

DATA CENTER AND DOMAIN NAME SWITCHING METHOD, APPARATUS, DEVICE AND MEDIUM

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims priority to Chinese Patent Application No. 202310025280.0, titled "DATA CENTER AND DOMAIN NAME SWITCHING METHOD, APPARATUS, DEVICE AND MEDIUM", filed with China National Intellectual Property Administration on January 9, 2023, the entire contents of which are incorporated herein by reference.

FIELD

The present disclosure belongs to the field of data processing, and in particular relates to a data center and domain name switching method and apparatus, and a device and a medium.

BACKGROUND

An Internet Protocol (IP) address is a unified address format that assigns a logical address to each network and each host on the Internet to mask differences in physical addresses. However, IP addresses have drawbacks such as inconvenience to remember and failure to display the names and nature of address organizations. In order to solve this problem, domain names came into being. Domain names and IP addresses are mapped to each other, and users can access the Internet by accessing domain names that are easier to remember.

Among them, multiple domain names may be directed to one website. In some scenarios, it is necessary to switch data centers and domain names to ensure normal service operation. However, the existing data center switching relies on a content delivery network (CDN) for network-level routing, which results in poor flexibility of switching between data centers and domain names.

SUMMARY

The embodiments of the present disclosure provide a data center and domain name switching method, apparatus, a device and a medium, which can improve the flexibility of switching between data centers and domain names.

In a first aspect, the embodiments of the present disclosure provide a data center and domain name switching method which can be employed by an electronic device. The method may comprise: if a domain name switching event is triggered, acquiring access attribute information and target service information corresponding to a current valid function trigger event; obtaining a target data center identifier based on center switching rules in the electronic device and the access attribute information; searching and obtaining, based on the target data center identifier and the target service information, a target domain name corresponding to the target data center identifier and the target service information from a center-and-domain-name mapping relationship in the electronic device, and switching an access corresponding to the current valid function trigger event to the target domain name, wherein the center-and-domain-name mapping relationship comprises a correspondence among data center identifiers, service information, and domain names.

In a second aspect, the embodiments of the present disclosure provide a data center and domain name switching apparatus, comprising: an acquisition module configured to, in the event that a domain name switching event is triggered, acquire access attribute information and target service information corresponding to the current valid function trigger event; a calculation processing module configured to obtain a target data center identifier based on the access attribute information and center switching rules in the data center and domain name switching apparatus; and a matching query module configured to search and obtain, based on the target data center identifier and the target service information, a target domain name corresponding to the target data center identifier and the target service information from a center-and-domain-name mapping relationship in the data center and domain name switching apparatus, and switch an access corresponding to the current valid function trigger event to the target domain name, wherein the center-and-domain-name mapping relationship comprises a correspondence among data center identifiers, service information, and domain names.

In a third aspect, the embodiments of the present disclosure provide an electronic device, comprising: a processor and a memory with computer program instructions stored therein, wherein the processor, when executing the computer program instructions, implements the data center and domain name switching method according to the first aspect.

In a fourth aspect, the embodiments of the present disclosure provide a computer-readable storage medium with computer program instructions stored thereon, wherein the computer program instructions, when executed by a processor, implement the data center and domain name switching method according to the first aspect.

The embodiments of the present disclosure provide a data center and domain name switching method, apparatus, a device and a medium. When a domain name switching event is triggered, an electronic device can dynamically perform calculation processing to obtain a target data center identifier capable of characterizing a data center to switch to, based on access attribute information corresponding to the current valid function trigger event and a center switching rule in the electronic device. Based on the target data center identifier and target service information corresponding to the current valid function trigger event, it is possible to search and obtain a target domain name corresponding to a target data center and the target service information from a center-and-domain-name mapping relationship capable of characterizing a correspondence between data center identifiers, service information, and domain names in the electronic device. The target domain name is the domain name to switch to, and an access corresponding to the current valid function trigger event is switched to the target domain name. The process of the data center and domain name switching method is implemented by an electronic device at the terminal side where the electronic device performs processing to obtain a target domain name based on access attribute information and target service information corresponding to a valid function trigger event, in conjunction with a center switching rule and a center-and-domain-name mapping relationship within the electronic device itself, without relying on adjustments to a content delivery network at the network level, thereby enhancing the flexibility of switching between data centers and domain names.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to illustrate the technical solutions of the embodiments of the present disclosure more clearly, the drawings required to describe the embodiments of the present disclosure will be briefly introduced hereinafter. For a person skilled in the art, additional drawings can further be obtained based on these drawings without any creative labor.

FIG. 1 shows a flowchart of a data center and domain name switching method provided by one embodiment of the present disclosure;

FIG. 2 shows a schematic diagram of an example of a center-and-domain-name mapping relationship in the embodiments of the present disclosure;

FIG. 3 shows a flowchart of a data center and domain name switching method provided by another embodiment of the present disclosure;

FIG. 4 shows a schematic diagram of an example of a center mapping relationship in the embodiments of the present disclosure;

FIG. 5 shows a flowchart of a data center and domain name switching method provided by yet another embodiment of the present disclosure;

FIG. 6 shows a schematic diagram of an example of detecting valid function trigger events with errors in the embodiments of the present disclosure;

FIG. 7 shows a flowchart of a data center and domain name switching method provided by a further embodiment of the present disclosure;

FIG. 8 shows a schematic diagram of an example of detection rules and domain name switching conditions in the embodiments of the present disclosure;

FIG. 9 shows a structural schematic diagram of a data center and domain name switching apparatus provided by one embodiment of the present disclosure;

FIG. 10 shows a structural schematic diagram of a data center and domain name switching apparatus provided by another embodiment of the present disclosure;

FIG. 11 shows a structural schematic diagram of an electronic device provided by one embodiment of the present disclosure.

DETAILED DESCRIPTION OF EMBODIMENTS

The features and exemplary embodiments of various aspects of the present disclosure will be described hereinafter in detail. In order to make the purpose, technical solutions and advantages of the present disclosure clearer, the present disclosure will be further described in detail below in conjunction with the drawings and embodiments. It should be understood that the embodiments described herein are only intended to explain the present disclosure, rather than limit the present disclosure. For a person skilled in the art, the present disclosure can be implemented without some of these specific details. The following description of the embodiments is merely intended to provide a better understanding of the present disclosure by illustrating the examples of the present disclosure.

An Internet Protocol (IP) address is a unified address format that assigns a logical address to each network and each host on the Internet to mask differences in physical addresses. However, IP addresses have drawbacks such as inconvenience to remember and failure to display the names and nature of address organizations. In order to solve this problem, domain names came into being. Domain names and IP addresses are mapped to each other, and users can access the Internet by accessing domain names that are easier to remember. Among them, multiple domain names may be directed to one website. In some scenarios, it is necessary to switch data centers and domain names to ensure normal service operation. However, the existing data center switching relies on a content delivery network (CDN) for network-level routing, which results in poor flexibility of switching between data centers and domain names.

The present disclosure provides a data center and domain name switching method and apparatus, a device and a medium, and can set a center switching rule and a correspondence between a data center, a service and a domain name in an electronic device. When a domain name switching event is triggered, the electronic device performs calculation processing, based on access attribute information corresponding to a valid function trigger event and the center switching rule, to obtain a data center identifier and further determine a data center to switch to, and can determine, based on the data center identifier and service information corresponding to the valid function trigger event as well as the correspondence between a data center, a service and a domain name, a domain name to switch to, and switch to that domain name. The data center and domain name switching process can be implemented through dynamic calculation and processing and searching by the electronic device, without relying on adjustments to a content delivery network at the network level, thereby enhancing the flexibility of switching between data centers and domain names.

It should be noted that the acquisition, storage, use, processing and the like of information and data in the embodiments of the present disclosure all have been authorized by users or relevant institutions, and comply with relevant provisions of national laws and regulations.

The data center and domain name switching method and apparatus, device and medium provided in the present disclosure are hereinafter introduced one by one.

In a first aspect, the present disclosure provides a data center and domain name switching method that can be used to an electronic device. In other words, the data center and domain name switching method can be implemented by the electronic device. The electronic device may include a user device or a gateway device, etc., and the user

terminal may include a C-end user terminal, a B-end user terminal, etc., which are not limited here. Further, the C-end user terminal may include a terminal device of an individual consumer, and the B-end user terminal may include a terminal device of a merchant, an enterprise, a service department, etc. FIG. 1 shows a flowchart of a data center and domain name switching method provided by one embodiment of the present disclosure. As illustrated in FIG. 1, the data center and domain name switching method can comprise steps S101 to S103.

In step S101, access attribute information and target service information corresponding to the current valid function trigger event are acquired in event of triggering of a domain name switching event.

The triggering of the domain name switching event indicates that it is necessary to switch domain names, and the cause of the triggering of the domain name switching event is not limited here. For example, the triggering of the domain name switching event can be determined if the domain name or data center fails (i.e., encounters errors). For another example, the triggering of the domain name switching event can be determined if a service undergoes changes. For yet another example, the triggering of the domain name switching event can be determined when the domain name switching is actively specified.

The valid function trigger events and access requests correspond to each other. One valid function trigger event corresponds to one access request. For example, an electronic device receiving an operational input from a user to a function application in the electronic device can be deemed as a function trigger event. The types of function applications are not limited here. For example, a function application may include payment application, shopping application, entertainment application etc., and one function application may integrate various service functions. For example, a payment application may integrate service functions such as money transfer, QR code payment, and utility bill payment. The function trigger events include valid function trigger events. Either all function trigger events can be determined as valid function trigger events, or some function trigger events can be determined as valid function trigger events. The valid function trigger events are function trigger events that need to be monitored.

The access attribute information includes attribute information associated with an access request corresponding to a valid function trigger event. In some examples, the access attribute information may include, but is not limited to, one or more of the following: user type information, electronic device type information, and application

type information. Among them, the user type information includes information related to users. For example, the user type information may include one or more of information such as user identifiers, a white list to which users belong, a user segment to which users belong, and a proportional segment to which users belong, which is not limited here. The classification of the user segment to which users belong is not limited here. For example, the user segment can be classified by age, region, function trigger frequency, etc., which is not limited here. The proportion to which users belong can be a predetermined proportion, and users fall into this proportion randomly. The electronic device type information includes information related to electronic devices. For example, the electronic device type information may include one or more of information such as the types of electronic device operating systems, the version numbers of electronic device operating systems, locations of electronic devices, electronic device identifiers, a white list to which electronic devices belong, an electronic device segment to which electronic devices belong, and a proportion to which electronic devices belong, which is not limited here. The classification of the electronic device segment to which electronic devices belong is not limited here. For example, the electronic device segment can be classified by the types of electronic devices, duration of using electronic devices, the types of electronic device operating systems, the version numbers of electronic device operating systems, etc., which is not limited here. The proportion to which electronic devices belong can be a predetermined proportion, and electronic devices falls into this proportion randomly. The application type information may include information related to function applications in electronic devices. For example, the application type information may include application types, application identifiers, application version numbers, etc., which is not limited here.

The target service information includes service information corresponding to the current valid function trigger event. The service information includes information related to a service function corresponding to a valid function trigger event. In some examples, the service information may include, but is not limited to, one or more of the following: service type tags, request type information of function trigger events, and access type information of function trigger events. The service type tag can be used to characterize a service function type of a function trigger event. The service function type is not limited here, and may include basic function type, payment function type, life cycle management type, shopping function type, and lifestyle function type, among others. In some examples, a domain name may represent the name and nature of an address organization, and the service type tag may be obtained by simplifying the domain name corresponding to the service type tag. For example, when a domain name

is www.xxxxxpay.xxxxx.com, the service type tag obtained by simplifying this domain name can be pay, which characterizes a payment service function. The request type information for a function trigger event is used to characterize the type of access request corresponding to the function trigger event. For example, the request type of a function trigger event may include a dynamic request type and a static request type. The dynamic request type accesses a domain name through the back end, while the static request type accesses a domain name through a static resource. The access type information for a function trigger event is used to characterize the access type for access request corresponding to the function trigger event. For example, the access type of a function trigger event may include a dynamic access type and a static access type.

In step S102, a target data center identifier can be obtained based on center switching rules in the electronic device and the access attribute information.

The center switching rules may be pre-stored in the electronic device. The center switching rules may also be acquired from a server and stored in the electronic device, in response to the domain name switching event or the valid function trigger event. For example, the electronic device may acquire the center switching rules from the server and store it, in response to the domain name switching event for the first time or in response to the valid function trigger event for the first time. The center switching rules may include a rule directed to the data center identifier. The center switching rules matching the access attribute information can be obtained by processing based on the access attribute information and the center switching rules, and the data center identifier to which the center switching rule matching the access attribute information is directed is the target data center identifier. The target data center identifier characterizes the data center to which the access request of the electronic device should be switched.

In step S103, a target domain name corresponding to the target data center identifier and the target service information is searched and obtained from a center-and-domain-name mapping relationship in the electronic device, based on the target data center identifier and the target service information, and the access corresponding to the current valid function trigger event is switched to the target domain name.

The center-and-domain-name mapping relationship comprises the correspondence among data center identifiers, service information, and domain names. The center-and-domain-name mapping relationship may be implemented as a data set of domain names corresponding to various services in the data center, or implemented in the form of a table or other forms, which is not limited here. The center-and-domain-name mapping relationship may include a plurality of data sets, with each data center identifier

corresponding to one data set, and each data set including the domain names corresponding to various service information in the data center represented by the data center identifier. For example, FIG. 2 shows a schematic diagram of an example of the center-and-domain-name mapping relationship in the embodiments of the present disclosure. As illustrated in FIG. 2, the center-and-domain-name mapping relationship may include a data set corresponding to data center A, a data set corresponding to data center B, and a data set corresponding to data center C. Each of the data sets may include the domain name set corresponding to service type tags when the request type is a dynamic request type and a domain name set corresponding to service type tags when the request type is a static request type. The service type tags may include base, pay, life, mall, base-static, mall-static, etc. For example, in the data set corresponding to data center A, under the dynamic request type, the domain name corresponding to the service type tag base is domain name 1, the domain name corresponding to the service type tag pay is domain name 2, the domain name corresponding to the service type tag life is domain name 3, and the domain name corresponding to the service type tag mall is domain name 4. Under the static request type, the domain name corresponding to the service type tag base-static is domain name 5, and the domain name corresponding to the service type tag mall-static is domain name 6, which will not be elaborated on here. The domain names corresponding to the same service type tag in different data centers are different; the domain names corresponding to different service type tags in the same data center may be the same or different.

The correspondence between service information and domain names in the data center represented by the target data center identifier can be searched and obtained based on the target data center identifier and a center-and-domain-name mapping relationship. Then, the domain name corresponding to the target service information can be determined from the correspondence between service information and domain names in the data center, according to the target service information, in which the determined domain name is the target domain name. In the event that the service information includes the service type tags, the match can be made by tagging the domain names to enable efficient and rapid search of the target domain name on the electronic device end. In the event that the target domain name is the domain switching event, the access corresponding to the current function trigger event shall be switched to the target domain. The access corresponding to the current function trigger event is switched to the target domain name to characterize that the function of the function application in the electronic device can operate normally and stably. The domain name switching in the embodiments of the present disclosure may be a switch between top-

level domain names, such as a switch between the top-level domain name com and the top-level domain name cn, or a switch between second-level domain names, etc., which is not limited here.

In the embodiments of the present disclosure, when the domain name switching event is triggered, the electronic device can dynamically perform calculation processing to obtain the target data center identifier which can characterize the data center to switch to, based on the access attribute information corresponding to the current valid function trigger event and the center switching rule in the electronic device. Based on the target data center identifier and target service information corresponding to the current valid function trigger event, it is possible to search and obtain the target domain name corresponding to the target data center and the target service information from the center-and-domain-name mapping relationship capable of characterizing the correspondence among data center identifiers, service information, and domain names in the electronic device. The target domain name is the domain name to switch to, and an access corresponding to the current valid function trigger event is switched to the target domain name. The process of the data center and domain name switching method is implemented by the electronic device based on the access attribute information and the target service information corresponding to the valid function trigger event, in conjunction with the center switching rule and the center-and-domain-name mapping relationship within the electronic device itself. with the implementing by the electronic device at the terminal side than relying on adjustments to a content delivery network at the network level, the flexibility of switching between data centers and domain names, are enhanced, and the pressure of real-time access of application service and the network transmission bandwidth occupied on the server end is reduced as much as possible. Timely switching between multiple data centers and multiple domain names can meet high performance and high concurrency requirements, and can also improve stability of domain name access.

The data center and domain name switching method according to the embodiments of the present disclosure can be used for the C-end terminals, the B-end terminals, and the gateway devices, etc., demonstrating great versatility. In particular, when the electronic device includes the user terminal, multi-active data center switching and multi-domain name switching on the terminal side can be realized. Furthermore, this process is executed by the electronic device, and can automatically switch to the target domain name without requiring user participation in the domain name selection, thus achieving seamless switching between multi-active data centers and multiple domain names.

In some embodiments, the electronic device can be configured with a center mapping relationship comprising a correspondence between data center identifiers and center switching rules, and the data mapping relationship can be utilized to determine the target data center identifier. FIG. 3 shows a flowchart of a data center and domain name switching method according to another embodiment of the present disclosure, and the difference between FIG. 3 and FIG. 1 lies in that the step S102 in FIG. 1 can be specifically refined into step S1021 and step S1022 in FIG. 3, and step S103 in FIG. 1 can be specifically refined into step S1031 to step S1033 in FIG. 3.

In step S1021, a target center switching rule is determined based on the access attribute information.

The target center switching rule comprises a center switching rule that matches the access attribute information. Center switching rules for different parts may be directed to different data center identifiers, i.e., different data centers may correspond to different center switching rules. Therefore, a target center switching rule that matches the access attribute information can be first determined in the center switching rules, and then a target data center identifier can be determined based on the target center switching rule.

In step S1022, a data center identifier corresponding to the target center switching rule is determined based on the target center switching rule and a center mapping relationship, and the data center identifier corresponding to the target center switching rule is determined as the target data center identifier.

The center mapping relationship can be presented in the form of data center identifiers and center switching rule sets. For example, FIG. 4 shows a schematic diagram of an example of the center mapping relationship in the embodiments of the present disclosure. As illustrated in FIG. 4, the data center identifiers are data center A, data center B and data center C in sequence. The center mapping relationship may include the data center A, the data center B, the data center C and correspondences of the center switching rule sets corresponding to the three data centers respectively. For example, the data center A corresponds to the center switching rule set 1, the data center B corresponds to the center switching rule set 2, and the data center C corresponds to the center switching rule set 3. Among them, the center switching rule set 1 corresponding to data center A may include rules 1 to 5 when the service type tag is base, in which rule 1 is the location of an electronic device = A1, rule 2 is a user identifier = B1, rule 3 is the type of an electronic device operating system = C1, rule 4 is an application version number = D1, and rule 5 is an electronic device identifier =

E1. The center switching rule set 1 may also include rules under other service type tags, which are not illustrated one by one in FIG. 4. The center switching rule sets corresponding to data center B and data center C respectively can be found in FIG. 4, and will not be elaborated on here. In the event that the location of an electronic device = A1, a user identifier = B1, the type of an electronic device operating system = C1, an application version number = D1 and an electronic device identifier = E1 in the access attribute information, then the center switching rule set 1 in FIG. 4 can be determined as the target center switching rule. And the center switching rule set 1 corresponds to data center A, then data center A can be determined as the target data center identifier.

In some examples, center switching rules corresponding to different service types in the same data center may also be different. For example, as illustrated in FIG. 4, in center switching rule set 1, the center switching rule when the service type tag is base may be different from the center switching rule when the service type tag is pay.

In step S1031, service information and domain names corresponding to the target data center identifier are searched and obtained from a center-and-domain-name mapping relationship, based on the target center identifier.

The center-and-domain-name mapping relationship includes a correspondence between data center identifiers, service information, and domain names, and the service information and domain names in the data center characterized by the target data center identifier can be obtained based on the target data center identifier. For example, as illustrated in FIG. 2, in the event that the data center represented by the target data center identifier is data center B, then the service information corresponding to the target data center identifier includes dynamic request type, static request type, base, pay, life, mall, etc., and the domain names corresponding to the target data center identifier includes domain name 7, domain name 8, domain name 9, domain name 10, domain name 11, domain name 12, etc.

In step S1032, a domain name corresponding to the target service information is searched and obtained from the service information and domain names corresponding to the target data center identifier, based on the target service information, and the domain name corresponding to the target service information is determined as a target domain name.

After the service information and domain names corresponding to the target data center identifier are obtained, the target domain name can then be located based on the target service information. For example, as illustrated in FIG. 2, the data center characterized by the target data center identifier is data center B; the service information

corresponding to the target data center identifier includes dynamic request type, static request type, base, pay, life, mall, etc.; the domain names corresponding to the target data center identifier include domain name 7, domain name 8, domain name 9, domain name 10, domain name 11, domain name 12, etc. In the event that the target service information includes the dynamic request type and pay, then the domain name corresponding to the target service information includes the domain name 8, and the domain name 8 is the target domain name.

In step S1033, an access corresponding to the current valid function trigger event is switched to the target domain name.

In the embodiments of the present disclosure, the data center and domain name switching method can be implemented through two functional interfaces. For ease of description, the two functional interfaces are referred to as a first functional interface and a second functional interface. The above step S102 can be specifically refined as follows: calling a first functional interface, and obtaining the target data center identifier based on the access attribute information and the center switching rule. The first functional interface is used to perform calculation processing based on multi-dimensional access attribute information and the center switching rule to obtain the target center identifier, and to call a second functional interface for matching query. The above step S103 can be specifically refined as follows: calling the second functional interface, and searching and obtaining, based on the target data center identifier and the target service information, the target domain name corresponding to the target data center identifier and the target service information from the center-and-domain-name mapping relationship. The second functional interface is directed to a data set including complete and valid different data centers, different service information, and different domain names. The second functional interface can be used to perform matching query so as to obtain the target domain name based on the target center identifier and the target service information.

The relevant logic of the data center and domain name switching method can be implemented through the first functional interface and the second functional interface, so that the data center and domain name switching method has the characteristics of being lightweight and easier for configuration and management.

In some embodiments, it can be determined that the region switching event is triggered when the accessed domain name or data center fails. FIG. 5 shows a flowchart of a data center and domain name switching method provided by yet another embodiment of the present disclosure, and the difference between FIG. 5 and FIG. 1

lies in that the data center and domain name switching method illustrated in FIG. 5 may further include step S104 and step S105.

In step S104, a valid function trigger event in the electronic device is detected, and the time points and the number of times when errors occur to the valid function trigger event are recorded.

The electronic device can spontaneously detect valid function trigger events, and errors may occur to the valid function trigger events. In the event that a valid function trigger event with errors is detected, the time points and the number of times when errors occur to the valid function trigger event are recorded. The occurrence of errors to the valid function trigger event can be deemed as errors occurring to the accessed path interface.

In step S105, when the time points and the number of times when errors occur to the valid function trigger event meet predetermined domain name switching conditions, it is determined that a domain name switching event is triggered.

The domain name switching conditions are used to determine whether the error frequency of valid function trigger events is high enough to require switching domain names. In the event that too many valid function trigger events with errors occur within a period of time, it can be determined that a domain name switching event is triggered, thereby performing the switching between data centers and domain names.

In some examples, the domain name switching conditions may include: a first interval duration between a time point when a previous domain name switching event was triggered and a time point when errors occur to the valid function trigger event this time is less than a first predetermined duration, and the number of times when errors occur to the valid function trigger event within the first interval duration is greater than or equal to a first switching trigger count threshold.

This example can be directed to scenarios where a domain name switching event has been triggered, and the first interval duration is the interval duration between a time point when a previous domain name switching event was triggered and a time point when errors occur to the valid function trigger event this time. The first interval duration and the number of times when errors occur to valid function trigger events can be used to reflect the error frequency of valid function trigger events. The first predetermined duration and the first switching trigger count threshold can be set according to scenarios, requirements, experience etc., which is not limited here. When the first interval duration is less than the first predetermined duration, and the number of times when errors occur

to the valid function trigger event within the first interval duration is greater than the first switching trigger count threshold, this means that the error frequency of valid function trigger events is high enough to require switching domain names.

In some other examples, a second interval duration between a time point when the valid function trigger event with errors was first detected and a time point when errors occur to the valid function trigger event this time is less than a predetermined duration, and the number of times when errors occur to the valid function trigger event within the second interval duration is greater than or equal to a second switching trigger count threshold.

This example can be directed to scenarios where a domain name switching event has not been triggered, and the second interval duration is the interval duration between a time point when the valid function trigger event with errors is detected for the first time and a time point when errors occur to the valid function trigger event this time. The second interval duration and the number of times when errors occur to valid function trigger events can be used to reflect the error frequency of valid function trigger events. The second predetermined duration and the second switching trigger count threshold can be set according to scenarios, requirements, experience etc., which is not limited here. The second predetermined duration may be equal to or different from the first predetermined duration. The second switching trigger count threshold may be equal to or different from the first switching trigger count threshold. When the second interval duration is less than the second predetermined duration, and the number of times when errors occur to the valid function trigger event within the second interval duration is greater than the second switching trigger count threshold, this means that the error frequency of valid function trigger events is high enough to require switching the domain name.

In the embodiments of the present disclosure, the time points and the number of times when errors occur to the valid function trigger event can also be recorded and counted by means of a time window. When the valid function trigger event with errors is detected for the first time, a time window is generated; each time the valid function trigger event with errors is detected, the time window is extended to include the detected valid function trigger event with errors, and the time points and the number of times when errors occur to the valid function trigger event within the time window are recorded until a domain name switching event is triggered; when the domain name switching event is triggered, a new time window is generated, and the valid function trigger event with errors is continuously detected, and the above steps are repeated until the detection of the valid function trigger event with errors stops.

When the valid function trigger event with errors is detected for the first time, the length of the generated time window can be 0, and the length of the time window can increase over time. Each time the valid function trigger event with errors is detected, the length of the time window includes the interval duration between a time point when the valid function trigger event with errors was detected for the first time and a time point when a valid function trigger event with errors is detected this time, and the time points and the number of times when errors occur to the valid function trigger event within the time window can be recorded. As time and the number of times when errors occur to the valid function trigger event increase, if the time points and the number of times when errors occur to the valid function trigger event within the time window meet domain name switching conditions, it is determined that a domain name switching event is triggered. When the domain name switching event is triggered, a new time window is generated, and the length of the new time window can be 0, and the length of the time window can increase over time. The above steps of recording the time points and the number of times when errors occur to the valid function trigger event within the time window, and determining that the time points and the number of times when errors occur to the valid function trigger event within the time window meet domain name switching conditions are repeated, until it is required to stop detecting the valid function trigger event with errors.

For example, FIG. 6 shows a schematic diagram of an example of detecting valid function trigger events with errors in the embodiments of the present disclosure. As illustrated in FIG. 6, the solid-line boxes indicate valid function trigger events with errors, and the numbers in the solid-line boxes represent the number of times when errors occur to valid function trigger events. Assuming that a domain name switching event is triggered when a valid function trigger event with errors occurs for the a th time, a new time window starts from the time point T_a in the dotted-line box in FIG. 6 to the time point T_b when errors occur to the valid function trigger event this time, i.e., the b th time. The length of the time window is the first interval duration. Assuming that a first predetermined duration is T_c and a first switching trigger count threshold is M , in the event that $T_b - T_a < T_c$ and $b - a \geq M$, it can be determined that the domain name switching event is triggered.

In the above embodiment, the issue of excessively long time periods for recording valid function trigger events with errors is avoided by utilizing a first predetermined duration and a second predetermined duration. By employing the first predetermined duration, the limitation of the first switching trigger count threshold, the second predetermined duration in calculation, and the limitation of the second switching trigger

count threshold in the calculations, the difficulty of real-time calculation is reduced. This ensures the timeliness and accuracy of detection while automating the detection and the switching between data centers and domain names, thereby achieving seamless switching between data centers and domain names.

In some embodiments, the electronic device may detect a plurality of function trigger events, and can obtain valid function trigger events by filtering the plurality of function trigger events, and only focus on the valid function trigger events. FIG. 7 shows a flowchart of a data center and domain name switching method provided by a further embodiment of the present disclosure. The difference between FIG. 7 and FIG. 5 lies in that the step S104 in FIG. 5 may be specifically refined into steps S1041 to S1043 in FIG. 7.

In step S1041, initial access information associated with a function trigger event is acquired.

The specific content of the function trigger event can be found in the relevant description in the above embodiments, which will not be elaborated on here. The initial access information associated with a function trigger event may include information associated with an access corresponding to the function trigger event. In some examples, the initial access information may include, but is not limited to, one or more of the following: a domain name that the function trigger event expects to access, a path interface accessed by the function trigger event, and a response code of the function trigger event. The response code may include a service response code or a technical response code for the access, which is not limited here.

In step S1042, when the initial access information complies with detection rules in an electronic device, the function trigger event is determined as a valid function trigger event.

The detection rules may be pre-stored in an electronic device, or may be actively requested by an electronic device to a server when detection is triggered for the first time, or issued by a server to an electronic device, which is not limited here. The detection rules include rules for distinguishing valid function trigger events. The detection rules may be associated with the operating system type of an electronic device, the operating system version of an electronic device, and the version of a function application in an electronic device. The electronic device can generate detection rules based on electronic device type information and application type information, etc., and take effect timely to realize strong management of the detection rule. The function

trigger event in which initial access information complies with the detection rules is a valid function trigger event.

In some examples, the detection rules include, but are not limited to, one or more of the following:

- a domain name that the function trigger event expects to access is in a predetermined monitored domain name list;

- a path interface accessed by the function trigger event is in a predetermined monitored path interface list; and

- a response code of the function trigger event is in a predetermined monitored response code list.

The monitored domain name list includes the domain names within the monitoring scope. The monitored path interface list includes the path interfaces within the monitoring scope. The monitoring response code list includes the response codes within the monitoring scope. Through the detection rules associated with the monitored domain name list, monitored path interface list, monitoring response code list and the like, the function trigger events that involve domain names, path interfaces, response codes and the like not within the monitoring scope can be filtered out, and the function trigger events that involve domain names, path interfaces, response codes and the like within the monitoring scope are retained, and the retained function trigger events are determined as valid function trigger events.

The detection rules and the domain name switching conditions can work in synergy. In some examples, different data centers have their respective corresponding detection rules and domain name switching conditions. The detection rules and domain name switching conditions corresponding to different data centers may be the same or different, which is not limited here. For example, FIG. 8 shows a schematic diagram of an example of detection rules and domain name switching conditions in the embodiments of the present disclosure. As illustrated in FIG. 8, the data center includes data center A, data center B and data center C. The three data centers have their respective corresponding detection rules and domain name switching conditions. For example, the detection rules corresponding to data center A include monitored domain name list 1, monitored path interface list 1, monitored response code list 1, etc., and the domain name switching conditions corresponding to data center A may include condition 1, condition 2 and the like, where condition 1 is the length of time window $< T1$, and condition 2 is the number of times when errors occur to the valid function

trigger event $\geq M1$; the detection rules and the domain name switching conditions corresponding to data center B and data center C respectively can be found in FIG. 8, which will not be elaborated on here.

In step S1043, the time points and the number of times when errors occur to the valid function trigger event are recorded.

In the embodiments of the present disclosure, the detection rules and the domain name switching conditions can work in synergy to determine, based on the valid function trigger events within the monitoring scope, whether a domain name switching event is triggered. The detection and the switching are performed automatically, thereby achieving seamless switching between data centers and domain names for users.

In a second aspect, the present disclosure provides a data center and domain name switching apparatus. FIG. 9 shows a structural schematic diagram of a data center and domain name switching apparatus provided by one embodiment of the present disclosure. As illustrated in FIG. 9, a data center and domain name switching apparatus 200 may include an acquisition module 201, a calculation processing module 202, a matching query module 203, and a switching module 204.

The acquisition module 201 can be used to, when a domain name switching event is triggered, acquire access attribute information and target service information corresponding to the current valid function trigger event.

The calculation processing module 202 can be used to obtain a target data center identifier based on the access attribute information and a center switching rule in the data center and domain name switching apparatus.

In some examples, the access attribute information may include, but is not limited to, one or more of the following: user type information, electronic device type information, and application type information.

In some examples, the data center and domain name switching apparatus may include a user terminal.

The matching query module 203 can be used to search and obtain, based on the target data center identifier and the target service information, a target domain name corresponding to the target data center identifier and the target service information from a center-and-domain-name mapping relationship in the data center and domain name switching apparatus.

The center-and-domain-name mapping relationship comprises a correspondence among data center identifiers, service information, and domain names.

In some examples, the service information comprises one or more of the following: service type tags, request type information of function trigger events, and access type information of function trigger events, in which the service type tags are obtained by simplifying domain names corresponding to the service type tags.

The switching module 204 can be used to switch the access corresponding to the current valid function trigger event to the target domain name.

In the embodiments of the present disclosure, when a domain name switching event is triggered, the data center and domain name switching apparatus can dynamically perform calculation processing to obtain a target data center identifier capable of characterizing a data center to switch to, based on access attribute information corresponding to the current valid function trigger event and a center switching rule in the data center and domain name switching apparatus. Based on the target data center identifier and target service information corresponding to the current valid function trigger event, it is possible to search and obtain a target domain name corresponding to a target data center and the target service information from a center-and-domain-name mapping relationship capable of characterizing a correspondence between data center identifiers, service information, and domain names in the data center and domain name switching apparatus. The target domain name is the domain name to switch to, and an access corresponding to the current valid function trigger event is switched to the target domain name. The process of the data center and domain name switching method is implemented by the data center and domain name switching apparatus, based on access attribute information and target service information corresponding to a valid function trigger event, in conjunction with the center switching rule and the center-and-domain-name mapping relationship, to obtain the target domain name. The flexibility of data centers and domain names switching is enhanced by relying on the implementation of the data center and domain name switching apparatus at the terminal side rather than depending on adjustments to the content delivery network at the network level, and the pressure of real-time access of application service and the network transmission bandwidth occupied on the server end can be also reduced as much as possible. Timely switching between multiple data centers and multiple domain names can meet high performance and high concurrency requirements, and can also improve stability of domain name access.

The data center and domain name switching method in the embodiments of the present disclosure can be used for C-end terminals, B-end terminals, gateway devices, etc., demonstrating great versatility. In particular, when the data center and domain name switching apparatus includes a user terminal, multi-active data center switching and multi-domain name switching on the terminal side can be realized. Furthermore, this process is executed by the data center and domain name switching apparatus, and can automatically switch to the target domain name without requiring user participation in the domain name selection, thus achieving seamless switching between multi-active data centers and multiple domain names.

In some embodiments, the data center and domain name switching apparatus has a center mapping relationship including a correspondence between data center identifiers and center switching rules. The calculation processing module 202 can be used to: determine a target center switching rule based on the access attribute information, wherein the target center switching rule comprises a center switching rule that matches the access attribute information; determine a data center identifier corresponding to the target center switching rule, based on the target center switching rule and the center mapping relationship; and determine the data center identifier corresponding to the target center switching rule as the target data center identifier.

In some embodiments, the matching query module 203 can be used to: search and obtain, based on the target center identifier, service information and domain names corresponding to the target data center identifier from the center-and-domain-name mapping relationship; determine a domain name corresponding to the target service information from the service information and domain names corresponding to the target data center identifier; and determine the domain name corresponding to the target service information as the target domain name.

In some embodiments, the calculation processing module 202 can be used to call a first functional interface, and obtain the target data center identifier based on the access attribute information and the center switching rule.

The matching query module 203 can be used to call a second functional interface, and search and obtain, based on the target data center identifier and the target service information, a target domain name corresponding to the target data center identifier and the target service information from the center-and-domain-name mapping relationship.

FIG. 10 shows a structural schematic diagram of a data center and domain name switching apparatus provided by another embodiment of the present disclosure. The difference between FIG. 10 and FIG. 9 lies in that the data center and domain name

switching apparatus 200 illustrated in FIG. 10 may further comprise a detection module 205 and a switching trigger module 206.

The detection module 205 can be used to detect a valid function trigger event in the data center and domain name switching apparatus, and record the time points and the number of times when errors occur to the valid function trigger event.

The switching trigger module 206 can be used to determine that a domain name switching event is triggered, when the time points and the number of times when errors occur to the valid function trigger event meet predetermined domain name switching conditions.

In some examples, the domain name switching conditions include:

a first interval duration between a time point when a previous domain name switching event was triggered and a time point when errors occur to the valid function trigger event this time is less than a first predetermined duration, and the number of times when errors occur to the valid function trigger event within the first interval duration is greater than or equal to a first switching trigger count threshold;

or

a second interval duration between a time point when the valid function trigger event with errors was first detected and a time point when errors occur to the valid function trigger event this time is less than a second predetermined duration, and the number of times when errors occur to the valid function trigger event within the second interval duration is greater than or equal to a second switching trigger count threshold.

In some embodiments, the detection module 205 can be used to: generate a time window, when the valid function trigger event with errors is detected for the first time; each time the valid function trigger event with errors is detected, extend the time window to include the detected valid function trigger event with errors, and record the time points and the number of times when errors occur to the valid function trigger event within the time window until a domain name switching event is triggered; when the domain name switching event is triggered, generate a new time window, and continuously detect the valid function trigger event with errors.

In some embodiments, the detection module 205 can be used to: acquire initial access information associated with a function trigger event; and when the initial access information complies with detection rules in the data center and domain name switching apparatus, determine the function trigger event as the valid function trigger event.

In some examples, the initial access information includes one or more of the following:

a domain name that the function trigger event expects to access, a path interface accessed by the function trigger event, and a response code of the function trigger event.

The detection rules include one or more of the following:

the domain name that the function trigger event expects to access is in a predetermined monitored domain name list;

the path interface accessed by the function trigger event is in a predetermined monitored path interface list; and

the response code of the function trigger event is in a predetermined monitored response code list.

In a third aspect, the present disclosure further provides an electronic device. FIG. 11 shows a structural schematic diagram of an electronic device provided by one embodiment of the present disclosure. As illustrated in FIG. 11, the electronic device 300 includes a memory 301, a processor 302, and a computer program stored in the memory 301 and executable on the processor 302.

In some examples, the processor 302 may include a central processing unit (CPU), or an application specific integrated circuit (ASIC), or may be configured to implement one or more integrated circuits of the embodiments of the present disclosure.

The memory 301 may include a read-only memory (ROM), a random access memory (RAM), a disk storage medium device, an optical storage medium device, a flash memory device, an electrical, optical or other physical/tangible memory storage device. Therefore, the memory typically includes one or more tangible (non-transitory) computer-readable storage media (e.g., a memory device) encoded with software including computer executable instructions, and when the software is executed (e.g., by one or more processors), it can perform operations with reference to those described in the data center and domain name switching method in the embodiments of the present disclosure.

By reading an executable program code stored in the memory 301, the processor 302 executes a computer program corresponding to the executable program code, to implement the data center and domain name switching method the above embodiments.

In some examples, the electronic device 300 may further include a communication interface 303 and a bus 304. As illustrated in FIG. 11, the memory 301, the processor

302, and the communication interface 303 are connected and communicate with each other via the bus 304.

The communication interface 303 is mainly used to realize the communication between various modules, apparatuses, units and/or devices in the embodiments of the present disclosure. The communication interface 303 may also be used to access input devices and/or output devices.

The bus 304 includes hardware, software, or both, coupling the components of the electronic device 300 together. By way of example rather than limitation, the bus 304 may include an Accelerated Graphics Port (AGP) or other graphics bus, an Enhanced Industry Standard Architecture (EISA) bus, a Front Side Bus (FSB), a Hyper Transport (HT) interconnect, an Industry Standard Architecture (ISA) bus, an InfiniBand interconnect, a Low Pin Count (LPC) bus, a memory bus, a Micro Channel Architecture (MCA) bus, a Peripheral Component Interconnect (PCI) bus, a PCI-Express (PCI-E) bus, a Serial Advanced Technology Attachment (SATA) bus, a Video Electronics Standards Association Local Bus (VLB), or other suitable bus or a combination of two or more of the above. Where appropriate, the bus 304 may include one or more buses. Although specific buses are described and illustrated in the embodiments of the present disclosure, the present disclosure considers any suitable bus or interconnect.

In a fourth aspect, the present disclosure provides a computer-readable storage medium with computer program instructions stored thereon, wherein the computer program instructions, when executed by a processor, can implement the data center and domain name switching method in the aforementioned embodiments, and can achieve the same technical effect. To avoid repetition, this will not be elaborated on here. Among them, the aforementioned computer-readable storage medium may include a non-transitory computer-readable storage medium, such as a read-only memory (ROM for short), a random access memory (RAM for short), a disk or an optical disk, etc., which is not limited here.

The embodiments of the present disclosure may further provide a computer program product, wherein instructions in the computer program product, when executed by a processor of an electronic device, cause the electronic device to implement the data center and domain name switching method in the aforementioned embodiments, and can achieve the same technical effect. To avoid repetition, this will not be elaborated on here.

It should be noted that various embodiments of this specification are all described in a progressive manner, and the same and similar parts between the embodiments may

be cross-referenced. What each embodiment emphasizes and focuses on makes it different from other embodiments. For apparatus embodiments, device embodiments, computer-readable storage medium embodiments, and computer program product embodiments, relevant information may be found in the description of the method embodiments. The present disclosure is not limited to the specific steps and structures described above and illustrated in the figures. A person skilled in the art can make various changes, modifications and additions, or change the sequence of steps after grasping the spirit of the present disclosure. In addition, for the sake of brevity, detailed descriptions of known method techniques are omitted here.

Various aspects of the present disclosure are described above with reference to the flowcharts and/or block diagrams of the method, apparatus (system) and computer program product according to the embodiments of the present disclosure. It should be understood that each block in the flowcharts and/or block diagrams, and a combination of blocks in the flowcharts and/or block diagrams can be implemented by computer program instructions. These computer program instructions can be provided to a processor of a general-purpose computer, a special-purpose computer or other programmable data processing device to produce a machine, so that these instructions, executed by the processor of the computer or other programmable data processing device, enable the implementation of the functions/actions specified in one or more blocks of the flowcharts and/or block diagrams. Such a processor may be, but is not limited to, a general-purpose processor, a special-purpose processor, an application-specific processor or a field programmable logic circuit. It can also be understood that each block in the block diagrams and/or flowcharts and a combination of blocks in the flowcharts and/or block diagrams can also be implemented by a specialized hardware that performs specified functions or actions, or can be implemented by a combination of specialized hardware and computer instructions.

It will be appreciated by a person skilled in the art that all the above embodiments are exemplary and non-restrictive. Different technical features appearing in different embodiments can be combined to achieve beneficial effects. Based on the study of the drawings, the specification, and the claims, a person skilled in the art should be able to understand and implement other variations of the disclosed embodiments. In the claims, the term "comprising" does not exclude other devices or steps; the quantifier "one" does not exclude multiple; the terms "first" and "second" are used to indicate names rather than indicate any specific order. Any reference signs in the claims should not be construed as limiting the scope of protection. The functions of multiple parts appearing in the claims can be implemented by a single hardware or software module. The

appearance of some technical features in different dependent claims does not mean that these technical features cannot be combined to achieve beneficial effects.

Claims:

1. A data center and domain name switching method used for an electronic device, the method comprising:

acquiring access attribute information and target service information corresponding to a current valid function trigger event, if a domain name switching event is triggered;

obtaining a target data center identifier based on center switching rules in the electronic device and the access attribute information;

searching and obtaining, based on the target data center identifier and the target service information, a target domain name corresponding to the target data center identifier and the target service information from a center-and-domain-name mapping relationship in the electronic device, and switching an access corresponding to the current valid function trigger event to the target domain name, wherein the center-and-domain-name mapping relationship comprises a correspondence among data center identifiers, service information, and domain names.

2. The method according to claim 1, wherein the electronic device is configured with a center mapping relationship comprising a correspondence between data center identifiers and center switching rules, and

the obtaining a target data center identifier based on center switching rules in the electronic device and the access attribute information, comprising:

determining a target center switching rule based on the access attribute information, wherein the target center switching rule comprises the center switching rule that matches the access attribute information;

determining a data center identifier corresponding to the target center switching rule, based on the target center switching rule and the center mapping relationship; and determining the data center identifier corresponding to the target center switching rule as the target data center identifier.

3. The method according to claim 1, wherein the searching and obtaining, based on the target data center identifier and the target service information, a target domain name corresponding to the target data center identifier and the target service information from a center-and-domain-name mapping relationship in the electronic device comprises:

searching and obtaining, based on the target center identifier, service information and domain names corresponding to the target data center identifier from the center-and-domain-name mapping relationship; and

searching and obtaining, based on the target service information, a domain name corresponding to the target service information from the service information and domain names corresponding to the target data center identifier, and determining the domain name corresponding to the target service information as the target domain name.

4. The method according to claim 1, wherein the obtaining a target data center identifier based on center switching rules in the electronic device and the access attribute information comprises:

calling a first functional interface, and obtaining the target data center identifier based on the access attribute information and the center switching rules; and

wherein the searching and obtaining, based on the target data center identifier and the target service information, a target domain name corresponding to the target data center identifier and the target service information from a center-and-domain-name mapping relationship in the electronic device comprises:

calling a second functional interface, and searching and obtaining, based on the target data center identifier and the target service information, the target domain name corresponding to the target data center identifier and the target service information from the center-and-domain-name mapping relationship.

5. The method according to claim 1, wherein prior to the acquiring access attribute information and target service information corresponding to the current valid function trigger event, the method further comprises:

detecting a valid function trigger event in the electronic device, and recording time points and the number of times when errors occur to the valid function trigger event;

determining that a domain name switching event is triggered, if the time points and the number of times when errors occur to the valid function trigger event meet predetermined domain name switching conditions.

6. The method according to claim 5, wherein the domain name switching conditions comprise:

a first interval duration between a time point when a previous domain name switching event was triggered and a time point when errors occur to the valid function trigger event this time is less than a first predetermined duration, and the number of

times when errors occur to the valid function trigger event within the first interval duration is greater than or equal to a first switching trigger count threshold;

or

a second interval duration between a time point when the valid function trigger event with errors was first detected and a time point when errors occur to the valid function trigger event this time is less than a second predetermined duration, and the number of times when errors occur to the valid function trigger event within the second interval duration is greater than or equal to a second switching trigger count threshold.

7. The method according to claim 5, wherein the recording the time points and the number of times when errors occur to the valid function trigger event comprises:

generating a time window, when the valid function trigger event with errors is detected for the first time;

each time the valid function trigger event with errors is detected, extending the time window to include the detected valid function trigger event with errors, and recording the time points and the number of times when errors occur to the valid function trigger event within the time window until a domain name switching event is triggered; and

when the domain name switching event is triggered, generating a new time window, and continuously detecting the valid function trigger event with errors.

8. The method according to claim 5, wherein the detecting a valid function trigger event for a function application in the electronic device comprises:

acquiring initial access information associated with a function trigger event; and

when the initial access information complies with detection rules in the electronic device, determining the function trigger event as the valid function trigger event.

9. The method according to claim 8, wherein:

the initial access information comprises one or more of the following:

a domain name that the function trigger event expects to access, a path interface accessed by the function trigger event, and a response code of the function trigger event;

the detection rules comprise one or more of the following:

the domain name that the function trigger event expects to access is in a predetermined monitored domain name list;

the path interface accessed by the function trigger event is in a predetermined monitored path interface list; and

the response code of the function trigger event is in a predetermined monitored response code list.

10. The method according to any one of claims 1 to 9, wherein the access attribute information comprises one or more of the following:

user type information, electronic device type information, and application type information.

11. The method according to any one of claims 1 to 9, wherein the service information comprises one or more of the following:

service type tags, request type information of function trigger events, and access type information of function trigger events;

wherein the service type tags are obtained by simplifying domain names corresponding to the service type tags.

12. The method according to any one of claims 1 to 9, wherein the electronic device comprises a user terminal.

13. A data center and domain name switching apparatus, comprising:

an acquisition module configured to, if a domain name switching event is triggered, acquire access attribute information and target service information corresponding to a current valid function trigger event;

a calculation processing module configured to obtain a target data center identifier based on center switching rules in the data center and domain name switching apparatus and the access attribute information; and

a matching query module configured to search and obtain, based on the target data center identifier and the target service information, a target domain name corresponding to the target data center identifier and the target service information from a center-and-domain-name mapping relationship in the data center and domain name switching apparatus, and switch an access corresponding to the current valid function trigger event to the target domain name, wherein the center-and-domain-name mapping relationship comprises a correspondence among data center identifiers, service information, and domain names.

14. An electronic device, comprising: a processor and a memory with computer program instructions stored therein;

wherein the processor, when executing the computer program instructions, implements the data center and domain name switching method according to any one of claims 1 to 12.

15. A computer-readable storage medium with computer program instructions stored thereon, wherein the computer program instructions, when executed by a processor, implement the data center and domain name switching method according to any one of claims 1 to 12.