CLAIMS

WHAT IS CLAIMED IS:

1. A storage device comprising:

a plurality of non-volatile memories;

a volatile memory;

a computing device configured to perform an operation on data provided by the plurality of non-volatile memories; and

a storage controller comprising a resource manager configured to receive information about priority of tenants from a host, and to dynamically set resources of the plurality of non-volatile memories, the volatile memory, and the computing device based on the priority.

2. The storage device of claim 1, wherein the computing device comprises a plurality of computing elements, and

the resource manager is configured to differently allocate a number of computing elements for each tenant, based on the information about priority of the tenants and based on task types requested by users respectively associated with the tenants.

3. The storage device of claim 2, wherein the resource manager is configured to, when the task types requested by the users respectively associated with the tenants are identical to each other, allocate time in which the plurality of computing elements are activated, in proportion to the priority of the tenants.

4. The storage device of claim 2 or claim 3, wherein the resource manager is configured to, when the task types requested by the tenants are different from each other, allocate at least some computing elements among the plurality of computing elements for each tenant, based on the information about priority of the tenants and a value of quality of service (QoS) of tasks requested by the users respectively associated with the tenants.

5. The storage device of any one of claims 1 to 4, wherein each of the plurality of non-volatile memories comprises a plurality of zone memories, and

the resource manager is configured to allocate at least some of the plurality of zone

memories for each tenant in proportion to the priority of the tenants.

6. The storage device of claim 5, wherein the resource manager is configured to set a bandwidth in proportion to the priority of the tenants by using interleaving.

7. The storage device of any one of claims 1 to 6, wherein the resource manager is configured to divide and allocate a storage region of the volatile memory in proportion to the priority of the tenants.

8. A storage device comprising:

a plurality of non-volatile memories;

a volatile memory;

a computing device configured to perform an operation on data provided by the plurality of non-volatile memories; and

a storage controller comprising a resource manager configured to receive information about priority of a first tenant and a second tenant from a host, and to dynamically set resources of the plurality of non-volatile memories, the volatile memory, and the computing device based on the priority of the first tenant and the second tenant.

9. The storage device of claim 8, wherein

the computing device comprises a plurality of computing elements, and

the resource manager is configured to divide and allocate the plurality of computing elements into at least some computing elements for performing a first task requested by a user of the first tenant and at least some computing elements for performing a second task requested by the second tenant, based on the information about priority of the first tenant and the second tenant and based on task types respectively requested by the user of the first tenant and a user of the second tenant.

10. The storage device of claim 9, wherein

the resource manager is configured to, when types of the first task and the second task are identical to each other, alternately activate the plurality of computing elements for a particular amount of time, and set the alternately activated time to be proportional to the priority of the first tenant and the priority of the second tenant.

11. The storage device of claim 9 or claim 10, wherein the resource manager is configured to, when types of the first task and the second task are different from each other, based on the information about priority of the first tenant and the second tenant and values of quality of service (QoS) of the first tenant and the second tenant, allocate the plurality of computing elements to perform the first task by using a first set of the plurality of computing elements, and to perform the second task by using a second set of the plurality of computing elements.

12. The storage device of any one of claims 8 to 11, wherein each of the plurality of non-volatile memories comprises a plurality of zone memories, and

wherein the resource manager is configured to differently allocate a number of the plurality of zone memories in proportion to the priority of the first tenant and the second tenant.

13. The storage device of claim 12, wherein the resource manager is configured to set a bandwidth in proportion to the priority of the first tenant and the second tenant, by using interleaving.

14. The storage device of any one of claims 8 to 13, wherein the resource manager is configured to divide and allocate a storage region of the volatile memory in proportion to the priority of the first tenant and the second tenant.

15. An operating method of a storage device comprising a plurality of non-volatile memories, a volatile memory, a computing device and a storage controller, the method comprising:

receiving information about priority of tenants from a host and information about a task type requested by a respective user of each tenant; and

dynamically allocating hardware resources of the plurality of non-volatile memories, the volatile memory, and the computing device to each tenant based on the priority and/or the task type.

16. The method of claim 15, wherein the dynamically allocating of the hardware resource further comprises:

determining whether task types requested by respective users of the tenants are identical to each other; and

when the task types requested by the respective users of the tenants are identical to each other, allocating activated time for alternately activating a plurality of computing elements

comprised in the computing device in proportion to the priority of the tenants.

17. The method of claim 16, wherein the dynamically allocating of the hardware resources further comprises, when the task types requested by the respective users of the tenants are different from each other, based on the information about priority of the tenants and values of quality of service (QoS) of the tasks requested by the respective users of the tenants, allocating at least some computing elements among the plurality of computing elements for each respective user.

18. The method of any one of claims 15 to 17, wherein each of the plurality of non-volatile memories comprises a plurality of zone memories, and

the dynamically allocating of the hardware resources further comprises allocating at least some of the plurality of zone memories for each tenant in proportion to the priority of the tenants.

19. The method of claim 18, wherein the dynamically allocating of the hardware resources further comprises setting a bandwidth in proportion to the priority of the tenants, by using interleaving.

20. The method of any one of claims 15 to 19, wherein the dynamically allocating of the hardware resources further comprises dividing and allocating a storage region of the volatile memory in proportion to the priority of the tenants.