CLAIMS

What is claimed is:

1. A privacy computing task execution method, related to a privacy task controller, a task resource group controller, and a centralized scheduler in a kubernetes cluster, wherein the method comprises:

creating, by the privacy task controller, a corresponding task resource group based on description information of a submitted privacy computing task, wherein information about the task resource group comprises information about a plurality of participants of the privacy computing task and a threshold of a quantity of task resources that have been in the reserved state;

creating, by the privacy task controller in each of namespaces of the plurality of participants, several pods used to run the privacy computing task;

learning, by the task resource group controller through watching, that the task resource group is created, and creating a task resource in the task resource group in each of the namespaces of the plurality of participants, wherein information about the task resource comprises a threshold of a quantity of pods in which a participant needs to reserve a resource;

learning, by the centralized scheduler through watching, that any of the several pods is created, and updating a state of the task resource to a reserved state when it is determined that a quantity of pods in which a resource is reserved in a task resource on which the pod depends is not less than the corresponding threshold of the quantity of pods;

if the task resource group controller determines that the quantity of task resources in the reserved state in the task resource group is less than the corresponding threshold of the quantity of task resources, determining, by the task resource group controller, whether a quantity of task resources in a reservable state and the reserved state in the task resource group is greater than or equal to the threshold of the quantity of task resources;

if it is determined that the quantity of task resources in the reservable state and the reserved state in the task resource group is less than the threshold of the quantity of task resources, changing the task resource group to a reserve failed state, and changing each task resource in the task resource group to a failed state; and

determining, by the centralized scheduler based on the state of the task resource, whether to schedule the pod to a computing node of a corresponding participant.

2. The method according to claim 1, further comprising:

updating, by the task resource group controller, each task resource in the task resource group to

a schedulable state if the task resource group controller determines that the quantity of task resources that have been in the reserved state in the task resource group is not less than the corresponding threshold of the quantity of task resources.

3. The method according to claim 2, wherein the determining, by the centralized scheduler based on the state of the task resource, whether to schedule the pod to a computing node of a corresponding participant comprises:

learning, by the centralized scheduler through watching, that the state of the task resource is updated to the schedulable state, and scheduling the pod to the computing node of the corresponding participant if the quantity of pods in which a resource is reserved in the task resource is not less than the corresponding threshold of the quantity of task resources.

4. The method according to claim 2, wherein the information about the task resource further comprises duration in which a participant reserves a resource, and after the state of the task resource is updated to the reserved state, the method further comprises:

if the centralized scheduler determines that a timing reaches the duration and does not learn through watching that the reserved state of the task resource is updated to the schedulable state, releasing, by the centralized scheduler, a reserved resource of a corresponding participant, and/or changing the state of the task resource to "failed".

5. The method according to claim 1, further comprising: continuing waiting if it is determined that the quantity of task resources in the reservable state and the reserved state in the task resource group is greater than or equal to the threshold of the quantity of task resources.

6. The method according to claim 1 or claim 5, wherein the information about the task resource group further comprises rescheduling waiting duration; and after the changing the task resource group to a reserve failed state, and changing each task resource in the task resource group to a failed state, the method further comprises:

after the waiting duration expires, separately changing, by the task resource group controller, states of the task resource group and each task resource to the reservable state, to enable a next round of scheduling for the privacy computing task.

7. The method according to any one of claims 2 to 6, wherein the information about the task resource group further comprises a lifecycle of the task resource group; and the method further comprises:

updating, by the task resource group controller, the state of the task resource group to "failed" when the task resource group controller determines that the lifecycle ends and scheduling of the privacy computing task is not completed.

8. The method according to claim 7, wherein after the updating the state of the task resource group to "failed", the method further comprises:

after the privacy task controller learns through watching that the state of the task resource group is "failed", updating, by the privacy task controller, a task state of the privacy computing task to "failed", and/or deleting the task resource group and the several pods.

9. The method according to any one of claims 1 to 6 or 8, wherein the description information of the privacy computing task comprises at least one of the following: the information about the plurality of participants, the threshold of the quantity of pods in which a participant needs to reserve a resource, or the threshold of the quantity of task resources that have been in the reserved state.

10. A privacy task controller in a kubernetes cluster, comprising:

a task resource group creation module, configured to create a corresponding task resource group based on description information of a submitted privacy computing task, wherein information about the task resource group comprises information about a plurality of participants of the privacy computing task and a threshold of a quantity of task resources that have been in the reserved state; and

a pod creation module, configured to create, in each of namespaces of the plurality of participants, several pods used to run the privacy computing task, wherein

the kubernetes cluster further comprises a task resource group controller, configured to: learn through watching that the task resource group is created, and create a task resource in the task resource group in each of the namespaces of the plurality of participants, wherein information about the task resource comprises a threshold of a quantity of pods in which a participant needs to reserve a resource; and

the kubernetes cluster further comprises a centralized scheduler, configured to: learn through watching that any of the several pods is created, and update a state of the task resource to a reserved state when it is determined that a quantity of pods in which a resource is reserved in a task resource on which the pod depends is not less than the corresponding threshold of the quantity of pods; and determine, based on the state of the task resource, whether to schedule the pod to a computing node of a corresponding participant, and

wherein the task resource group controller is further configured to: if the task resource group controller determines that the quantity of task resources in the reserved state in the task resource group is less than the corresponding threshold of the quantity of task resources, determine, by the task resource group controller, whether a quantity of task resources in a reservable state and the reserved state in the task resource group is greater than or equal to the threshold of the quantity of task

resources; if it is determined that the quantity of task resources in the reservable state and the reserved state in the task resource group is less than the threshold of the quantity of task resources, change the task resource group to a reserve failed state, and change each task resource in the task resource group to a failed state.

11. A task resource group controller in a kubernetes cluster, wherein the kubernetes cluster further comprises a privacy task controller, configured to: create a corresponding task resource group based on description information of a submitted privacy computing task, wherein information about the task resource group comprises information about a plurality of participants of the privacy computing task and a threshold of a quantity of task resources that have been in the reserved state; and create, in each of namespaces of the plurality of participants, several pods used to run the privacy computing task; and the task resource group controller comprises:

a task resource creation module, configured to: learn through watching that the task resource group is created, and create a task resource in the task resource group in each of the namespaces of the plurality of participants, wherein information about the task resource comprises a threshold of a quantity of pods in which a participant needs to reserve a resource, wherein

the kubernetes cluster further comprises a centralized scheduler, configured to: learn through watching that any of the several pods is created, and update a state of the task resource to a reserved state when it is determined that a quantity of pods in which a resource is reserved in a task resource on which the pod depends is not less than the corresponding threshold of the quantity of pods; and determine, based on the state of the task resource, whether to schedule the pod to a computing node of a corresponding participant, and

wherein the task resource group controller is further configured to: if the task resource group controller determines that the quantity of task resources in the reserved state in the task resource group is less than the corresponding threshold of the quantity of task resources, determine, by the task resource group controller, whether a quantity of task resources in a reservable state and the reserved state in the task resource group is greater than or equal to the threshold of the quantity of task resources; if it is determined that the quantity of task resources in the reservable state and the reserved state in the task resource group is less than the threshold of the quantity of task resources, change the task resource group to a reserve failed state, and change each task resource in the task resource group to a failed state.

12. A centralized scheduler in a kubernetes cluster, wherein the kubernetes cluster further comprises a privacy task controller, configured to: create a corresponding task resource group based on description information of a submitted privacy computing task, wherein information about the task

resource group comprises information about a plurality of participants of the privacy computing task and a threshold of a quantity of task resources that have been in the reserved state; and create, in each of namespaces of the plurality of participants, several pods used to run the privacy computing task;

the kubernetes cluster further comprises a task resource group controller, configured to: learn through watching that the task resource group is created, and create a task resource in the task resource group in each of the namespaces of the plurality of participants, wherein information about the task resource comprises a threshold of a quantity of pods in which a participant needs to reserve a resource; and

the centralized scheduler comprises:

a state updating module, configured to: learn through watching that any of the several pods is created, and update a state of the task resource to a reserved state when it is determined that a quantity of pods in which a resource is reserved in a task resource on which the pod depends is not less than the corresponding threshold of the quantity of pods; and

a scheduling module, configured to determine, based on the state of the task resource, whether to schedule the pod to a computing node of a corresponding participant, and

wherein the task resource group controller is further configured to: if the task resource group controller determines that the quantity of task resources in the reserved state in the task resource group is less than the corresponding threshold of the quantity of task resources, determine, by the task resource group controller, whether a quantity of task resources in a reservable state and the reserved state in the task resource group is greater than or equal to the threshold of the quantity of task resources; if it is determined that the quantity of task resources in the reservable state and the reserved state in the task resource group is less than the threshold of the quantity of task resources, change the task resource group to a reserve failed state, and change each task resource in the task resource group to a failed state.

13. A computer-readable storage medium, wherein the computer-readable storage medium stores a computer program, and when the computer program is executed on a computer, the computer is enabled to perform the method according to any one claims 1 to 9.

14. A computing device, comprising a memory and a processor, wherein the memory stores executable code, and when the processor executes the executable code, the method according to any one of claims 1 to 9 is implemented.