RESOURCE ALLOCATION METHOD AND BASE STATION CONTROLLER

~~[0001] This application claims priority to Chinese Patent Application No. 201410091149.5, filed with the Chinese Patent Office on March 12, 2014 and entitled "RESOURCE ALLOCATION METHOD AND BASE STATION CONTROLLER", which is incorporated herein by reference in its entirety.~~

TECHNICAL FIELD

[0002] The present invention relates to the communications field, and in particular, to a resource allocation method and a base station controller.

BACKGROUND

[0003] In a broad sense, a base station is short for a BSS (~~Base Station Subsystem,~~ base station subsystem), including a base station controller and a base station antenna. The base station antenna is classified into three types of antennas: an access antenna, a backhaul antenna, and a listening antenna. The listening antenna is used to receive, during a listening period, a reference signal sent by user equipment, so as to detect a reference signal of active user equipment and determine a position of an active user. The access antenna and the backhaul antenna are antennas used to perform service communication, where ~~a receiving~~an access antenna is an antenna used to perform service communication between a base station and a user, and the backhaul antenna is an antenna used to perform data transmission between base stations.

[0004] In the prior art, an access antenna and a backhaul antenna are two different constituent parts in one base station, and both a resource quantity of the access antenna and a resource quantity of the backhaul antenna are fixed values. A resource of the access antenna and a resource of the backhaul antenna are selected in a resource redundancy manner, and the resource redundancy manner is: The resource quantity of the access antenna and that of the backhaul antenna are set to two or three times an actual resource quantity, or larger, to avoid an occurrence of such a burst case

that data traffic of user equipment increases explosively. For example, an access antenna of 100 array element units and a backhaul antenna of 150 array element units can enable user equipment in an area in which the base station is located to work normally. In practice, a resource quantity of the access antenna is set to 200 array element units, and a resource quantity of the backhaul antenna is set to 300 array element units. However, if the user equipment does not encounter this kind of burst case for a long time, a resource of a redundant part is idle for a long time, which causes a waste of resources of a base station antenna, and therefore, resource utilization of the base station is relatively low.

SUMMARY

[0005] Embodiments of the present invention provide a resource allocation method and a base station controller, which can improve resource utilization.

[0006] To achieve the foregoing objective, the following technical solutions are used in the embodiments of the present invention:

[0007] According to a first aspect, a base station controller is provided, including:

a receiving unit, configured to receive reference signals sent by all active user equipment in a first sector during a current listening period, where the first sector is any sector of a base station antenna in a base station in which the base station controller is located;

a first determining unit, configured to determine the all active user equipment according to the reference signals;

a first acquiring unit, configured to acquire total data traffic of the first sector during the current listening period according to the all active user equipment;

a second determining unit, configured to determine a to-be-adjusted resource quantity of an access antenna and a to-be-adjusted resource quantity of a backhaul antenna in resources of the base station antenna according to the total data traffic of the first sector during the current listening period;

a generation unit, configured to generate control information, where the control information includes the to-be-adjusted resource quantity of the access antenna and the to-be-adjusted resource quantity of the backhaul antenna; and

a first sending unit, configured to send the control information to the base station antenna, where the control information includes the to-be-adjusted resource

quantity of the access antenna and the to-be-adjusted resource quantity of the backhaul antenna, so that the base station antenna adjusts a resource of the access antenna and a resource of the backhaul antenna according to the control information.

[0008] With reference to the first aspect, in a first implementable manner, ~~the~~ an initial resources of the base station antenna are allocated according to a preset proportion of the access antenna, the backhaul antenna, and a listening antenna.

[0009] With reference to the first implementable manner, in a second implementable manner, a parameter of the listening antenna is preset by the base station controller, and the parameter of the listening antenna includes a beam width, a beam angle, a listening period, and listening time that are of the listening antenna.

[0010] With reference to the second implementable manner, in a third implementable manner,

the second determining unit is specifically configured to:

acquire preset average data traffic of the first sector;

determine whether the total data traffic of the first sector during the current listening period is greater than the preset average data traffic of the first sector;

acquire a preset peak value of the first sector if the total data traffic of the first sector during the current listening period is greater than the preset average data traffic of the first sector;

determine whether the total data traffic of the first sector during the current listening period is greater than the preset peak value of the first sector;

acquire total data traffic of the first sector during a previous listening period if the total data traffic of the first sector during the current listening period is greater than the preset peak value of the first sector;

determine whether the total data traffic of the first sector during the previous listening period is greater than the preset peak value of the first sector; and

send a cooperative work request to another base station if the total data traffic of the first sector during the previous listening period is less than or equal to the preset peak value of the first sector, so that the another base station performs information transmission with user equipment in the first sector according to the cooperative work request.

[0011] With reference to the third implementable manner, in a fourth implementable manner,

the second determining unit is further configured to:

acquire the total data traffic of the first sector during the previous listening period if the total data traffic of the first sector during the current listening period is less than or equal to the preset peak value of the first sector;

determine whether the total data traffic of the first sector during the previous listening period is greater than the preset peak value of the first sector;

if the total data traffic of the first sector during the previous listening period is greater than the preset peak value of the first sector, send a cooperative stop request to another base station, so that the another base station stops performing information transmission with user equipment in the first sector according to the cooperative stop request;

obtain a corresponding to-be-decreased resource quantity of the backhaul antenna and a corresponding to-be-increased resource quantity of the access antenna according to a traffic difference between the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector; and

if the total data traffic of the first sector during the previous listening period is less than or equal to the preset peak value of the first sector, obtain a corresponding to-be-decreased resource quantity of the backhaul antenna and a corresponding to-be-increased resource quantity of the access antenna according to a traffic difference between the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector.

[0012] With reference to the third implementable manner, in a fifth implementable manner,

the ~~adjusted resources are~~ second determining unit is further ~~used~~ configured to:

if the total data traffic of the first sector during the current listening period is less than or equal to the preset average data traffic of the first sector, obtain a corresponding to-be-increased resource quantity of the backhaul antenna and a corresponding to-be-decreased resource quantity of the access antenna according to a traffic difference between the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector.

[0013] With reference to the fifth implementable manner, in a sixth implementable manner,

the base station controller further includes:

a second acquiring unit, configured to acquire a total quantity of the all

active user equipment;

a judging unit, configured to determine whether the total quantity of the all active user equipment is 0; and

a second sending unit, configured to: if the total quantity of the all active user equipment is 0, send, to the base station antenna, a disabling indication used to instruct to disable all access antennas in the first sector.

[0014] According to a second aspect, a resource allocation method is provided and is applied to a base station controller, including:

receiving reference signals sent by all active user equipment in a first sector during a current listening period, where the first sector is any sector of a base station antenna in a base station in which the base station controller is located;

determining the all active user equipment according to the reference signals;

acquiring total data traffic of the first sector during the current listening period according to the all active user equipment;

determining a to-be-adjusted resource quantity of an access antenna and a to-be-adjusted resource quantity of a backhaul antenna in resources of the base station antenna according to the total data traffic of the first sector during the current listening period;

generating control information, where the control information includes the to-be-adjusted resource quantity of the access antenna and the to-be-adjusted resource quantity of the backhaul antenna; and

sending the control information to the base station antenna, where the control information includes the to-be-adjusted resource quantity of the access antenna and the to-be-adjusted resource quantity of the backhaul antenna, so that the base station antenna adjusts a resource of the access antenna and a resource of the backhaul antenna according to the control information.

[0015] With reference to the second aspect, in a first implementable manner, before the determining a to-be-adjusted resource quantity of an access antenna and a to-be-adjusted resource quantity of a backhaul antenna in resources of the base station antenna according to the total data traffic of the first sector during the current listening period, ~~the~~ an initial resources of the base station antenna are allocated according to a preset proportion of the access antenna, the backhaul antenna, and a listening antenna.

[0016] With reference to the first implementable manner, in a second

and a to-be-adjusted resource quantity of a backhaul antenna in resources of the base station antenna according to the total data traffic of the first sector during the current listening period ~~a total quantity of active user equipment in the first sector and total data traffic of active user equipment in the first sector~~ further includes:

acquiring the total data traffic of the first sector during the previous listening period if the total data traffic of the first sector during the current listening period is less than or equal to the preset peak value of the first sector;

determining whether the total data traffic of the first sector during the previous listening period is greater than the preset peak value of the first sector;

if the total data traffic of the first sector during the previous listening period is greater than the preset peak value of the first sector, sending a cooperative stop request to another base station, so that the another base station stops performing information transmission with user equipment in the first sector according to the cooperative stop request;

obtaining a corresponding to-be-decreased resource quantity of the backhaul antenna and a corresponding to-be-increased resource quantity of the access antenna according to a traffic difference between the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector; and

if the total data traffic of the first sector during the previous listening period is less than or equal to the preset peak value of the first sector, obtaining a corresponding to-be-decreased resource quantity of the backhaul antenna and a corresponding to-be-increased resource quantity of the access antenna according to a traffic difference between the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector.

[0019] With reference to the third implementable manner, in a fifth implementable manner,

after the determining whether the total data traffic of the first sector during the current listening period is greater than the preset average data traffic of the first sector, the resource allocation method further includes:

if the total data traffic of the first sector during the current listening period is less than or equal to the preset average data traffic of the first sector, obtaining a corresponding to-be-increased resource quantity of the backhaul antenna and a corresponding to-be-decreased resource quantity of the access antenna according to a traffic difference between the total data traffic of the first sector during

the current listening period and the preset average data traffic of the first sector.

[0020] With reference to the fifth implementable manner, in a sixth implementable manner,

after the determining the all active user equipments according to the reference signals~~used to determine the all active user equipment according to the reference signals~~, the resource allocation method further includes:

acquiring a total quantity of the all active user equipment;

determining whether the total quantity of the all active user equipment is 0; and

if the total quantity of the all active user equipment is 0, sending, to the base station antenna, a disabling indication used to instruct to disable all access antennas in the first sector.

[0021] The embodiments of the present invention provide a resource ~~acquiring~~ allocation method and a base station controller. The method includes: receiving reference signals sent by all active user equipment in a first sector during a current listening period, where the first sector is any sector of a base station antenna in a base station in which the base station controller is located; determining the all active user equipment according to the reference signals; acquiring total data traffic of the first sector during the current listening period according to the all active user equipment; determining a to-be-adjusted resource quantity of an access antenna and a to-be-adjusted resource quantity of a backhaul antenna in resources of the base station antenna according to the total data traffic of the first sector during the current listening period; generating control information, where the control information includes the to-be-adjusted resource quantity of the access antenna and the to-be-adjusted resource quantity of the backhaul antenna; and sending the control information to the base station antenna. In this way, ~~a base station console~~ the base station controller may adjust a resource quantity of the access antenna and a resource quantity of the backhaul antenna according to a total quantity of active user equipment during the current listening period and the total data traffic of the first sector during the current listening period, which improves resource utilization of the base station antenna and saves resources of the base station.

BRIEF DESCRIPTION OF DRAWINGS

[0022] To describe the technical solutions in the embodiments of the present invention or in the prior art more clearly, the following briefly introduces the

first sector during the current listening period according to the all active user equipment;

a second determining unit 104, configured to determine a to-be-adjusted resource quantity of an access antenna and a to-be-adjusted resource quantity of a backhaul antenna in resources of the base station antenna according to the total data traffic of the first sector during the current listening period, where

a parameter of ~~the~~ a listening antenna is preset by the base station controller, and the parameter of the listening antenna includes a beam width, a beam angle, a listening period, and listening time that are of the listening antenna;

a generation unit 105, configured to generate control information, where the control information includes the to-be-adjusted resource quantity of the access antenna and the to-be-adjusted resource quantity of the backhaul antenna; and

a first sending unit 106, configured to send the control information to the base station antenna, where the control information includes the to-be-adjusted resource quantity of the access antenna and the to-be-adjusted resource quantity of the backhaul antenna, so that the base station antenna adjusts a resource of the access antenna and a resource of the backhaul antenna according to the control information.

[0030] In this way, ~~a~~ the base station ~~console~~controller may adjust a resource quantity of the access antenna and a resource quantity of the backhaul antenna according to a total quantity of active user equipment during the current listening period and the total data traffic of the first sector during the current listening period, which improves resource utilization of the base station antenna and saves resources of the base station.

[0031] The initial resources of the base station antenna are allocated according to a preset proportion of the access antenna, the backhaul antenna, and the listening antenna. Compared with the prior art, each base station antenna can allocate resources to both an access antenna and a backhaul antenna, instead of only the access antenna or the backhaul antenna. Therefore, resources of the base station antenna are saved, and the access antenna and the backhaul antenna are located at a same base station, which implements integration of the base station antenna.

[0032] The second determining unit 104 is specifically configured to:

acquire preset average data traffic of the first sector;

determine whether the total data traffic of the first sector during the current listening period is greater than the preset average data traffic of the first sector;

acquire a preset peak value of the first sector if the total data traffic of the first sector during the current listening period is greater than the preset average data traffic of the first sector;

determine whether the total data traffic of the first sector during the current listening period is greater than the preset peak value of the first sector;

acquire total data traffic of the first sector during a previous listening period if the total data traffic of the first sector during the current listening period is greater than the preset peak value of the first sector;

determine whether the total data traffic of the first sector during the previous listening period is greater than the preset peak value of the first sector; and

send a cooperative work request to another base station if the total data traffic of the first sector during the previous listening period is less than or equal to the preset peak value of the first sector, so that the another base station performs information transmission with user equipment in the first sector according to the cooperative work request.

[0033] Further, the second determining unit 104 is further configured to:

acquire the total data traffic of the first sector during the previous listening period if the total data traffic of the first sector during the current listening period is less than or equal to the preset peak value of the first sector;

determine whether the total data traffic of the first sector during the previous listening period is greater than the preset peak value of the first sector;

if the total data traffic of the first sector during the previous listening period is greater than the preset peak value of the first sector, send a cooperative stop request to another base station, so that the another base station stops performing information transmission with user equipment in the first sector according to the cooperative stop request;

obtain a corresponding to-be-decreased resource quantity of the backhaul antenna and a corresponding to-be-increased resource quantity of the access antenna according to a traffic difference between the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector; and

if the total data traffic of the first sector during the previous listening period is less than or equal to the preset peak value of the first sector, obtain a corresponding to-be-decreased resource quantity of the backhaul antenna and a corresponding to-be-increased resource quantity of the access antenna according to a

traffic difference between the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector.

[0034] Further, the ~~adjusted resources~~second determining unit 104 ~~are~~ is further ~~used~~ configured to:

if the total data traffic of the first sector during the current listening period is less than or equal to the preset average data traffic of the first sector, obtain a corresponding to-be-increased resource quantity of the backhaul antenna and a corresponding to-be-decreased resource quantity of the access antenna according to a traffic difference between the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector.

[0035] As shown in FIG. 2, the base station controller 10 further includes:

a second acquiring unit 107, configured to acquire a total quantity of the all active user equipment;

a judging unit 108, configured to determine whether the total quantity of the all active user equipment is 0; and

a second sending unit 109, configured to: if the total quantity of the all active user equipment is 0, send, to the base station antenna, a disabling indication used to instruct to disable all access antennas in the first sector.

[0036] As shown in FIG. 3, an embodiment of the present invention provides a base station controller 20, including: a receiver 201, a processor 202, and a transmitter 203.

[0037] The receiver 201 is configured to receive reference signals sent by all active user equipment in a first sector during a current listening period, where the first sector is any sector of a base station antenna in a base station in which the base station controller is located; and

the processor 202 is configured to determine the all active user equipment according to the reference signals.

[0038] The processor 202 is further configured to acquire total data traffic of the first sector during the current listening period according to the all active user equipment.

[0039] The processor 202 is further configured to determine a to-be-adjusted resource quantity of an access antenna and a to-be-adjusted resource quantity of a backhaul antenna in resources of the base station antenna according to the total data traffic of the first sector during the current listening period.

[0040] A parameter of ~~the~~ a listening antenna is preset by the base station controller,

and the parameter of the listening antenna includes a beam width, a beam angle, a listening period, and listening time that are of the listening antenna.

[0041] The processor 202 is further configured to generate control information, where the control information includes the to-be-adjusted resource quantity of the access antenna and the to-be-adjusted resource quantity of the backhaul antenna.

[0042] The transmitter 203 is configured to send the control information to the base station antenna, where the control information includes the to-be-adjusted resource quantity of the access antenna and the to-be-adjusted resource quantity of the backhaul antenna, so that the base station antenna adjusts a resource of the access antenna and a resource of the backhaul antenna according to the control information.

[0043] In this way, ~~a~~ the base station ~~console~~controller may adjust a resource quantity of the access antenna and a resource quantity of the backhaul antenna according to a total quantity of active user equipment during the current listening period and the total data traffic of the first sector during the current listening period, which improves resource utilization of the base station antenna and saves resources of the base station.

[0044] It should be noted that the initial resources of the base station antenna are allocated according to a preset proportion of the access antenna, the backhaul antenna, and the listening antenna. Compared with the prior art, each base station antenna can allocate resources to both an access antenna and a backhaul antenna, instead of only the access antenna or the backhaul antenna. Therefore, resources of the base station antenna are saved, and the access antenna and the backhaul antenna are located at a same base station, which implements integration of the base station antenna.

[0045] The processor 202 is further configured to:

acquire preset average data traffic of the first sector;

determine whether the total data traffic of the first sector during the current listening period is greater than the preset average data traffic of the first sector;

acquire a preset peak value of the first sector if the total data traffic of the first sector during the current listening period is greater than the preset average data traffic of the first sector;

determine whether the total data traffic of the first sector during the current listening period is greater than the preset peak value of the first sector;

acquire total data traffic of the first sector during a previous listening period if the total data traffic of the first sector during the current listening period is

traffic difference between the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector.

[0048] As shown in FIG. 3, the base station controller ~~10~~ 20 further includes:

[0049] The processor 202 is further configured to acquire a total quantity of the all active user equipment.

[0050] The processor 202 is further configured to determine whether the total quantity of the all active user equipment is 0.

[0051] The transmitter 203 is further configured to: if the total quantity of the all active user equipment is 0, send, to the base station antenna, a disabling indication used to instruct to disable all access antennas in the first sector.

[0052] An embodiment of the present invention provides a resource allocation method applied to a base station controller, and as shown in FIG. 4, specific steps include the following:

[0053] Step 301: Receive reference signals sent by all active user equipment in a first sector during a current listening period, where the first sector is any sector of a base station antenna in a base station in which the base station controller is located.

[0054] A listening antenna is configured to: receive a reference signal sent by active user equipment and send the reference signal to the base station controller. A parameter of the listening antenna is preset by the base station controller, and the parameter of the listening antenna includes a beam width, a beam angle, a listening period, and listening time that are of the listening antenna. The active user equipment is user equipment that performs a data service with the base station, and silent user equipment is user equipment that has a capability to perform a data service with the base station but does not perform the data service.

[0055] Step 302: Determine the all active user equipment according to the reference signals.

[0056] Step 303: Acquire total data traffic of the first sector during the current listening period according to the all active user equipment.

[0057] Step 304: Determine a to-be-adjusted resource quantity of an access antenna and a to-be-adjusted resource quantity of a backhaul antenna in resources of the base station antenna according to the total data traffic of the first sector during the current listening period.

[0058] Step 305: Generate control information, where the control information includes the to-be-adjusted resource quantity of the access antenna and the

to-be-adjusted resource quantity of the backhaul antenna.

[0059] Step 306: Send the control information to the base station antenna.

[0060] It should be noted that, before a resource quantity of the access antenna and a resource quantity of the backhaul antenna are adjusted, the resources of the antenna are allocated according to a preset proportion of the access antenna, the backhaul antenna, and the listening antenna.

[0061] In this way, ~~a~~ the base station ~~console~~controller may adjust the resource quantity of the access antenna and the resource quantity of the backhaul antenna according to a total quantity of active user equipment during the current listening period and the total data traffic of the first sector during the current listening period, which improves resource utilization of the base station antenna and saves resources of the base station.

[0062] Before step 301, the resource allocation method further includes the following: The base station controller receives a registration request sent by first user equipment, where the first user equipment is any one of all unregistered user equipment; allocates a registration identifier to the first user equipment according to the registration request, where the registration identifier is in one-to-one correspondence with the first user equipment; and sends registration response information to the first user equipment, where the registration response information includes the registration identifier.

[0063] Further, step 304 that determine a to-be-adjusted resource quantity of an access antenna and a to-be-adjusted resource quantity of a backhaul antenna in resources of the base station antenna according to the total data traffic of the first sector during the current listening period,~~according to a total quantity of the active user equipment and the total data traffic of the first sector~~ includes the following:

[0064] The base station controller may acquire preset average data traffic of the first sector; determine whether the total data traffic of the first sector during the current listening period is greater than the preset average data traffic of the first sector; acquire a preset peak value of the first sector if the total data traffic of the first sector during the current listening period is greater than the preset average data traffic of the first sector; and determine whether the total data traffic of the first sector during the current listening period is greater than the preset peak value of the first sector.

[0065] The base station controller acquires total data traffic of the first sector during a previous listening period if the total data traffic of the first sector during the current listening period is greater than the preset peak value of the first sector; determines whether the total data traffic of the first sector during the previous

corresponding mobile phone by using the base station antenna.

[0076] Step 404: Receive reference signals sent by all active mobile phones in a first sector during a current listening period.

[0077] Specifically, for reference signals of all active mobile phones in the first sector sent by a listening antenna during the current listening period, the listening antenna sends the reference signals to the base station controller, where the reference signals of the active mobile phones are received by using the listening ~~a monitoring~~ antenna. A parameter of the listening antenna is preset by the base station controller, and the parameter of the listening antenna includes a beam width, a beam angle, a listening period, and listening time that are of the listening antenna.

[0078] Step 405: Determine the all active mobile phones according to the reference signals.

[0079] Specifically, an active mobile phone may receive a signal of a wireless local area network hotspot to obtain signal strength of the wireless local area network hotspot, and sends the signal strength, used as a reference signal, to the base station controller. The base station controller may obtain a distance from a position of the mobile phone to a transmit end of the wireless local area network hotspot according to contrast calculation between the signal strength and preset signal strength of the wireless local area network hotspot. If there are multiple transmit ends of wireless local area network hotspots, a distance from the mobile phone to each transmit end may be obtained. Then, position coordinates of the active mobile phone are calculated according to position coordinates of each transmit end of the wireless local area network hotspots. A range of the first sector is acquired, and it is determined whether the position coordinates of the active mobile phone are within the range of the first sector, where the active mobile phone is an active mobile phone in the first sector. It should be noted that there are still various methods for obtaining a position of the active mobile phone in the first sector in the present invention, for example, a direction of arrival estimation method.

[0080] Step 406: Acquire total data traffic of the first sector during the current listening period according to the all active mobile phones.

[0081] Step 407: Determine a to-be-adjusted resource quantity of an access antenna and a to-be-adjusted resource quantity of a backhaul antenna in resources of a base station antenna according to the total data traffic of the first sector during the current listening period.

corresponding to-be-increased resource quantity of the access antenna and a corresponding to-be-decreased resource quantity of the backhaul antenna are obtained. If the data traffic during the previous listening period is less than or equal to the preset peak value of the first sector, the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector are compared to obtain a traffic difference. A resource quantity of resources is obtained according to the traffic difference, and then a corresponding to-be-increased resource quantity of the access antenna and a corresponding to-be-decreased resource quantity of the backhaul antenna are obtained.

[0085] If the total data traffic of the first sector during the current listening period is less than or equal to the preset average data traffic of the first sector, a corresponding to-be-increased resource quantity of the backhaul antenna and a corresponding to-be-decreased resource quantity of the access antenna are obtained according to a traffic difference between the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector.

[0086] Step 408: Generate control information.

[0087] The control information includes a corresponding to-be-increased resource quantity of the backhaul antenna and a corresponding to-be-decreased resource quantity of the access antenna; or a corresponding to-be-decreased resource quantity of the backhaul antenna and a corresponding to-be-increased resource quantity of the access antenna.

[0088] Step 409: Send the control information to the base station antenna, so that the base station antenna adjusts an allocation proportion of resources.

[0089] For example, it is assumed that a football field that can accommodate twenty thousand people exists in a cell range corresponding to the first sector. When a football match is held, a quantity of people in the first sector during a current listening period increases explosively, and the base station controller may acquire total data traffic of the first sector during the current listening period, acquire a preset average data traffic of the first sector, and acquire a preset peak value of the first sector. If the total data traffic of the first sector during the current listening period is greater than the preset average data traffic, the base station controller determines whether the total data traffic of the first sector during the current listening period is greater than the preset peak value of the first sector. If the total data traffic of the first sector during the current listening period is greater than the preset peak value of the first sectoryes, the base station controller acquires total data traffic of the first sector during a previous listening period. If the total data traffic

of the first sector during the previous listening period is less than or equal to data traffic of a first listening period, the base station controller sends a cooperative work request to another base station. When the football match is over, the base station controller may acquire total data traffic of the first sector during a current listening period and acquire the preset average data traffic of the first sector. If the total data traffic of the first sector during the current listening period is greater than the preset average data traffic, the base station controller determines whether the total data traffic of the first sector during the current listening period is greater than the preset peak value of the first sector. If the total data traffic of the first sector during the current listening period is not greater than the preset peak value of the first sector~~no~~, the base station controller acquires total data traffic of the first sector during a previous listening period, and determines whether the total data traffic of the first sector during the previous listening period is greater than the data traffic of the first listening period. If the total data traffic of the first sector during the previous listening period is greater than the data traffic of the first listening period, the base station controller sends a cooperative stop request to another base station, and adjusts resources of the base station antenna according to a difference between the total data traffic of the first sector during the current listening period and the preset peak value. An hour later after the match is over, people in the football field are increasingly fewer. The base station controller may acquire total data traffic of the first sector during a current listening period and acquire the preset average data traffic of the first sector. If the total data traffic of the first sector during the current listening period is less than or equal to the preset average data traffic, the base station controller adjusts the resources of the base station antenna, so as to increase a corresponding resource quantity of the backhaul antenna, and decrease a corresponding resource quantity of the access antenna. When the football field is closed, there is no active mobile phone in the first sector, and the base station controller sends, to the base station antenna, a disabling indication used to instruct to disable an access antenna corresponding to the first sector.

[0090] The embodiments of the present invention provide a resource acquiring method and a base station controller. The method includes: receiving reference signals sent by all active user equipment in a first sector during a current listening period, where the first sector is any sector of a base station antenna in a base station in which the base station controller is located; determining the all active user equipment according to the reference signals; acquiring total data traffic of the first sector during the current listening period according to the all active user equipment; determining a

to-be-adjusted resource quantity of an access antenna and a to-be-adjusted resource quantity of a backhaul antenna in resources of the base station antenna according to the total data traffic of the first sector during the current listening period; generating control information, where the control information includes the to-be-adjusted resource quantity of the access antenna and the to-be-adjusted resource quantity of the backhaul antenna; and sending the control information to the base station antenna. In this way, ~~a base station console~~the base station controller may adjust a resource quantity of the access antenna and a resource quantity of the backhaul antenna according to a total quantity of active user equipment during the current listening period and the total data traffic of the first sector during the current listening period, which improves resource utilization of the base station antenna and saves resources of the base station.

[0091] A person of ordinary skill in the art may understand that all or some of the steps of the method embodiments may be implemented by a program instructing relevant hardware. The program may be stored in a computer-readable storage medium. When the program runs, the steps of the method embodiments are performed. The foregoing storage medium includes: any medium that can store program code, such as a ROM, a RAM, a magnetic disk, or an optical disc.

[0092] It should be noted that a sequence of the steps of the resource allocation method provided in the embodiments of the present invention may be adjusted properly, and the steps may also be added or removed according to conditions. Any changed method readily figured out by a person skilled in the art within the technical scope disclosed in the present invention shall fall within the protection scope of the present invention, and therefore, details are not described again.

[0093] The foregoing descriptions are merely specific implementation manners of the present invention, but are not intended to limit the protection scope of the present invention. Any variation or replacement readily figured out by a person skilled in the art within the technical scope disclosed in the present invention shall fall within the protection scope of the present invention. Therefore, the protection scope of the present invention shall be subject to the protection scope of the claims.

CLAIMS

~~What is claimed is:~~

1. A base station controller (10), comprising:

a receiving unit (101), configured to receive reference signals sent by all active user equipment in a first sector during a current listening period, wherein the first sector is any sector of a base station antenna in a base station in which the base station controller is located;

a first determining unit (102), configured to determine the all active user equipment according to the reference signals;

a first acquiring unit (103), configured to acquire total data traffic of the first sector during the current listening period according to the all active user equipment;

a second determining unit (104), configured to determine a to-be-adjusted resource quantity of an access antenna and a to-be-adjusted resource quantity of a backhaul antenna in resources of the base station antenna according to the total data traffic of the first sector during the current listening period;

a generation unit (105), configured to generate control information, wherein the control information comprises the to-be-adjusted resource quantity of the access antenna and the to-be-adjusted resource quantity of the backhaul antenna; and

a first sending unit (106), configured to send the control information to the base station antenna, so that the base station antenna adjusts a resource of the access antenna and a resource of the backhaul antenna according to the control information.

2. The base station controller (10) according to claim 1, wherein ~~the~~ an initial resources of the base station antenna are allocated according to a preset proportion of the access antenna, the backhaul antenna, and a listening antenna.

3. The base station controller (10) according to claim 2, wherein a parameter of the listening antenna is preset by the base station controller, and the parameter of the listening antenna comprises a beam width, a beam angle, a listening period, and listening time that are of the listening antenna.

4. The base station controller (10) according to claim 3, wherein the second determining unit (104) is specifically configured to:

acquire preset average data traffic of the first sector;

determine whether the total data traffic of the first sector during the current

listening period is greater than the preset average data traffic of the first sector;

acquire a preset peak value of the first sector if the total data traffic of the first sector during the current listening period is greater than the preset average data traffic of the first sector;

determine whether the total data traffic of the first sector during the current listening period is greater than the preset peak value of the first sector;

acquire total data traffic of the first sector during a previous listening period if the total data traffic of the first sector during the current listening period is greater than the preset peak value of the first sector;

determine whether the total data traffic of the first sector during the previous listening period is greater than the preset peak value of the first sector; and

send a cooperative work request to another base station if the total data traffic of the first sector during the previous listening period is less than or equal to the preset peak value of the first sector, so that the another base station performs information transmission with user equipment in the first sector according to the cooperative work request.

5. The base station controller according to claim 4, wherein

the second determining unit (104) is further configured to:

acquire the total data traffic of the first sector during the previous listening period if the total data traffic of the first sector during the current listening period is less than or equal to the preset peak value of the first sector;

determine whether the total data traffic of the first sector during the previous listening period is greater than the preset peak value of the first sector;

if the total data traffic of the first sector during the previous listening period is greater than the preset peak value of the first sector, send a cooperative stop request to another base station, so that the another base station stops performing information transmission with user equipment in the first sector according to the cooperative stop request;

obtain a corresponding to-be-decreased resource quantity of the backhaul antenna and a corresponding to-be-increased resource quantity of the access antenna according to a traffic difference between the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector; and

if the total data traffic of the first sector during the previous listening period is less than or equal to the preset peak value of the first sector, obtain a corresponding

to-be-decreased resource quantity of the backhaul antenna and a corresponding to-be-increased resource quantity of the access antenna according to a traffic difference between the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector.

6. The base station controller according to claim 4, wherein the ~~adjusted resources~~second determining unit (104) ~~are~~ is further ~~used~~ configured to:

if the total data traffic of the first sector during the current listening period is less than or equal to the preset average data traffic of the first sector, obtain a corresponding to-be-increased resource quantity of the backhaul antenna and a corresponding to-be-decreased resource quantity of the access antenna according to a traffic difference between the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector.

7. The base station controller (10) according to claim 6, wherein the base station controller (10) further comprises:

a second acquiring unit (107), configured to acquire a total quantity of the all active user equipment;

a judging unit (108), configured to determine whether the total quantity of the all active user equipment is 0; and

a second sending unit (109), configured to: if the total quantity of the all active user equipment is 0, send, to the base station antenna, a disabling indication used to instruct to disable all access antennas in the first sector.

8. A resource allocation method, applied to a base station controller, wherein the method comprises:

receiving (301) reference signals sent by all active user equipment in a first sector during a current listening period, wherein the first sector is any sector of a base station antenna in a base station in which the base station controller is located;

determining (302) the all active user equipment according to the reference signals;

acquiring (303) total data traffic of the first sector during the current listening period according to the all active user equipment;

determining (304) a to-be-adjusted resource quantity of an access antenna and a to-be-adjusted resource quantity of a backhaul antenna in resources of the base station antenna according to the total data traffic of the first sector during the current listening period;

generating (305) control information, wherein the control information comprises the

to-be-adjusted resource quantity of the access antenna and the to-be-adjusted resource quantity of the backhaul antenna; and

sending (306) the control information to the base station antenna, wherein the control information comprises the to-be-adjusted resource quantity of the access antenna and the to-be-adjusted resource quantity of the backhaul antenna, so that the base station antenna adjusts a resource of the access antenna and a resource of the backhaul antenna according to the control information.

9. The resource allocation method according to claim 8, wherein before the determining a to-be-adjusted resource quantity of an access antenna and a to-be-adjusted resource quantity of a backhaul antenna in resources of the base station antenna according to the total data traffic of the first sector during the current listening period, the initial resources of the base station antenna are allocated according to a preset proportion of the access antenna, the backhaul antenna, and a listening antenna.

10. The resource allocation method according to claim 9, wherein a parameter of the listening antenna is preset by the base station controller, and the parameter of the listening antenna comprises a beam width, a beam angle, a listening period, and listening time that are of the listening antenna.

11. The resource allocation method according to claim 10, wherein the determining a to-be-adjusted resource quantity of an access antenna and a to-be-adjusted resource quantity of a backhaul antenna in resources of the base station antenna according to the total data traffic of the first sector during the current listening period comprises:

acquiring preset average data traffic of the first sector;

determining whether the total data traffic of the first sector during the current listening period is greater than the preset average data traffic of the first sector;

acquiring a preset peak value of the first sector if the total data traffic of the first sector during the current listening period is greater than the preset average data traffic of the first sector;

determining whether the total data traffic of the first sector during the current listening period is greater than the preset peak value of the first sector;

acquiring total data traffic of the first sector during a previous listening period if the total data traffic of the first sector during the current listening period is greater than the preset peak value of the first sector;

determining whether the total data traffic of the first sector during the previous

listening period is greater than the preset peak value of the first sector; and

sending a cooperative work request to another base station if the total data traffic of the first sector during the previous listening period is less than or equal to the preset peak value of the first sector, so that the another base station performs information transmission with user equipment in the first sector according to the cooperative work request.

12. The resource allocation method according to claim 11, wherein after the determining whether the total data traffic of the first sector during the current listening period is greater than the preset peak value of the first sector,

the determining a to-be-adjusted resource quantity of an access antenna and a to-be-adjusted resource quantity of a backhaul antenna in resources of the base station antenna according to the total data traffic of the first sector during the current listening period,~~according to a total quantity of active user equipment in the first sector and total data traffic of active user equipment in the first sector~~ further comprises:

acquiring the total data traffic of the first sector during the previous listening period if the total data traffic of the first sector during the current listening period is less than or equal to the preset peak value of the first sector;

determining whether the total data traffic of the first sector during the previous listening period is greater than the preset peak value of the first sector;

if the total data traffic of the first sector during the previous listening period is greater than the preset peak value of the first sector, sending a cooperative stop request to another base station, so that the another base station stops performing information transmission with user equipment in the first sector according to the cooperative stop request;

obtaining a corresponding to-be-decreased resource quantity of the backhaul antenna and a corresponding to-be-increased resource quantity of the access antenna according to a traffic difference between the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector; and

if the total data traffic of the first sector during the previous listening period is less than or equal to the preset peak value of the first sector, obtaining a corresponding to-be-decreased resource quantity of the backhaul antenna and a corresponding to-be-increased resource quantity of the access antenna according to a traffic difference between the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector.

13. The resource allocation method according to claim 11, wherein after the

determining whether the total data traffic of the first sector during the current listening period is greater than the preset average data traffic of the first sector, the resource allocation method further comprises:

if the total data traffic of the first sector during the current listening period is less than or equal to the preset average data traffic of the first sector, obtaining a corresponding to-be-increased resource quantity of the backhaul antenna and a corresponding to-be-decreased resource quantity of the access antenna according to a traffic difference between the total data traffic of the first sector during the current listening period and the preset average data traffic of the first sector.

14. The resource allocation method according to claim 13, wherein after the determining the all active user equipment according to the reference signals, the resource allocation method further comprises:

acquiring a total quantity of the all active user equipment;

determining whether the total quantity of the all active user equipment is 0; and

if the total quantity of the all active user equipment is 0, sending, to the base station antenna, a disabling indication used to instruct to disable all access antennas in the first sector.