of the target terminal, and then determines the reference roaming steering condition from the first correspondence based on the model identifier of the target terminal. In other words, in the third manner, the first access point device may obtain the reference roaming steering condition by interacting with the access control device once, and does not need to first interact with the access control device once to determine a reference model identifier, and then interact with the access control device for the second time by using the model identifier to obtain the reference roaming steering condition. That is, a quantity of times that the first access point device interacts with the access control device is reduced, so that overheads are reduced.

[0025] Optionally, before sending the roaming steering instruction to the target terminal, the first access point device may further determine an identifier/identifiers of one or more reference access point devices. In an example, the first access point device obtains a roaming device list from the access control device. The roaming device list includes an identifier/identifiers of one or more third access point devices. The one or more third access point devices are neighboring access point devices of the first access point device. The first access point device determines, based on the roaming device list and from the one or more third access point devices, a third access point device as the one or more reference access point devices.

[0026] The first access point device may obtain the roaming device list from the access control device in an active manner or a passive manner. To be specific, the first access point device may directly receive the roaming device list sent by the access control device. Alternatively, the first access point device may send a list obtaining request to the access control device. The list obtaining request carries an identifier of the first access point device. The first access point device receives the roaming device list sent by the access control device.

[0027] For a manner in which the first access point device passively obtains the roaming device list, because the access control device may actively send the roaming device list corresponding to the first access point device to the first access point device, when the first access point device subsequently performs roaming steering on the target terminal, the first access point device may directly determine, from the roaming ~~steering~~ device list, the identifier/identifiers of the one or more reference access point devices, and does not need to interact with the access control device, so that overheads are reduced.

[0028] For a manner in which the first access point device actively obtains the roaming device list, the access control device may determine corresponding roaming device lists for different

between the first device identifier and the second device identifier. Therefore, when the first access point device performs roaming steering on a terminal (for example, the target terminal), and the access control device receives the list obtaining request sent by the first access point device, the access control device may determine, in the foregoing manner, the roaming device list corresponding to the first access point device, and send the roaming device list corresponding to the first access point device to the first access point device. In this way, when the roaming ~~steering~~ device list corresponding to the first access point device is updated, it can be ensured that the first access point device can obtain a roaming device list with high accuracy.

[0031] Optionally, the one or more second access point devices include the one or more third access point devices. In this way, when the first access point device determines, based on the roaming device list corresponding to the first access point device and from the one or more third access point devices, the third access point device as the one or more reference access point devices, the first access point device may select, based on the roaming device list and from the one or more third access point devices, a third access point device that satisfies the reference roaming steering condition, to obtain the one or more reference access point devices.

[0032] According to a second aspect, a roaming steering method is provided. In the method, an access control device determines a reference roaming steering condition by performing, for a plurality of times, a roaming steering test on one or more terminals belonging to a reference model. The access control device sends the reference roaming steering condition to a first access point device. A model of a target terminal associated with the first access point device is the reference mode. The first access point device is an access point device controlled by the access control device.

[0033] That is, the access control device determines different roaming steering conditions for terminals of different models. In this way, during subsequent roaming steering, even if roaming rules in the terminals of different models are different, after the target terminal satisfies the reference roaming steering condition determined according to the foregoing method, when roaming steering is performed on the target terminal, a roaming steering success rate can be improved.

[0034] Optionally, the access control device may send the reference roaming steering condition to the first access point device in a plurality of manners. A part of the manners are described below.

[0035] In a first manner, the access control device sends a first correspondence to the first

record that signal quality is improved after roaming;

obtain an identifier of a neighboring access point device of the first access point device, where the neighboring access point device is not included in the plurality of historical roaming records; and

determine an identifier of a destination access point device included in the selected historical roaming record and the obtained identifier of the neighboring access point device as the identifiers of the one or more third access point devices.

[0079] Optionally, the first determining module is configured to:

determine a plurality of combinations of access point devices and a plurality of parameter combinations corresponding to each combination of access point devices, where each combination of access point devices includes an identifier of a source access point device and an identifier of a destination access point device, and all source access point devices in the plurality of combinations of access point devices are the first access point device; and

perform, for a plurality of times based on the plurality of combinations of access point devices and the plurality of parameter combinations corresponding to each combination of access point devices, the roaming steering test on the one or more terminals belonging to the reference model by using different steering test conditions, to determine the reference roaming steering condition by using a standard that the one or more terminals belonging to the reference model are successfully steered to roam.

[0080] Optionally, the plurality of parameter combinations are obtained by combining different values of one or more dimension features. The one or more dimension features include one or more of a signal strength, a channel, a frequency band, and load.

[0081] According to a fifth aspect, an access point device is provided. The access point device includes a processor and a memory. The memory is configured to store a program for performing the roaming steering method provided in the first aspect, and store data used to implement the roaming steering method provided in the first aspect. The processor is configured to execute the program stored in the memory. The access control device~~An operation apparatus of the storage device~~ may further include a communication bus. The communication bus is configured to establish a connection between the processor and the memory.

[0082] According to a sixth aspect, an access control device is provided. The access control device includes a processor and a memory. The memory is configured to store a program for

performing the roaming steering method provided in the second aspect, and store data used to implement the roaming steering method provided in the second aspect. The processor is configured to execute the program stored in the memory. The access control device~~An operation apparatus of the storage device~~ may further include a communication bus. The communication bus is configured to establish a connection between the processor and the memory.

[0083] According to a seventh aspect, a computer-readable storage medium is provided. The computer-readable storage medium stores instructions. When the instructions are run on a computer, the computer is enabled to perform the roaming steering method in the first aspect.

[0084] According to an eighth aspect, a computer-readable storage medium is provided. The computer-readable storage medium stores instructions. When the instructions are run on a computer, the computer is enabled to perform the roaming steering method in the second aspect.

[0085] According to a ninth aspect, a computer program product including instructions is provided. When the computer program product runs on a computer, the computer is enabled to perform the roaming steering method in the first aspect.

[0086] According to a tenth aspect, a computer program product including instructions is provided. When the computer program product runs on a computer, the computer is enabled to perform the roaming steering method in the second aspect.

[0087] According to an eleventh aspect, a roaming steering system is provided. The roaming steering system includes a plurality of access point devices, an access control device, and a target terminal. The plurality of access point devices include a first access point device. The first access point device is configured to implement steps of the method in the first aspect, and the access control device is configured to implement steps of the method in the second aspect.

[0088] Technical effects obtained in the second aspect to the eleventh aspect are similar to technical effects obtained by using a corresponding technical means in the first aspect. Details are not described herein again.

[0089] The technical solutions provided in this application can bring at least the following beneficial effects:

[0090] In this application, a reference roaming steering condition is determined by an access control device by performing, for a plurality of times, a roaming steering test on one or more terminals belonging to a reference model, and the reference model is a model of a target terminal. Therefore, the reference roaming steering condition is similar to a roaming rule in the target

terminal. In this case, when the first access point device obtains the reference roaming steering condition and determines that the target terminal satisfies the reference roaming steering condition, even if the target terminal does not unconditionally obey roaming steering of the first access point device, there is a high probability that the target terminal is successfully steered to roam. In addition, the access control device determines different roaming steering conditions for terminals of different models. Even if roaming rules in the terminals of different models are different, when roaming steering is performed according to the foregoing method, a roaming steering success rate may also be improved.

BRIEF DESCRIPTION OF DRAWINGS

[0091] FIG. 1 is a schematic diagram of a roaming process according to an embodiment of this application;

[0092] FIG. 2 is a schematic diagram of an implementation environment according to an embodiment of this application;

[0093] FIG. 3 is a schematic diagram of another implementation environment according to an embodiment of this application;

[0094] FIG. 4 is a schematic diagram of a structure of a network device according to an embodiment of this application;

[0095] FIG. 5 is a flowchart of a roaming steering~~data access~~ method according to an embodiment of this application;

[0096] FIG. 6 is a schematic diagram of a structure of a roaming steering apparatus according to an embodiment of this application; and

[0097] FIG. 7 is a schematic diagram of a structure of another roaming steering apparatus according to an embodiment of this application.

DESCRIPTION OF EMBODIMENTS

[0098] To make objectives, technical solutions, and advantages of this application clearer, the following further describes implementations of this application in detail with reference to the accompanying drawings.

[0099] For ease of understanding, before a roaming steering method provided in embodiments

sent by the access control device. The roaming device list includes an identifier/identifiers of one or more third access point devices. The one or more third access point devices are neighboring access point devices of the first access point device. In this way, before sending the roaming steering instruction to the target terminal, the first access point device may select, from the roaming device list, an identifier of a third access point device that satisfies the reference roaming steering condition, and use the identifier of the selected third access point device as the identifier of the one or more reference access point devices.

[00178] In some embodiments, the access control device may determine corresponding roaming device lists for different access point devices, and send the roaming device lists to the corresponding access point devices. Using the first access point device as an example, after determining the roaming device list corresponding to the first access point device, the access control device may send the roaming device list to the first access point device. The roaming device list includes identifiers of all other access point devices to which the first access point device can roam, but some access point devices may not satisfy the reference roaming steering condition. Therefore, before sending the roaming steering instruction to the target terminal, the first access point device may select, from the roaming device list, the identifier of the third access point device that satisfies the reference roaming steering condition as the identifier of the one or more reference access point devices.

[00179] For the foregoing first manner, the access control device may actively send the roaming device list corresponding to the first access point device to the first access point device. In this way, when the first access point device subsequently performs roaming steering on the target terminal, the first access point device may directly determine, from the roaming ~~steering~~ device list, the identifier/identifiers of the one or more reference access point devices, and does not need to interact with the access control device, so that overheads are reduced.

[00180] For example, the roaming device list that is received and stored by the first access point device and that is sent by the access control device includes an identifier of a third access point device. Before the first access point device sends the roaming steering instruction to the target terminal, assuming that the first access point device determines that the third access point device in the roaming device list satisfies the reference roaming steering condition, the first access point device may directly use the identifier of the third access point device in the roaming ~~steering~~ device list as the identifier of the reference access point device.

identifier of each access point device and the identifier/identifiers of the corresponding one or more third access point devices are stored in the correspondence between the first device identifier and the second device identifier. In this way, when determining, based on the identifier of the first access point device, the roaming device list corresponding to the first access point device, the first access point device may use the identifier of the first access point device as the first device identifier, determine an identifier/identifiers of one or more corresponding second device identifiers from the correspondence between the first device identifier and the second device identifier, and further use the identifier/identifiers of the determined one or more second device identifiers as the identifier/identifiers of the one or more third access point devices corresponding to the first access point device. Then, the access control device generates the roaming device list including the identifier/identifiers of the one or more third access point devices, and sends the roaming device list to the first access point device.

[00185] For the foregoing second manner, after determining the identifier/identifiers of the one or more third access point devices corresponding to the first access point device, the access control device does not generate the roaming device list and deliver the roaming device list to the first access point device, but stores the correspondence between the device identifier and the roaming device list or the correspondence between the first device identifier and the second device identifier. Therefore, when the first access point device performs roaming steering on a terminal (for example, the target terminal), and the access control device receives the list obtaining request sent by the first access point device, the access control device may determine, in the foregoing manner, the roaming device list corresponding to the first access point device, and send the roaming device list corresponding to the first access point device to the first access point device. In this way, when the roaming ~~steering~~ device list corresponding to the first access point device is updated, it can be ensured that the first access point device can obtain a roaming device list with high accuracy.

[00186] For example, the first access point device sends a list obtaining request to the access control device. An identifier that is carried in the list obtaining request and that is of the first access point device is 48f8-db86-3460. The access control device receives the list obtaining request sent by the first access point device, and determines, based on the identifier of the first access point device and from a correspondence that is between a device identifier and a roaming device list and that is shown in the following Table 3, that the corresponding roaming device list includes one third access point device, and an identifier of the third access point device is 48f8-db79-2420. Then, the access

control device sends the roaming device list to the first access point device. The first access point device receives the roaming device list sent by the access control device. It is assumed that the third access point device in the roaming device list satisfies the reference roaming steering condition. In this case, the first access point device may directly use the identifier of the third access point device in the roaming ~~steering~~ device list as the identifier of the reference access point device.

Table 3

Device identifier	Roaming device list
48f8-db86-3460	48f8-db79-2420
48f8-db06-f9e0	48f8-db86-2f80, 48f8-db07-0ba0
...	...

[00187] In the foregoing second manner, before determining, based on the identifier of the first access point device, the roaming device list corresponding to the first access point device, the access control device may further determine the identifier/identifiers of the one or more third access point devices corresponding to the first access point device. To be specific, the access control device obtains a plurality of historical roaming records and roaming experience indication information that corresponds to each historical roaming record. Each historical roaming record includes an identifier of a source access point device and an identifier of a destination access point device. All source access point devices in the plurality of historical roaming records are the first access point device. The roaming experience indication information is used to indicate whether signal quality is improved after a terminal associated with the first access point device roams to a destination access point device corresponding to a corresponding historical roaming record. The access control device determines, based on the plurality of historical roaming records and the roaming experience indication information that corresponds to each historical roaming record, the identifier/identifiers of the one or more third access point devices corresponding to the first access point device. The access control device stores the identifier/identifiers of the one or more third access point devices based on the identifier of the first access point device.

[00188] Based on the foregoing descriptions, the access control device may store a correspondence between a device identifier and a roaming device list, and may further store a

CLAIMS

What is claimed is:

1. A roaming steering method, wherein the method comprises:

determining, by a first access point device, a signal strength during communication between each of one or more second access point devices and a target terminal, to obtain one or more signal strengths, wherein the one or more second access point devices comprise the first access point device and/or a neighboring access point device of the first access point device, and the target terminal is a terminal associated with the first access point device; and

if determining, based on the one or more signal strengths, that the target terminal satisfies a reference roaming steering condition, sending, by the first access point device, a roaming steering instruction to the target terminal, wherein the roaming steering instruction carries an identifier/identifiers of one or more reference access point devices, the roaming steering instruction is used to steer the target terminal to roam to one of the one or more reference access point devices, the reference roaming steering condition is determined ~~by an access control device~~ by performing, for a plurality of times, a roaming steering test on one or more terminals belonging to a reference model, and the reference model is a model of the target terminal.

2. The method according to claim 1, before the determining, based on the one or more signal strengths, that the target terminal satisfies a reference roaming steering condition, the method further comprises:

determining, by the first access point device, a model identifier of the target terminal; and

determining, by the first access point device, the reference roaming steering condition based on the model identifier.

3. The method according to claim 2, wherein the method further comprises:

receiving and storing, by the first access point device, a first correspondence sent by the access control device, wherein the first correspondence is used to indicate a roaming steering condition corresponding to each model identifier identified by the access control device; and

the determining, by the first access point device, the reference roaming steering condition based on the model identifier comprises:

determining, by the first access point device, the reference roaming steering condition from the first correspondence based on the model identifier of the target terminal.

4. The method according to claim 2, wherein the determining, by the first access point device, the reference roaming steering condition based on the model identifier comprises:

sending, by the first access point device, a first steering-condition obtaining request to the access control device, wherein the first steering-condition obtaining request carries the model identifier of the target terminal; and

receiving, by the first access point device, the reference roaming steering condition sent by the access control device, wherein the reference roaming steering condition is determined by the access control device based on the model identifier of the target terminal and from a first correspondence stored in the access control device, and the first correspondence is used to indicate a roaming steering condition corresponding to each model identifier identified by the access control device.

5. The method according to any one of claims 2 to 4, wherein the determining, by the first access point device, a model identifier of the target terminal comprises:

obtaining, by the first access point device, the model identifier of the target terminal from the access control device.

6. The method according to claim 5, wherein the obtaining, by the first access point device, the model identifier of the target terminal from the access control device comprises:

sending, by the first access point device, a model query request to the access control device, wherein the model query request carries a media access control MAC address of the target terminal, and receiving, by the first access point device, the model identifier that is sent by the access control device and that is of the target terminal; or

receiving, by the first access point device, the model identifier that is sent by the access control device and that is of the target terminal, wherein the model identifier of the target terminal is determined by the access control device by using a MAC address of the target terminal after the access control device obtains, from a data packet sent by the target terminal, the MAC address of the target terminal.

7. The method according to claim 1, before the determining, based on the one or more signal strengths, that the target terminal satisfies a reference roaming steering condition, the method further comprises:

sending, by the first access point device, a second steering-condition obtaining request to the access control device, wherein the second steering-condition obtaining request carries a

MAC address of the target terminal; and

receiving, by the first access point device, the reference roaming steering condition sent by the access control device, wherein the reference roaming steering condition is determined by the access control device, from a first correspondence stored in the access control device, after the access control device determines a model identifier of the target terminal based on the MAC address of the target terminal, and the first correspondence is used to indicate a roaming steering condition corresponding to each model identifier identified by the access control device.

8. The method according to any one of claims 1 to 7, wherein before the sending, by the first access point device, a roaming steering instruction to the target terminal, the method further comprises:

obtaining, by the first access point device, a roaming device list from the access control device, wherein the roaming device list comprises an identifier/identifiers of one or more third access point devices, and the one or more third access point devices are neighboring access point devices of the first access point device; and

determining, by the first access point device based on the roaming device list and from the one or more third access point devices, a third access point device as the one or more reference access point devices.

9. The method according to claim 8, wherein the obtaining, by the first access point device, a roaming device list from the access control device comprises:

receiving, by the first access point device, the roaming device list sent by the access control device; or

sending, by the first access point device, a list obtaining request to the access control device, wherein the list obtaining request carries an identifier of the first access point device, and receiving, by the first access point device, the roaming device list sent by the access control device.

10. The method according to claim 8, wherein the one or more second access point devices comprise the one or more third access point devices; and

the determining, by the first access point device based on the roaming device list and from the one or more third access point devices, a third access point device as the one or more reference access point devices comprises:

selecting, by the first access point device based on the roaming device list and from the one

or more third access point devices, a third access point device that satisfies the reference roaming steering condition, to obtain the one or more reference access point devices.

11. A roaming steering method, wherein the method comprises:

determining, by an access control device, a reference roaming steering condition by performing, for a plurality of times, a roaming steering test on one or more terminals belonging to a reference model; and

sending, by the access control device, the reference roaming steering condition to a first access point device, wherein a model of a target terminal associated with the first access point device is the reference model, and the first access point device is an access point device controlled by the access control device.

12. The method according to claim 11, wherein the sending, by the access control device, the reference roaming steering condition to a first access point device comprises:

sending, by the access control device, a first correspondence to the first access point device, wherein the first correspondence is used to indicate a roaming steering condition corresponding to each model identifier identified by the access control device.

13. The method according to claim 11, wherein before the sending, by the access control device, the reference roaming steering condition to a first access point device, the method further comprises:

receiving, by the access control device, a first steering-condition obtaining request sent by the first access point device, wherein the first steering-condition obtaining request carries a model identifier of the target terminal; and

determining, by the access control device, the reference roaming steering condition from a stored first correspondence based on the model identifier of the target terminal, wherein the first correspondence is used to indicate a roaming steering condition corresponding to each model identifier identified by the access control device.

14. The method according to claim 12 or 13, wherein the method further comprises:

obtaining, by the access control device, a media access control MAC address of the target terminal;

determining, by the access control device, the model identifier of the target terminal from a stored second correspondence based on the MAC address of the target terminal, wherein the second correspondence is used to indicate a model identifier corresponding to each MAC address

identified by the access control device; and

sending, by the access control device, the model identifier of the target terminal to the first access point device, to enable the first access point device to determine the reference roaming steering condition based on the model identifier of the target terminal.

15. The method according to claim 14, wherein the obtaining, by the access control device, a MAC address of the target terminal comprises:

receiving, by the access control device, a model query request sent by the first access point device, wherein the model query request carries the MAC address of the target terminal; or

obtaining, by the access control device from a data packet sent by the target terminal, the MAC address of the target terminal.

16. The method according to claim 11, wherein before the sending, by the access control device, the reference roaming steering condition to a first access point device, the method further comprises:

receiving, by the access control device, a second steering-condition obtaining request sent by the first access point device, wherein the second steering-condition obtaining request carries a MAC address of the target terminal;

determining, by the access control device, a model identifier of the target terminal from a stored second correspondence based on the MAC address of the target terminal, wherein the second correspondence is used to indicate a model identifier corresponding to each MAC address identified by the access control device; and

determining, by the access control device, the reference roaming steering condition from a stored first correspondence based on the model identifier of the target terminal, wherein the first correspondence is used to indicate a roaming steering condition corresponding to each model identifier identified by the access control device.

17. The method according to claim 14 or 16, wherein before the determining, by the access control device, a model identifier of the target terminal from a stored second correspondence based on the MAC address of the target terminal, the method further comprises:

obtaining, by the access control device from a data packet sent by the target terminal, the MAC address of the target terminal and model description information of the target terminal;

determining, by the access control device, the model identifier of the target terminal based on the model description information of the target terminal; and

storing, by the access control device, the MAC address and the model identifier of the target terminal in the second correspondence.

18. The method according to any one of claims 11 to 17, wherein the method further comprises:

receiving, by the access control device, a list obtaining request sent by the first access point device, wherein the list obtaining request carries an identifier of the first access point device;

determining, by the access control device based on the identifier of the first access point device, a roaming device list corresponding to the first access point device, wherein the roaming device list comprises an identifier/identifiers of one or more third access point devices, and the one or more third access point devices are neighboring access point devices of the first access point device; and

sending, by the access control device, the roaming device list to the first access point device.

19. The method according to claim 18, wherein before the determining, by the access control device based on the identifier of the first access point device, a roaming device list corresponding to the first access point device, the method further comprises:

obtaining, by the access control device, a plurality of historical roaming records and roaming experience indication information that corresponds to each historical roaming record, wherein each historical roaming record comprises an identifier of a source access point device and an identifier of a destination access point device, all source access point devices in the plurality of historical roaming records are the first access point device, and the roaming experience indication information is used to indicate whether signal quality is improved after a terminal associated with the first access point device roams to a destination access point device corresponding to a corresponding historical roaming record;

determining, by the access control device, the identifier/identifiers of the one or more third access point devices based on the plurality of historical roaming records and the roaming experience indication information that corresponds to each historical roaming record; and

storing, by the access control device, the identifier/identifiers of the one or more third access point devices based on the identifier of the first access point device.

20. The method according to claim 19, wherein the determining, by the access control device, the identifier/identifiers of the one or more third access point devices based on the

plurality of historical roaming records and the roaming experience indication information that corresponds to each historical roaming record comprises:

determining, by the access control device, the identifier/identifiers of the one or more third access point devices in a reinforcement learning manner based on the plurality of historical roaming records and the roaming experience indication information that corresponds to each historical roaming record.

21. The method according to claim 20, wherein the determining, by the access control device, the identifier/identifiers of the one or more third access point devices in a reinforcement learning manner based on the plurality of historical roaming records and the roaming experience indication information that corresponds to each historical roaming record comprises:

selecting, by the access control device based on the roaming experience indication information that corresponds to each historical roaming record and from the plurality of historical roaming records, a historical roaming record that signal quality is improved after roaming;

obtaining, by the access control device, an identifier of a neighboring access point device of the first access point device, wherein the neighboring access point device is not comprised in the plurality of historical roaming records; and

determining, by the access control device, an identifier of a destination access point device comprised in the selected historical roaming record and the obtained identifier of the neighboring access point device as the identifiers of the one or more third access point devices.

22. The method according to any one of claims 11 to 21, wherein the determining, by an access control device, a reference roaming steering condition by performing, for a plurality of times, a roaming steering test on one or more terminals belonging to a reference model comprises:

determining, by the access control device, a plurality of combinations of access point devices and a plurality of parameter combinations corresponding to each combination of access point devices, wherein each combination of access point devices comprises an identifier of a source access point device and an identifier of a destination access point device, and all source access point devices in the plurality of combinations of access point devices are the first access point device; and

performing, by the access control device for a plurality of times based on the plurality of

combinations of access point devices and the plurality of parameter combinations corresponding to each combination of access point devices, the roaming steering test on the one or more terminals belonging to the reference model by using different steering test conditions, to determine the reference roaming steering condition by using a standard that the one or more terminals belonging to the reference model are successfully steered to roam.

23. The method according to claim 22, wherein the plurality of parameter combinations are obtained by combining different values of one or more dimension features, and the one or more dimension features comprise one or more of a signal strength, a channel, a frequency band, and load.

24. A roaming steering apparatus, wherein the apparatus is implemented according to any one of claims 1 to 10.

25. A roaming steering apparatus, wherein the apparatus is implemented according to any one of claims 11 to 23.

26. An access point device, comprising a processor and a memory, wherein

the memory is configured to store a computer program, wherein the computer program comprises program instructions; and

the processor is configured to invoke the computer program, to implement the roaming steering method according to any one of claims 1 to 10.

27. An access control device, comprising a processor and a memory, wherein

the memory is configured to store a computer program, wherein the computer program comprises program instructions; and

the processor is configured to invoke the computer program, to implement the roaming steering method according to any one of claims 11 to 23.

28. A computer-readable storage medium, wherein the storage medium stores a computer program, and when the computer program is executed by a processor, steps of the method according to any one of claims 1 to 10 are implemented.

29. A computer-readable storage medium, wherein the storage medium stores a computer program, and when the computer program is executed by a processor, steps of the method according to any one of claims 11 to 23 are implemented.

30. A roaming steering system, comprising a plurality of access point devices, an access control device, and a target terminal, wherein the plurality of access point devices comprise a

first access point device, the first access point device is configured to implement steps of the method according to any one of claims 1 to 10, and the access control device is configured to implement steps of the method according to any one of claims 11 to 23.

~~24. A roaming steering apparatus, used in a first access point device, wherein the apparatus comprises:~~

~~a first determining module, configured to determine a signal strength during communication between each of one or more second access point devices and a target terminal, to obtain one or more signal strengths, wherein the one or more second access point devices comprise the first access point device and/or a neighboring access point device of the first access point device, and the target terminal is a terminal associated with the first access point device, wherein~~

~~the first determining module is further configured to determine, based on the one or more signal strengths, that the target terminal satisfies a reference roaming steering condition; and~~

~~a first sending module, configured to: when the first determining module determines that the target terminal satisfies the reference roaming steering condition, send a roaming steering instruction to the target terminal, wherein the roaming steering instruction carries an identifier/identifiers of one or more reference access point devices, the roaming steering instruction is used to steer the target terminal to roam to one of the one or more reference access point devices, the reference roaming steering condition is determined by an access control device by performing, for a plurality of times, a roaming steering test on one or more terminals belonging to a reference model, and the reference model is a model of the target terminal.~~

~~25. The apparatus according to claim 24, wherein the apparatus further comprises:~~

~~a second determining module, configured to determine a model identifier of the target terminal; and~~

~~a third determining module, configured to determine the reference roaming steering condition based on the model identifier.~~

~~26. The apparatus according to claim 25, wherein the apparatus further comprises:~~

~~a first receiving module, configured to receive and store a first correspondence sent by the access control device, wherein the first correspondence is used to indicate a roaming steering condition corresponding to each model identifier identified by the access control device, wherein~~

~~the third determining module is configured to:~~

~~determine the reference roaming steering condition from the first correspondence based on~~

the model identifier of the target terminal.

27. The apparatus according to claim 25, wherein the third determining module comprises:

a first sending submodule, configured to send a first steering-condition obtaining request to the access control device, wherein the first steering-condition obtaining request carries the model identifier of the target terminal; and

a first receiving submodule, configured to receive the reference roaming steering condition sent by the access control device, wherein the reference roaming steering condition is determined by the access control device based on the model identifier of the target terminal and from a first correspondence stored in the access control device, and the first correspondence is used to indicate a roaming steering condition corresponding to each model identifier identified by the access control device.

28. The apparatus according to any one of claims 25 to 27, wherein the second determining module comprises:

an obtaining submodule, configured to obtain the model identifier of the target terminal from the access control device.

29. The apparatus according to claim 28, wherein the obtaining submodule comprises:

a sending unit, configured to send a model query request to the access control device, wherein the model query request carries a media access control MAC address of the target terminal, and the first access point device receives the model identifier that is sent by the access control device and that is of the target terminal; or

a receiving unit, configured to receive the model identifier that is sent by the access control device and that is of the target terminal, wherein the model identifier of the target terminal is determined by the access control device by using a MAC address of the target terminal after the access control device obtains, from a data packet sent by the target terminal, the MAC address of the target terminal.

30. The apparatus according to claim 24, wherein the apparatus further comprises:

a second sending module, configured to send a second steering-condition obtaining request to the access control device, wherein the second steering-condition obtaining request carries a MAC address of the target terminal; and

a second receiving module, configured to receive the reference roaming steering condition sent by the access control device, wherein the reference roaming steering condition is determined

by the access control device, from a first correspondence stored in the access control device, after the access control device determines a model identifier of the target terminal based on the MAC address of the target terminal, and the first correspondence is used to indicate a roaming steering condition corresponding to each model identifier identified by the access control device.

31. The apparatus according to any one of claims 24 to 30, wherein the apparatus further comprises:

an obtaining module, configured to obtain a roaming device list from the access control device, wherein the roaming device list comprises an identifier/identifiers of one or more third access point devices, and the one or more third access point devices are neighboring access point devices of the first access point device; and

a fourth determining module, configured to determine, based on the roaming device list and from the one or more third access point devices, a third access point device as the one or more reference access point devices.

32. The apparatus according to claim 31, wherein the obtaining module comprises:

a second receiving submodule, configured to receive the roaming device list sent by the access control device; or

a second sending submodule, configured to send a list obtaining request to the access control device, wherein the list obtaining request carries an identifier of the first access point device; and a third receiving submodule, configured to receive the roaming device list sent by the access control device.

33. The apparatus according to claim 31, wherein the one or more second access point devices comprise the one or more third access point devices, wherein

the fourth determining module comprises:

a selection submodule, configured to select, based on the roaming device list and from the one or more third access point devices, a third access point device that satisfies the reference roaming steering condition, to obtain the one or more reference access point devices.

34. A roaming steering apparatus, used in an access control device, wherein the apparatus comprises:

a first determining module, configured to determine a reference roaming steering condition by performing, for a plurality of times, a roaming steering test on one or more terminals belonging to a reference model; and

a first sending module, configured to send the reference roaming steering condition to a first access point device, wherein a model of a target terminal associated with the first access point device is the reference model, and the first access point device is an access point device controlled by the access control device.

35. The apparatus according to claim 34, wherein the first sending module is configured to:

send a first correspondence to the first access point device, wherein the first correspondence is used to indicate a roaming steering condition corresponding to each model identifier identified by the access control device.

36. The apparatus according to claim 34, wherein the apparatus further comprises:

a first receiving module, configured to receive a first steering-condition obtaining request sent by the first access point device, wherein the first steering-condition obtaining request carries a model identifier of the target terminal; and

a second determining module, configured to determine the reference roaming steering condition from a stored first correspondence based on the model identifier of the target terminal, wherein the first correspondence is used to indicate a roaming steering condition corresponding to each model identifier identified by the access control device.

37. The apparatus according to claim 35 or 36, wherein the apparatus further comprises:

a first obtaining module, configured to obtain a media access control MAC address of the target terminal;

a third determining module, configured to determine the model identifier of the target terminal from a stored second correspondence based on the MAC address of the target terminal, wherein the second correspondence is used to indicate a model identifier corresponding to each MAC address identified by the access control device; and

a second sending module, configured to send the model identifier of the target terminal to the first access point device, to enable the first access point device to determine the reference roaming steering condition based on the model identifier of the target terminal.

38. The apparatus according to claim 37, wherein the first obtaining module comprises:

a receiving submodule, configured to receive a model query request sent by the first access point device, wherein the model query request carries the MAC address of the target terminal; or

an obtaining submodule, configured to obtain, from a data packet sent by the target terminal, the MAC address of the target terminal.

~~39. The apparatus according to claim 34, wherein the apparatus further comprises:~~

~~a second receiving module, configured to receive a second steering condition obtaining request sent by the first access point device, wherein the second steering condition obtaining request carries a MAC address of the target terminal; and~~

~~a fourth determining module, configured to determine a model identifier of the target terminal from a stored second correspondence based on the MAC address of the target terminal, wherein the second correspondence is used to indicate a model identifier corresponding to each MAC address identified by the access control device; and determine the reference roaming steering condition from a stored first correspondence based on the model identifier of the target terminal, wherein the first correspondence is used to indicate a roaming steering condition corresponding to each model identifier identified by the access control device.~~

~~40. The apparatus according to claim 37 or 39, wherein the apparatus further comprises:~~

~~a second obtaining module, configured to obtain, from a data packet sent by the target terminal, the MAC address of the target terminal and model description information of the target terminal;~~

~~a fifth determining module, configured to determine the model identifier of the target terminal based on the model description information of the target terminal; and~~

~~a first storage module, configured to store the MAC address and the model identifier of the target terminal in the second correspondence.~~

~~41. The apparatus according to any one of claims 34 to 40, wherein the apparatus further comprises:~~

~~a third receiving module, configured to receive a list obtaining request sent by the first access point device, wherein the list obtaining request carries an identifier of the first access point device;~~

~~a sixth determining module, configured to determine, based on the identifier of the first access point device, a roaming device list corresponding to the first access point device, wherein the roaming device list comprises an identifier/identifiers of one or more third access point devices, and the one or more third access point devices are neighboring access point devices of the first access point device; and~~

~~a third sending module, configured to send the roaming device list to the first access point device.~~

42. The apparatus according to claim 41, wherein the apparatus further comprises:

a third obtaining module, configured to obtain a plurality of historical roaming records and roaming experience indication information that corresponds to each historical roaming record, wherein each historical roaming record comprises an identifier of a source access point device and an identifier of a destination access point device, all source access point devices in the plurality of historical roaming records are the first access point device, and the roaming experience indication information is used to indicate whether signal quality is improved after a terminal associated with the first access point device roams to a destination access point device corresponding to a corresponding historical roaming record;

a seventh determining module, configured to determine the identifier/identifiers of the one or more third access point devices based on the plurality of historical roaming records and the roaming experience indication information that corresponds to each historical roaming record; and

a second storage module, configured to store the identifier/identifiers of the one or more third access point devices based on the identifier of the first access point device.

43. The apparatus according to claim 42, wherein the seventh determining module comprises:

a determining submodule, configured to determine the identifier/identifiers of the one or more third access point devices in a reinforcement learning manner based on the plurality of historical roaming records and the roaming experience indication information that corresponds to each historical roaming record.

44. The apparatus according to claim 43, wherein the determining submodule is configured to:

select, based on the roaming experience indication information that corresponds to each historical roaming record and from the plurality of historical roaming records, a historical roaming record that signal quality is improved after roaming;

obtain an identifier of a neighboring access point device of the first access point device, wherein the neighboring access point device is not comprised in the plurality of historical roaming records; and

determine an identifier of a destination access point device comprised in the selected historical roaming record and the obtained identifier of the neighboring access point device as

the identifiers of the one or more third access point devices.

45. The apparatus according to any one of claims 34 to 44, wherein the first determining module is configured to:

determine a plurality of combinations of access point devices and a plurality of parameter combinations corresponding to each combination of access point devices, wherein each combination of access point devices comprises an identifier of a source access point device and an identifier of a destination access point device, and all source access point devices in the plurality of combinations of access point devices are the first access point device; and

perform, for a plurality of times based on the plurality of combinations of access point devices and the plurality of parameter combinations corresponding to each combination of access point devices, the roaming steering test on the one or more terminals belonging to the reference model by using different steering test conditions, to determine the reference roaming steering condition by using a standard that the one or more terminals belonging to the reference model are successfully steered to roam.

46. The apparatus according to claim 45, wherein the plurality of parameter combinations are obtained by combining different values of one or more dimension features, and the one or more dimension features comprise one or more of a signal strength, a channel, a frequency band, and load.

47. An access point device, comprising a processor and a memory, wherein

the memory is configured to store a computer program, wherein the computer program comprises program instructions; and

the processor is configured to invoke the computer program, to implement the roaming steering method according to any one of claims 1 to 10.

48. An access control device, comprising a processor and a memory, wherein

the memory is configured to store a computer program, wherein the computer program comprises program instructions; and

the processor is configured to invoke the computer program, to implement the roaming steering method according to any one of claims 11 to 23.

49. A computer-readable storage medium, wherein the storage medium stores a computer program, and when the computer program is executed by a processor, steps of the method according to any one of claims 1 to 10 are implemented.

~~50. A computer-readable storage medium, wherein the storage medium stores a computer program, and when the computer program is executed by a processor, steps of the method according to any one of claims 11 to 23 are implemented.~~

~~51. A roaming steering system, comprising a plurality of access point devices, an access control device, and a target terminal, wherein the plurality of access point devices comprise a first access point device, the first access point device is configured to implement steps of the method according to any one of claims 1 to 10, and the access control device is configured to implement steps of the method according to any one of claims 11 to 23.~~