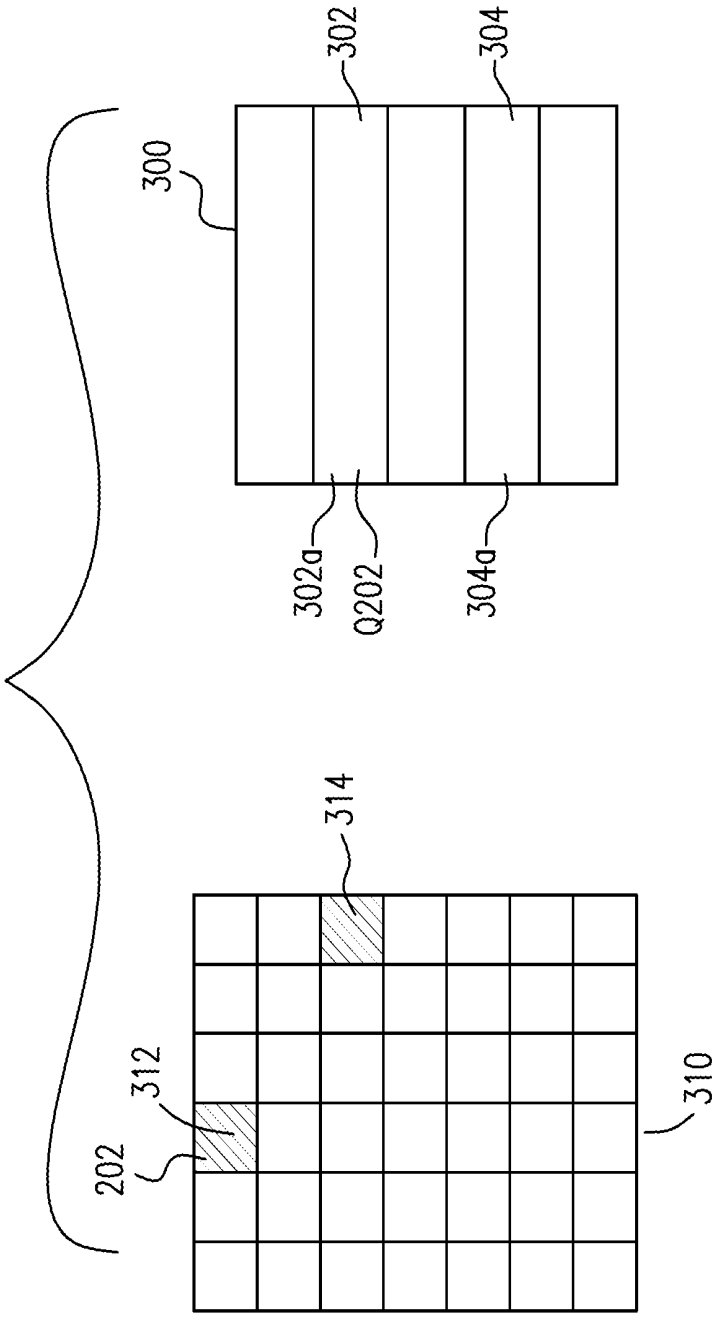


Fig. 3

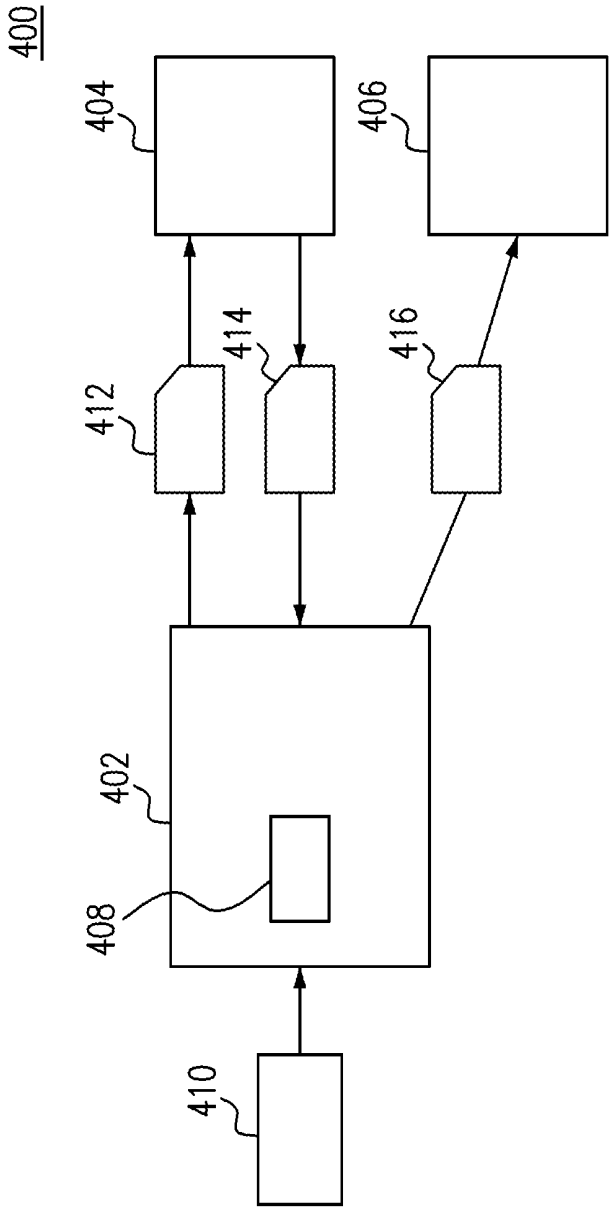


Fig. 4

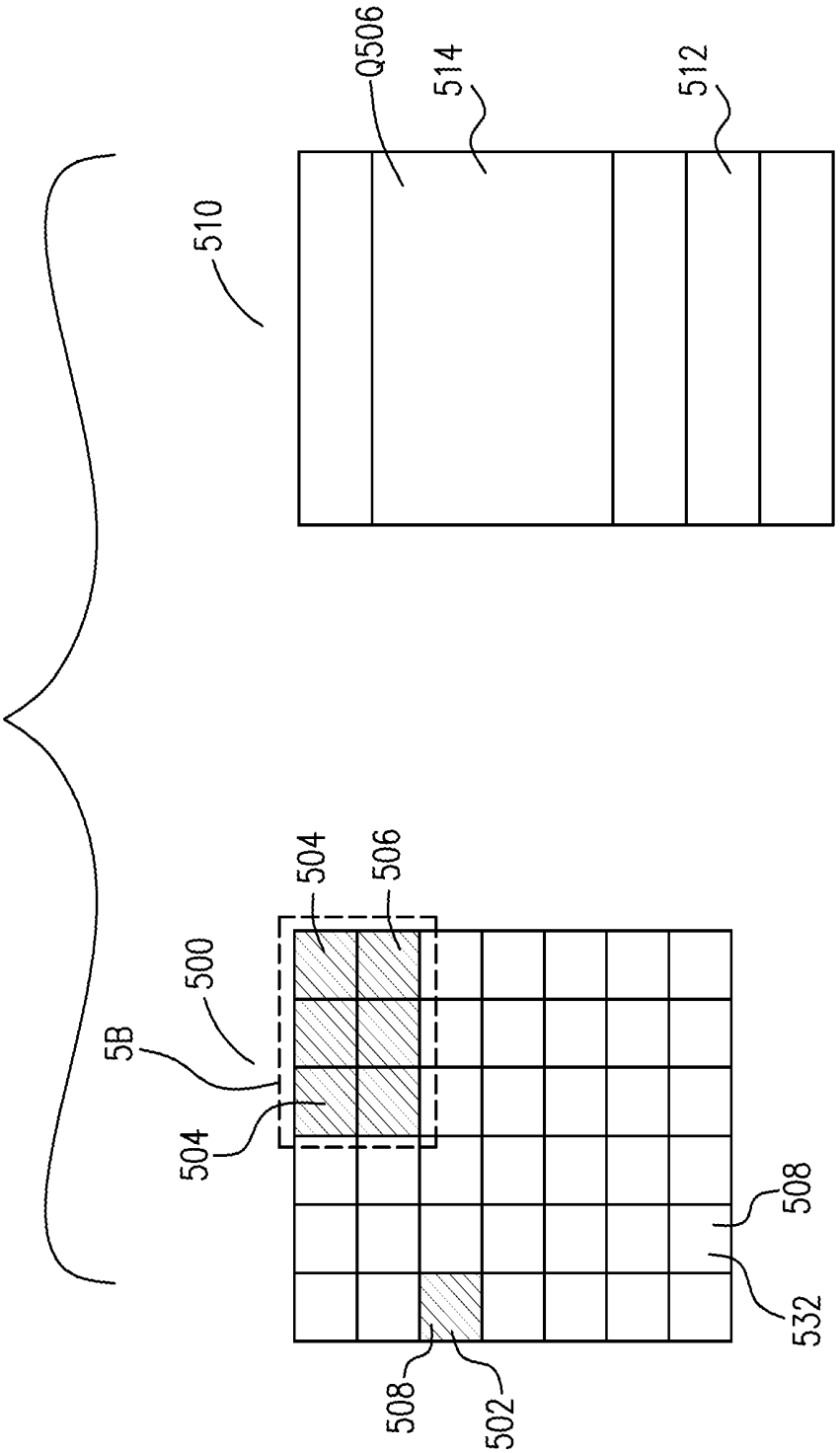


Fig. 5

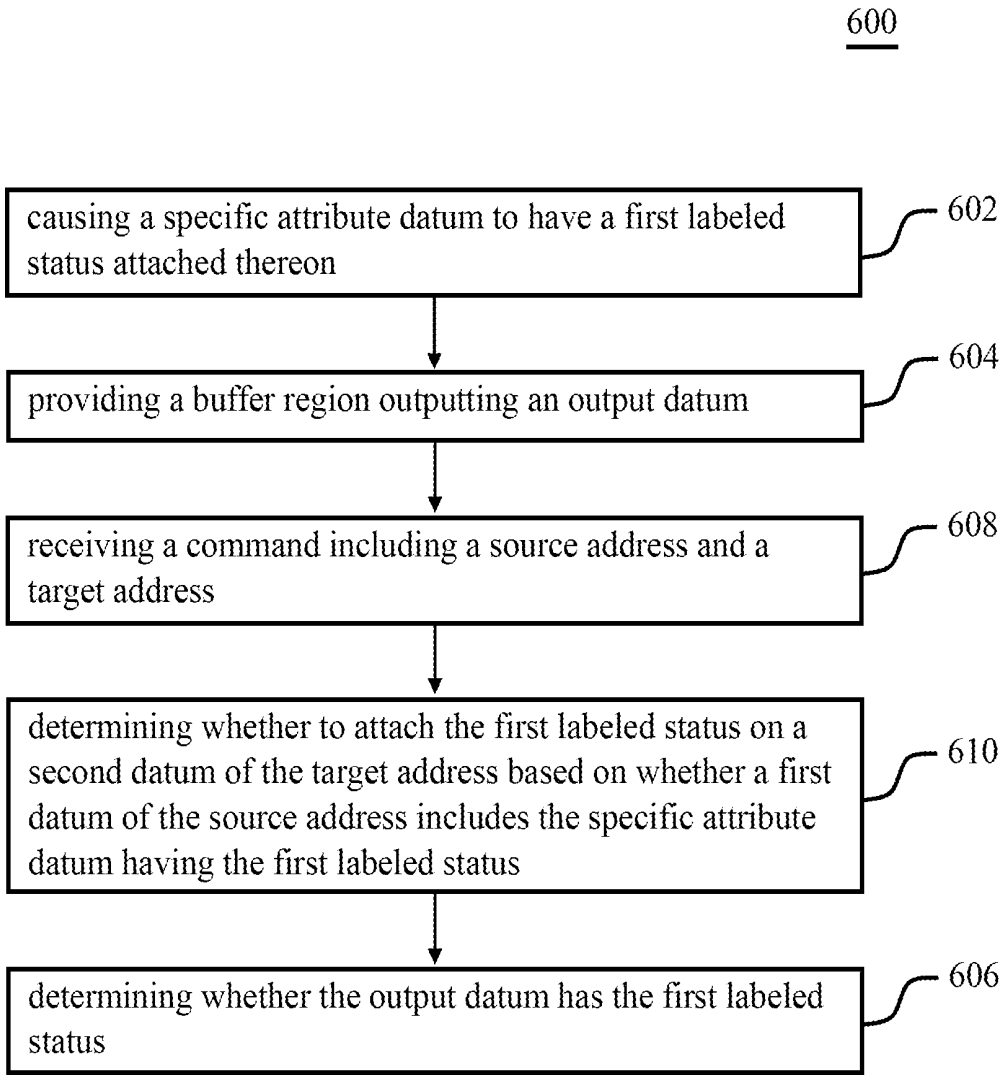

600
causing a specific attribute datum to have a first labeled status attached thereon
602
providing a buffer region outputting an output datum
604
receiving a command including a source address and a target address
608
determining whether to attach the first labeled status on a second datum of the target address based on whether a first datum of the source address includes the specific attribute datum having the first labeled status
610
determining whether the output datum has the first labeled status
606

Fig. 6

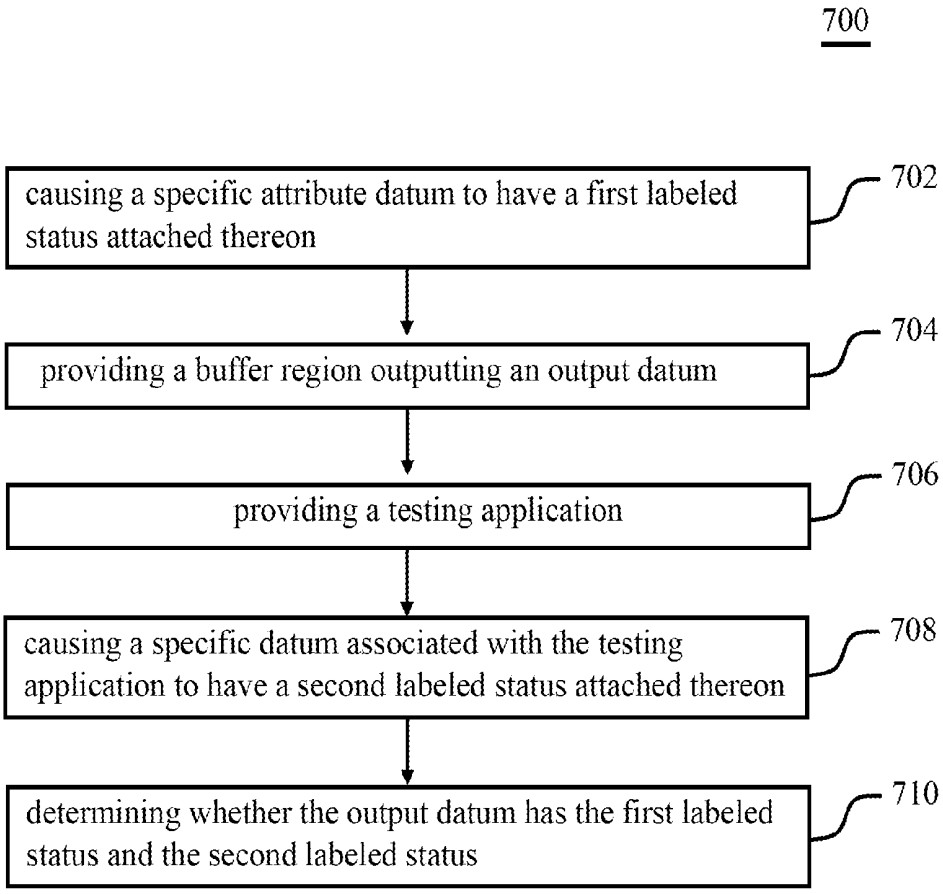

700
causing a specific attribute datum to have a first labeled status attached thereon
702
providing a buffer region outputting an output datum
704
providing a testing application
706
causing a specific datum associated with the testing application to have a second labeled status attached thereon
708
determining whether the output datum has the first labeled status and the second labeled status
710

Fig. 7

METHOD FOR DETECTING A POSSIBILITY OF AN UNAUTHORIZED TRANSMISSION OF A SPECIFIC DATUM

CROSS REFERENCE TO RELATED APPLICATION

[0001] The application claims the benefit of the Taiwan Patent Application No. 101135433, filed on Sep. 26, 2012, in the Taiwan Intellectual Property Office, the disclosures of which are incorporated herein in their entirety by reference.

FIELD OF INVENTION

[0002] The present invention relates to a method for detecting whether a datum has a possibility of being stolen, and more particularly to a method for detecting whether a specific attribute datum has a possibility of being stolen.

BACKGROUND

[0003] As the technology progresses, the utility rate of smart phones is growing, and the suppliers develop many applications (apps) used on the smart phones. Some apps are the communication software used for chatting between friends, some are used for looking up the traffic information, and some are used for leisure, such as line, Taiwan bus pass, angry bird, etc. More and more different kinds of apps are advantageous to the smart phone user; however, the accompanying danger is that whether these apps will steal a specific attribute datum (such as a privacy datum) in the smart phone.

[0004] The conventional method for detecting whether the specific attribute datum has a possibility of being stolen adopts the technical scheme of checking whether a packet sent from the smart phone includes the specific attribute datum. However, when the information in the packet is encrypted, such method is not applicable. In this situation, if one wants to know whether there is a specific attribute datum included in the sent packet, it is necessary to track the information flow in the software so as to determine whether the specific attribute datum has a possibility of being stolen.

[0005] The US Publication No. 2009/0172644 provides a method of using multiple threads to track the software information flow. The method includes providing a main thread and a tracking thread, wherein the main thread is responsible for executing a program, and the tracking thread is responsible for tracking whether the main thread executes the program.

[0006] The U.S. Pat. No. 7,958,558 provides a computer system including a mechanism for tracking the information flow. The mechanism for tracking the information flow prevents the computer system from suffering certain forms of attack by maintaining and selectively propagating the propagating taint status of the storage locations corresponding to the information flows of the instructions executed by the computing system. In some embodiments, a decay oriented metric is applied, and once the aging reaches a predetermined decay threshold, the taint propagation is interrupted.

[0007] However, the above-mentioned two tracking information flow technical schemes are merely applicable for tracking the dynamic information flow or tainted condition of the monitoring procedure, but not applicable for tracking the information flows of the central processing unit (CPU), physical memory and hard disk.

[0008] Besides, the conventional technical scheme of detecting the information flow is merely applicable for processing the bytecode executed on the Dalvik virtual machine; however, it is not applicable for the native byte code executed on the machine level. That is to say, the conventional detecting method can be merely applied in the Dalvik virtual machine level to track the information flow and analyze whether the specific attribute datum has been stolen; however, it could not detect the information flow of the system machine level.

[0009] In order to overcome the drawbacks in the prior art, a method for detecting a possibility of an unauthorized transmission of a specific datum is provided. The particular design in the present invention not only solves the problems described above, but also is easy to be implemented. Thus, the present invention has the utility for the industry.

SUMMARY

[0010] In accordance with one aspect of the present disclosure, a tracing device for detecting whether a specific attribute datum has a possibility of being stolen is provided. The tracing device includes a label map and a first processing device, wherein the label map has a specific label attached on the specific attribute datum and a buffer region, and the first processing device is coupled to the label map and determines whether there is the specific label in the buffer region.

[0011] In accordance with another aspect of the present disclosure, a method for determining whether a specific attribute datum has a possibility of being stolen is provided. The method includes steps of causing the specific attribute datum to have a first labeled status attached thereon, providing a buffer region outputting an output datum, and determining whether the output datum has the first labeled status.

[0012] In accordance with one more aspect of the present disclosure, a method for detecting a possibility of an unauthorized transmission of a specific datum is provided. The method includes steps of attaching a labeled status on a specific datum, providing a buffer unit outputting an output datum, and determining whether there is the specific datum having the labeled status in the buffer unit.

[0013] The above objectives and advantages of the present invention will become more readily apparent to those ordinarily skilled in the art after reviewing the following detailed descriptions and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. **1** shows a device for detecting whether a specific attribute datum has a possibility of being stolen in accordance with an embodiment of the present disclosure;

[0015] FIG. **2**(*a*) illustrates a label map of the device for detecting whether a specific attribute datum has a possibility of being stolen in accordance with an embodiment of the present disclosure;

[0016] FIG. **2**(*b*) illustrates a label map of the device for detecting whether a specific attribute datum has a possibility of being stolen in accordance with another embodiment of the present disclosure;

[0017] FIG. **2**(*c*) illustrates a label map of the device for detecting whether a specific attribute datum has a possibility of being stolen in accordance with still another embodiment of the present disclosure;

[0018] FIG. **3** illustrates a diagram of tracking the information flow in accordance with an embodiment of the present disclosure;

[0019] FIG. **4** illustrates a device for detecting whether the specific attribute datum has a possibility of being stolen in accordance with another embodiment of the present disclosure;

[0020] FIG. **5** illustrates a label map of the device for detecting whether the specific attribute datum has a possibility of being stolen in accordance with an embodiment of the present disclosure;

[0021] FIG. **6** illustrates a method for detecting whether the specific attribute datum has a possibility of being stolen in accordance with an embodiment of the present disclosure; and

[0022] FIG. **7** illustrates a method for detecting whether the specific attribute datum has a possibility of being stolen in accordance with another embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0023] The present invention will now be described more specifically with reference to the following embodiments. It is to be noted that the following descriptions of preferred embodiments of this invention are presented herein for the purposes of illustration and description only; it is not intended to be exhaustive or to be limited to the precise form disclosed.

[0024] FIG. **1** shows a device **100** for detecting whether a specific attribute datum has a possibility of being stolen in accordance with an embodiment of the present disclosure. The device **100** includes a first processing unit **120**, a second processing unit **140** and a label map **160**, wherein the device **100** is used for executing a command **102** and tracking the specific information flow caused by the command **102**, and the label map **160** is used to attach a label status on a datum having a specific attribute (please refer to FIG. **2** and the following description for details). The device **100** expresses the information flow state of the datum having the specific attribute by the label map **160**, and determines whether the output data of the device **100** includes the datum having the specific attribute. If the output data of the device **100** includes the datum having the label status, it represents that the privacy datum has a possibility of being stolen. In an embodiment, the device **100** is a computer system. In another embodiment, the datum having the specific attribute represents that the datum includes the privacy datum. In a further embodiment, the privacy datum is one of an International Mobile Equipment Identity number (IMEI), an International Mobile Subscriber Identity (IMSI) number, contact information and a message.

[0025] Please refer to FIG. **2**(*a*), which illustrates a label map **200** of the device **100** for detecting whether a specific attribute datum has a possibility of being stolen in accordance with an embodiment of the present disclosure. The label map **200** includes a plurality of blocks, which are corresponding to a plurality of storage locations in the computer system, respectively. Each of the storage locations may be a memory location, a register or a hard disk location. For example, the label map **200** includes a block **210** and a block **212**, wherein the block **210** and the block **212** are corresponding to a memory location **220** and a memory location **222** of the memory **240** of the computer system, respectively.

[0026] When a specific storage location **224** of the computer system includes the privacy datum, the first processing unit **120** labels a specific block **214** in the label map **160** to generate a specific label **202**, wherein the specific block **214** is corresponding to a specific storage location **224**, as shown in FIG. **2**(*a*). For example, the specific storage location **224** is a specific memory location, a specific register or a specific hard disk location. The specific storage location **224** stores a datum **224***a*, and the specific label **202** enables the datum **224***a* to have a label status Q**202**. In an embodiment, the specific label **202** is a symbol. In another embodiment, the specific label **202** may be represented as a value. In a further embodiment, when the specific storage location **224** does not include any privacy datum, the first processing unit **120** labels the specific block **214** to generate a specific label **202**W, and the specific label **202**W enables the datum **224***a* to have a label status Q**202**W.

[0027] Besides, please refer to FIGS. **1** and **2**(*a*). The device **100** further includes an Input/Output (I/O) device **180**, the label map **200** includes a buffer region **2**A, and the buffer region **2**A is corresponding to an Input/Output device **280**, wherein the buffer region **2**A is composed of a first group of blocks **213** (**2**B). The buffer region **212** is used to represent whether the output data includes the datum having the label status Q**202**. That is to say, the buffer region **212** is used to record whether the output data of the device **100** includes the privacy datum. If there is any privacy datum in the buffer region **212**, it represents that the privacy datum is stolen.

[0028] In an embodiment, the label map **200** is a bit map. That is to say, each block corresponding to each storage location of the device **100** in the label map **200** has a bit size. For example, when a block of a first bit in the label map **200** has a specific label **202** (such as "1"), it represents that a first specific storage location corresponding to the first bit includes the privacy datum. On the contrary, when the block of the first bit in the label map **200** has a specific label **202**W (such as "0"), it represents that the first specific storage location corresponding to the first bit does not include the privacy datum. In another embodiment, the Input/Output (I/O) device **180** is a network interface card. When there is a datum having the specific label **202** in the buffer region, it represents that the output data of the device **100** or the Input/Output device **180** may include the privacy datum.

[0029] Referring to FIGS. **1** and **2**(*a*) at the same time, when the second processing unit **140** receives the command **102**, the second processing unit **140** translates the command **102** into an information flow code including a source address region **226** and a target address region **228**, wherein the memory **240** includes a source location region L**226** and a target location region L**228**, and the target location region L**226** and the target location region L**228** have the source address region **226** and the target address region **228**, respectively. The source block **216** and the target block **218** of the label map **200** are corresponding to the source address region **226** and the target address region **228** respectively. The source location region L**226** and the target location region L**228** store the source datum **226***a* and the target datum **228***a*, respectively. Then, the first processing unit **120** receives the information flow code and determines whether to attach the specific label **202** on the target block **218** based on whether the source block **216** has the specific label **202**. That is to say, the first processing unit **120** checks whether the source datum **226***a* directed by the source address region **226** in the memory **240** has the privacy datum so as to determine whether the target datum **228***a* directed by the target address region **228** in the memory **240** includes the privacy datum.

[0030] Please refer to FIGS. **1** and **2**(*b*) at the same time, FIG. **2**(*b*) illustrates a label map **200** of the device **100** for detecting whether a specific attribute datum has a possibility

of being stolen in accordance with another embodiment of the present disclosure. In one embodiment, the command **102** copies the source datum **226***a* directed by the source address region **226** to the target location region L**228** having the target address region **228**. The source address region **226** includes a source address **232** and a source address **234** directed to a source location L**232** and a source location L**234**, respectively. The source location L**232** and the source location L**234** store a source datum **232***a* and a source datum **234***a* respectively. The source datum **232***a* has the label status Q**202** (that it to say, a source block **252** of the label map **200** has the specific label **202**, wherein the source block **252** is corresponding to the source address **232**), and the source datum **234***a* does not have the label status Q**202** (such as having the label status Q**202**W). That is to say, a source block **254** of the label map **200** does not have the specific label **202** (such as having the specific label **202**W), wherein the source block **254** is corresponding to the source address **234**.

[0031] The target address region **228** includes a target address **236** and a target address **238** directed to a target location L**236** and a target location L**238**. The target location L**236** and the target location L**238** store a target datum **236***a* and a target datum **238***a*, respectively, wherein a target block **256** and a target block **258** of the label map **200** are corresponding to the target address **236** and target address **238**, respectively. In this situation, the first processing unit **120** enables the target datum **236***a* to have the label status Q**202** based on the source datum **232***a* having the label status Q**202**. Besides, since the source datum **234***a* does not have the label status Q**202** (such as having the label status Q**202**W), the first processing unit **120** determines that the source datum **234***a* does not include any privacy datum. Thus, the target datum **238***a* does not need to attach the label status Q**202**, as shown in FIG. **2**(*b*).

[0032] Please refer to FIGS. **1** and **2**(*c*), FIG. **2**(*c*) illustrates a label map **200** of the device **100** for detecting whether a specific attribute datum has a possibility of being stolen in accordance with still another embodiment of the present disclosure. In another embodiment, the command **102** copies the source datum **226***a* directed by the source address region **226** to the target location region L**228** in the target address region. The source address region **226** includes a source address **232** and a source address **234** directed to a source location L**232** and a source location L**234** respectively. The source location L**232** and the source location L**234** store a source datum **232***a* and a source datum **234***a*, respectively, wherein the source datum **232***a* has the label status Q**202**, and the source datum **234***a* does not have the label status Q**202**.

[0033] The target address region **228** includes a target address **236** directed to a target location L**236**, and the target address **236** stores a target datum **236***a*, wherein the target region **256** of the label map **200** is corresponding to the target address **236**. In this situation, since the source datum **232***a* has the label status Q**202**, the first processing unit **120** determines that the source datum **232***a* includes the privacy datum. Thus, the target datum **236***a* needs to attach the label status Q**202**, as shown in FIG. **2**(*c*).

[0034] Please refer back to FIG. **2**(*a*). In one embodiment, the first group of blocks **213** (2B) does not include the source block **216** and the target block **218**. That is to say, the source block **216** and the target block **218** are not located in the buffer region **212**. It can be inferred that the command **102** does not send out any data. In another embodiment, the first group of blocks **213** (2B) includes the target block **218**. That is to say, the target block **28** is located in the buffer region **212**, which represents that the command **102** wants to send out data. At this moment, the first processing unit **120** examines whether there is a label status in the target block **218** to make a determination. When the determination is positive, the first processing unit **120** presumes that the command **102** wants to send out the data including the privacy datum. That is to say, the privacy datum is stolen.

[0035] In an embodiment according to FIGS. **1** and **2**(*a*)-**2**(*c*), a device **100** for detecting whether the specific attribute datum has a possibility of being stolen includes a bit map (**160** or **200**), an Input/Output (I/O) device **180** and a first processing unit **120**. The label map **220** has a specific label **202** and a buffer region **2**A. The specific label **202** attaches a label status Q**202** on a datum (such as **226***a*) having a specific attribute. The Input/Output (I/O) device **180** is corresponding to the buffer region **2**A. The first processing unit **120** determines whether there is a specific label **202** in the buffer region **2**A. In one embodiment, the specific attribute is a privacy attribute.

[0036] Please refer to FIG. **3**, which illustrates a diagram of tracking the information flow in accordance with an embodiment of the present disclosure. The memory **300** includes a first section **302** and a second section **304** storing a first datum **302***a* and a second datum **304***a* respectively. When the first section **302** of the memory **300** includes the privacy datum, the first datum **302***a* of the first section **302** is attached with the label status Q**202** to represent that the first datum **302***a* includes the privacy datum. That is to say, a third block **312** corresponding to the first section **302** in the label map **310** is labeled as having the specific label **202**. Then, when the device **100** executes some commands to copy the first datum **302***a* of the first section **302** to the second section **304**, the second datum **304***a* stored in the second section **304** will also be labeled as having the label status **202** so that the second datum **304** may also include the privacy datum **306**. A fourth block **314** corresponding to the second section **304** in the label map **310** is labeled to have the specific label **202**.

[0037] In one embodiment, the device **100** may calculate the first datum **302***a* in the first section **302**, and store the calculation result in the second section **304**. At this moment, the second section **304** is also labeled to have the label status **202**. That is to say, the present invention is not limited to the way of causing the second section **304** to have the label status **202**. The process of the first datum **302***a* stored in the first section **302** affecting the second datum **302***b* stored in the second section **304** is called the privacy information flow caused by the executed command.

[0038] Based on the above description, the skilled person may appreciate that the present invention determines whether the device is indicated to send out the data including the privacy datum by detecting if there is any datum including the specific label **202** in the buffer region **212**. The purpose of the present invention is to provide a device for a user to execute an unknown application on the device before downloading the unknown application to the user's mobile phone, so as to examine whether the unknown application will steal the privacy datum. Thus, the device **100** provided by the present invention hopes that the datum (packet) instructed to be sent out can be sent out successfully.

[0039] Generally speaking, when an application wants to steal the privacy datum, it needs to be connected to an external server to send out the stolen privacy datum. However, the external sever may be a famous malware, such that the stolen

process may be blocked by the DNS (domain name system) server during the DNS request stage. This may result in the application unable to send out the stolen privacy datum, and thus result in the device unable to detect that the application will steal the privacy datum.

[0040] In order to avoid this situation, please refer to FIG. **4**, which illustrates a device **400** for detecting whether the specific attribute datum has a possibility of being stolen in accordance with another embodiment of the present disclosure. The device **400** includes a tracking device **402**, an interceptor **404** and a server **406**, wherein the tracking device **402** further includes a network interface card **408**, and the tracking device **402** is an implementation of the device **100**. A test application **410** is executed on the tracking device **402**. The interceptor **404** examines a first packet **412** sent by the tracking device **402**. When the first packet **412** includes a DNS request, the interceptor **404** intercepts the first packet **412**. In response to the first packet **412**, the device **400** provides a second packet **414** to the tracking device **402** so as to direct the datum (packet) sent by the tracking device **402** to the server **406**. This enables the test application **410** to successfully send out the datum (packet) **416**, wherein the second packet **414** includes the IP address of the server **406**.

[0041] It should be noted that some legal applications in the mobile phone will also need to send out the privacy datum through the buffer region **212**. For example, when the mobile phone is connected to the 3G network, it needs to be connected with the base station to send the privacy datum (such as the International Mobile Equipment Identity (IMEI) number and the International Mobile Subscriber Identity (IMSI) number) to the base station, thereby enabling the mobile phone to surf on the internet. In one embodiment, in order to prevent the above-mentioned legal applications from being misjudged as the application stealing the privacy datum, a method for determining whether the application sending out the privacy datum is a legal application or the test application **410** is needed.

[0042] In one embodiment, a method for determining whether the sent packet has a target IP address identified by the test application is used to determine whether the program sending out the privacy datum is a Terminate and Stay Resident or the test application **410**. Generally speaking, the target IP address is written in the test application **410**. However, in some special situations, the target IP address is not directly written in the application; instead, a domain name is given so that the corresponding IP address is obtained by the DNS request. For these two situations mentioned above, in one embodiment, considering the test application **410** as another label source can be viewed as another solution, which is described as follows.

[0043] Please refer to FIG. **5**, which illustrates a label map **500** of the device **400** for detecting whether the specific attribute datum has a possibility of being stolen in accordance with an embodiment of the present disclosure. The device **400** includes a tracking device **402**, and the tracking device **402** includes a label map **500** and a memory **510**. As shown in FIG. **5**, a test program block **502** in the label map **500** is corresponding to a memory location **512** of the test application **410**. The first processing unit **120** attaches a specific label **506** on a group of blocks **504** (5B) corresponding to a memory location region **514** in the bitmap **500** to enable the memory location region **514** to have a label status Q**506**. The memory location region **514** has a datum having the privacy datum, and the test application block **502** in the label map **500** is attached with a specific label **508** to enable the memory location **512** to have a label status Q**508**. As a result, when the output data of the device **400** have the label status **506**, the device **400** determines that the output data have the privacy datum. On the other hand, when the output data of the device **400** have the label status **508**, the device **400** determines that the target IP address is identified by the test application. When the output data of the device **400** has the label status **506** and the label status **508**, the device **400** determines that the output data include the privacy datum, and the target IP address is identified by the test application **410**. That is to say, the test application **410** steals the privacy datum.

[0044] In one embodiment, the target IP address is not directly written in the application; instead, a domain name is given so that the corresponding target IP address is obtained by the DNS request. As described above, the tracking device **402** enables an interceptor to intercept the DNS request, and provides an IP address of the server **406** to the server **406** by the DNS request. Thus, in this situation, the first processing unit **120** does not label the test application block **502** of the bitmap **500** to have the specific label **508**, but labels a block **532** corresponding to a memory location storing the server IP address in the bitmap **500** to have the specific label **508**. When the output data of the device **400** have the label statuses **506** and **508**, the device **400** determines that the test application **400** steals the privacy datum.

[0045] In one embodiment, each block of the label **500** includes a plurality of bits. For example, a first block includes a first bit and a second bit for recording whether the privacy datum and the target IP address source are included in the memory location corresponding to the first block, respectively.

[0046] Please refer to FIG. **6**, which illustrates a method **600** for detecting whether the specific attribute datum has a possibility of being stolen in accordance with an embodiment of the present disclosure. The method **600** includes the steps of causing a specific attribute datum to have a first labeled status attached thereon (step **602**); providing a buffer region outputting an output datum (step **604**); and determining whether the output data have the first labeled status (step **606**).

[0047] In one embodiment, the method **600** further includes the steps of receiving a command including a source address and a target address (step **608**); and determining whether to attach the first labeled status on a second datum of the target address based on whether a first datum of the source address includes the specific attribute datum having the first labeled status (step **610**).

[0048] Please refer to FIG. **7**, which illustrates a method **700** for detecting whether the specific attribute datum has a possibility of being stolen in accordance with another embodiment of the present disclosure. The method **700** includes the steps of causing a specific attribute datum to have a first labeled status attached thereon (step **702**); and providing a buffer region outputting an output datum (step **704**).

[0049] In one embodiment, the method **700** further includes the steps of providing a test application (step **706**); causing a specific datum associated with the testing application to have a second labeled status attached thereon (step **708**); and determining whether the output datum has the first labeled status and the second labeled status (step **710**). When the output datum has the first labeled status but does not have the second labeled status, it represents that although the output datum includes the privacy datum, it is not stolen by the test application. Conversely, if the output datum has the first

labeled status and the second labeled status, it represents that the test application steals the privacy datum.

Embodiments

[0050] 1. A tracing device for detecting whether a specific attribute datum has a possibility of being stolen, comprising:

[0051] a label map having a specific label attached on the specific attribute datum and a buffer region; and

[0052] a first processing device coupled to the label map and determining whether there is the specific label in the buffer region.

[0053] 2. The device of Embodiment 1, wherein the specific attribute datum has a labeled status and a private information.

[0054] 3. The device of any one of Embodiments 1-2, wherein the private information is one selected from a group consisting of an International Mobile Equipment Identity number (IMEI), an International Mobile Subscriber Identity number (IMSI), a contact information, a message and a combination thereof.

[0055] 4. The device of any one of Embodiments 1-3, further comprising a memory coupled to the first processing device and having a source address region and a target address region in which a first and a second data are stored respectively, wherein the specific attribute datum has a labeled status.

[0056] 5. The device of any one of Embodiments 1-4, wherein the first processing device determines whether to attach the labeled status on the second datum based on whether the first datum has the specific attribute datum.

[0057] 6. The device of any one of Embodiments 1-5, further comprising a second processing device coupled to the first processing device, receiving a command and translating the command into an information flow code.

[0058] 7. The device of any one of Embodiments 1-6, wherein the information flow code includes a specific source address in the source address region and a specific target address in the target address region corresponding to the command.

[0059] 8. The device of any one of Embodiments 1-7, further comprising an Input/Output (I/O) device corresponding to the buffer region and the I/O device is a network interface card.

[0060] 9. The device of any one of Embodiments 1-8, further comprising an interceptor coupled to the first processing device, intercepting a domain name system (DNS) request being intended to be output from the device and responding with an IP address according to the DNS request.

[0061] 10. The device of any one of Embodiments 1-9, wherein the first processing device determines whether the specific attribute datum existing in the buffer region has the IP address.

[0062] 11. A method for determining whether a specific attribute datum has a possibility of being stolen, comprising steps of:

[0063] causing the specific attribute datum to have a first labeled status attached thereon;

[0064] providing a buffer region outputting an output datum; and

[0065] determining whether the output datum has the first labeled status.

[0066] 12. The method of Embodiment 11, further comprising the steps of:

[0067] providing a testing application associated with the buffer region;

[0068] causing a specific datum associated with the testing application to have a second labeled status attached thereon; and

[0069] determining whether the output datum has the second labeled status.

[0070] 13. The method of any one of Embodiments 11-12, wherein the specific attribute datum has a private information and when the output datum has the first labeled status and the second labeled status, it represents that the output datum includes the private information and has an IP address identified by the testing application.

[0071] 14. The method of any one of Embodiments 11-13, wherein the buffer region is corresponding to an Input/Output (I/O) device.

[0072] 15. The method of any one of Embodiments 11-14, wherein the I/O device is a network interface card.

[0073] 16. A method for detecting a possibility of an unauthorized transmission of a specific datum, comprising steps of:

[0074] attaching a labeled status on a specific datum;

[0075] providing a buffer unit outputting an output datum; and

[0076] determining whether there is the specific datum having the labeled status in the buffer unit.

[0077] 17. The method of Embodiment 16, wherein the specific datum includes a private information and the method further comprises the steps of:

[0078] receiving a command including a source address and a target address in which a first and a second data are stored respectively; and

[0079] determining whether to attach the labeled status on the second datum based on whether the first datum includes the specific datum having the labeled status.

[0080] 18. The method of any one of Embodiments 16-17, wherein the buffer device has a buffer region corresponding to an Input/Output (I/O) device.

[0081] 19. The method of any one of Embodiments 16-18, determining whether the specific datum has a possibility of being stolen.

[0082] 20. The method of any one of Embodiments 16-19, wherein the specific datum includes a specific attribute and a private information being one selected from a group consisting of an International Mobile Equipment Identity number (IMEI), an International Mobile Subscriber Identity (IMSI), a contact information, a message and a combination thereof.

[0083] While the invention has been described in terms of what is presently considered to be the most practical and preferred embodiments, it is to be understood that the invention needs not be limited to the disclose embodiments. Therefore, it is intended to cover various modifications and similar arrangements included within the spirit and scope of the appended claims, which are to be accorded with the broadest interpretation so as to encompass all such modifications and similar structures.

What is claimed is:

1. A tracing device for detecting whether a specific attribute datum has a possibility of being stolen, comprising:

a label map having a specific label attached on the specific attribute datum and a buffer region; and

a first processing device coupled to the label map and determining whether there is the specific label in the buffer region.

2. A device as claimed in claim **1**, wherein the specific attribute datum has a labeled status and a private information.

3. A device as claimed in claim 2, wherein the private information is one selected from a group consisting of an International Mobile Equipment Identity number (IMEI), an International Mobile Subscriber Identity number (IMSI), a contact information, a message and a combination thereof.

4. A device as claimed in claim 1, further comprising a memory coupled to the first processing device and having a source address region and a target address region in which a first and a second data are stored respectively, wherein the specific attribute datum has a labeled status.

5. A device as claimed in claim 4, wherein the first processing device determines whether to attach the labeled status on the second datum based on whether the first datum has the specific attribute datum.

6. A device as claimed in claim 4, further comprising a second processing device coupled to the first processing device, receiving a command and translating the command into an information flow code.

7. A device as claimed in claim 6, wherein the information flow code includes a specific source address in the source address region and a specific target address in the target address region corresponding to the command.

8. A device as claimed in claim 1, further comprising an Input/Output (I/O) device corresponding to the buffer region and the I/O device is a network interface card.

9. A device as claimed in claim 1, further comprising an interceptor coupled to the first processing device, intercepting a domain name system (DNS) request being intended to be output from the device and responding with an IP address according to the DNS request.

10. A device as claimed in claim 9, wherein the first processing device determines whether the specific attribute datum existing in the buffer region has the IP address.

11. A method for determining whether a specific attribute datum has a possibility of being stolen, comprising steps of:

causing the specific attribute datum to have a first labeled status attached thereon;

providing a buffer region outputting an output datum; and

determining whether the output datum has the first labeled status.

12. A method as claimed in claim 11, further comprising the steps of:

providing a testing application associated with the buffer region;

causing a specific datum associated with the testing application to have a second labeled status attached thereon; and

determining whether the output datum has the second labeled status.

13. A method as claimed in claim 12, wherein the specific attribute datum has a private information and when the output datum has the first labeled status and the second labeled status, it represents that the output datum includes the private information and has an IP address identified by the testing application.

14. A method as claimed in claim 11, wherein the buffer region is corresponding to an Input/Output (I/O) device.

15. A method as claimed in claim 14, wherein the I/O device is a network interface card.

16. A method for detecting a possibility of an unauthorized transmission of a specific datum, comprising steps of:

attaching a labeled status on a specific datum;

providing a buffer unit outputting an output datum; and

determining whether there is the specific datum having the labeled status in the buffer unit.

17. A method as claimed in claim 16, wherein the specific datum includes a private information and the method further comprises the steps of:

receiving a command including a source address and a target address in which a first and a second data are stored respectively; and

determining whether to attach the labeled status on the second datum based on whether the first datum includes the specific datum having the labeled status.

18. A method as claimed in claim 16, wherein the buffer device has a buffer region corresponding to an Input/Output (I/O) device.

19. A method as claimed in claim 18, determining whether the specific datum has a possibility of being stolen.

20. A method as claimed in claim 16, wherein the specific datum includes a specific attribute and a private information being one selected from a group consisting of an International Mobile Equipment Identity number (IMEI), an International Mobile Subscriber Identity (IMSI), a contact information, a message and a combination thereof.

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