

CLAIMS

What is claimed is:

1. A method for storing data by a storage device, wherein the storage device comprises a first storage area and a second storage area, wherein the first storage area comprises data space and reserved space, and the second storage area comprises data space and reserved space, and the method comprises:

receiving, by the storage device, a write request, wherein the write request carries a logical address and data;

determining, by the storage device, a feature of the write request;

writing, by the storage device when the feature of the write request meets a first condition, the data carried in the write request to a first storage address of the reserved space of the first storage area; and

establishing, by the storage device, a mapping relationship between the logical address and the first storage address;

writing, when the feature of the write request meets a second condition, the data carried in the write request to a second storage address of the reserved space of the second storage area; and

establishing, by the storage device, a mapping relationship between the logical address and the second storage address, and

wherein the reserved space of the first storage area is smaller than the reserved space of the second storage area, or

a ratio of the reserved space of the first storage area to the data space of the first storage area is less than a ratio of the reserved space of the second storage area to the data space of the second storage area, and

wherein the determining, by the storage device, a feature of the write request comprises:

determining, by the storage device, whether the write request is a sequential write request or a random write request, wherein

the first condition is the sequential write request, and the second condition is the random write request.

2. A method for storing data by a storage device, wherein the storage device comprises a first storage area and a second storage area, wherein the first storage area comprises data space and reserved space, and the second storage area comprises data space and reserved space, and the method comprises:

receiving, by the storage device, a write request, wherein the write request carries a logical

address and data;

determining, by the storage device, a feature of the write request;

writing, by the storage device when the feature of the write request meets a first condition, the data carried in the write request to a first storage address of the reserved space of the first storage area; and

establishing, by the storage device, a mapping relationship between the logical address and the first storage address;

writing, when the feature of the write request meets a second condition, the data carried in the write request to a second storage address of the reserved space of the second storage area; and

establishing, by the storage device, a mapping relationship between the logical address and the second storage address, and

wherein the reserved space of the first storage area is smaller than the reserved space of the second storage area, or

a ratio of the reserved space of the first storage area to the data space of the first storage area is less than a ratio of the reserved space of the second storage area to the data space of the second storage area, and

wherein the determining, by the storage device, a feature of the write request comprises:

determining, by the storage device, a sequence level of the write request, wherein

the first condition is a first sequence level range, the second condition is a second sequence level range, and a minimum value of the first sequence level range is greater than a maximum value of the second sequence level range.

3. A method for storing data by a storage device, wherein the storage device comprises a first storage area and a second storage area, wherein the first storage area comprises data space and reserved space, and the second storage area comprises data space and reserved space, and the method comprises:

receiving, by the storage device, a write request, wherein the write request carries a logical address and data;

determining, by the storage device, a feature of the write request;

writing, by the storage device when the feature of the write request meets a first condition, the data carried in the write request to a first storage address of the reserved space of the first storage area; and

establishing, by the storage device, a mapping relationship between the logical address and the first storage address;

writing, when the feature of the write request meets a second condition, the data carried in the

write request to a second storage address of the reserved space of the second storage area; and
establishing, by the storage device, a mapping relationship between the logical address and the
second storage address, and

wherein the reserved space of the first storage area is smaller than the reserved space of the
5 second storage area, or

a ratio of the reserved space of the first storage area to the data space of the first storage area is
less than a ratio of the reserved space of the second storage area to the data space of the second
storage area, and

wherein the determining, by the storage device, a feature of the write request comprises:

10 determining, by the storage device, a randomness level of the write request, wherein
the first condition is a first randomness level range, the second condition is a second
randomness level range, and a maximum value of the first randomness level range is less than a
minimum value of the second randomness level range.

4. A method for storing data by a storage device, wherein the storage device comprises a first
15 storage area and a second storage area, wherein the first storage area comprises data space and
reserved space, and the second storage area comprises data space and reserved space, and the
method comprises:

receiving, by the storage device, a write request, wherein the write request carries a logical
address and data;

20 determining, by the storage device, a feature of the write request;
writing, by the storage device when the feature of the write request meets a first condition, the
data carried in the write request to a first storage address of the reserved space of the first storage
area; and

establishing, by the storage device, a mapping relationship between the logical address and the
25 first storage address;

writing, when the feature of the write request meets a second condition, the data carried in the
write request to a second storage address of the reserved space of the second storage area; and

establishing, by the storage device, a mapping relationship between the logical address and the
second storage address, and

30 wherein the reserved space of the first storage area is smaller than the reserved space of the
second storage area, or

a ratio of the reserved space of the first storage area to the data space of the first storage area is
less than a ratio of the reserved space of the second storage area to the data space of the second
storage area, and

wherein the determining, by the storage device, a feature of the write request comprises:
determining, by the storage device, a size of the data carried in the write request, wherein
the first condition is a first data range stored in the first storage area, the second condition is a
second data range stored in the second storage area, and a minimum value of the first data range is
greater than a maximum value of the second data range.

5 5. A storage device, comprising a storage controller, a first storage area, and a second storage area, wherein the first storage area comprises data space and reserved space, the second storage area comprises data space and reserved space, and the storage controller comprises:

10 a receiving unit, configured to receive a write request, wherein the write request carries a logical address and data;

a determining unit, configured to determine a feature of the write request;

a writing unit, configured to write, when the feature of the write request meets a first condition, the data carried in the write request to a first storage address of the reserved space of the first storage area;

15 a mapping unit, configured to establish a mapping relationship between the logical address and the first storage address, wherein

the writing unit is further configured to write, when the feature of the write request meets a second condition, the data carried in the write request to a second storage address of the reserved space of the second storage area; and

20 the mapping unit is further configured to establish a mapping relationship between the logical address and the second storage address, and

wherein the reserved space of the first storage area is smaller than the reserved space of the second storage area, or

25 a ratio of the reserved space of the first storage area to the data space of the first storage area is less than a ratio of the reserved space of the second storage area to the data space of the second storage area, and

wherein the determining unit is specifically configured to determine whether the write request is a sequential write request or a random write request, wherein

30 the first condition is the sequential write request, and the second condition is the random write request.

6. A storage device, comprising a storage controller, a first storage area, and a second storage area, wherein the first storage area comprises data space and reserved space, the second storage area comprises data space and reserved space, and the storage controller comprises:

a receiving unit, configured to receive a write request, wherein the write request carries a

logical address and data;

a determining unit, configured to determine a feature of the write request;

a writing unit, configured to write, when the feature of the write request meets a first condition, the data carried in the write request to a first storage address of the reserved space of the first storage area;

a mapping unit, configured to establish a mapping relationship between the logical address and the first storage address, wherein

the writing unit is further configured to write, when the feature of the write request meets a second condition, the data carried in the write request to a second storage address of the reserved space of the second storage area; and

the mapping unit is further configured to establish a mapping relationship between the logical address and the second storage address, and

wherein the reserved space of the first storage area is smaller than the reserved space of the second storage area, or

a ratio of the reserved space of the first storage area to the data space of the first storage area is less than a ratio of the reserved space of the second storage area to the data space of the second storage area, and

wherein the determining unit is specifically configured to determine a sequence level of the write request, wherein

the first condition is a first sequence level range, the second condition is a second sequence level range, and a minimum value of the first sequence level range is greater than a maximum value of the second sequence level range.

7. A storage device, comprising a storage controller, a first storage area, and a second storage area, wherein the first storage area comprises data space and reserved space, the second storage area comprises data space and reserved space, and the storage controller comprises:

a receiving unit, configured to receive a write request, wherein the write request carries a logical address and data;

a determining unit, configured to determine a feature of the write request;

a writing unit, configured to write, when the feature of the write request meets a first condition, the data carried in the write request to a first storage address of the reserved space of the first storage area;

a mapping unit, configured to establish a mapping relationship between the logical address and the first storage address, wherein

the writing unit is further configured to write, when the feature of the write request meets a

second condition, the data carried in the write request to a second storage address of the reserved space of the second storage area; and

the mapping unit is further configured to establish a mapping relationship between the logical address and the second storage address, and

5 wherein the reserved space of the first storage area is smaller than the reserved space of the second storage area, or

a ratio of the reserved space of the first storage area to the data space of the first storage area is less than a ratio of the reserved space of the second storage area to the data space of the second storage area, and

10 wherein the determining unit is specifically configured to determine a randomness level of the write request, wherein

the first condition is a first randomness level range, the second condition is a second randomness level range, and a maximum value of the first randomness level range is less than a minimum value of the second randomness level range.

15 8. A storage device, comprising a storage controller, a first storage area, and a second storage area, wherein the first storage area comprises data space and reserved space, the second storage area comprises data space and reserved space, and the storage controller comprises:

a receiving unit, configured to receive a write request, wherein the write request carries a logical address and data;

20 a determining unit, configured to determine a feature of the write request;

a writing unit, configured to write, when the feature of the write request meets a first condition, the data carried in the write request to a first storage address of the reserved space of the first storage area;

25 a mapping unit, configured to establish a mapping relationship between the logical address and the first storage address, wherein

the writing unit is further configured to write, when the feature of the write request meets a second condition, the data carried in the write request to a second storage address of the reserved space of the second storage area; and

30 the mapping unit is further configured to establish a mapping relationship between the logical address and the second storage address, and

wherein the reserved space of the first storage area is smaller than the reserved space of the second storage area, or

a ratio of the reserved space of the first storage area to the data space of the first storage area is less than a ratio of the reserved space of the second storage area to the data space of the second

storage area, and

wherein the determining unit is specifically configured to determine a size of the data carried in the write request, wherein

the first condition is a first data range stored in the first storage area, the second condition is a second data range stored in the second storage area, and a minimum value of the first data range is greater than a maximum value of the second data range.

9. A storage device, comprising a storage controller, a first storage area, and a second storage area, wherein the first storage area comprises data space and reserved space, and the second storage area comprises data space and reserved space, and

the storage controller is configured to:
receive a write request, wherein the write request carries a logical address and data;
determine a feature of the write request;
write, when the feature of the write request meets a first condition, the data carried in the write request to a first storage address of the reserved space of the first storage area; and

establish a mapping relationship between the logical address and the first storage address;
write, when the feature of the write request meets a second condition, the data carried in the write request to a second storage address of the reserved space of the second storage area; and
establish a mapping relationship between the logical address and the second storage address,
and

wherein the reserved space of the first storage area is smaller than the reserved space of the second storage area, or

a ratio of the reserved space of the first storage area to the data space of the first storage area is less than a ratio of the reserved space of the second storage area to the data space of the second storage area, and

wherein the storage controller is specifically configured to determine whether the write request is a sequential write request or a random write request, wherein

the first condition is the sequential write request, and the second condition is the random write request.

10. A storage device, comprising a storage controller, a first storage area, and a second storage area, wherein the first storage area comprises data space and reserved space, and the second storage area comprises data space and reserved space, and

the storage controller is configured to:
receive a write request, wherein the write request carries a logical address and data;
determine a feature of the write request;

write, when the feature of the write request meets a first condition, the data carried in the write request to a first storage address of the reserved space of the first storage area; and

establish a mapping relationship between the logical address and the first storage address;

5 write, when the feature of the write request meets a second condition, the data carried in the write request to a second storage address of the reserved space of the second storage area; and
establish a mapping relationship between the logical address and the second storage address,
and

wherein the reserved space of the first storage area is smaller than the reserved space of the second storage area, or

10 a ratio of the reserved space of the first storage area to the data space of the first storage area is less than a ratio of the reserved space of the second storage area to the data space of the second storage area, and

wherein the storage controller is specifically configured to determine a sequence level of the write request, wherein

15 the first condition is a first sequence level range, the second condition is a second sequence level range, and a minimum value of the first sequence level range is greater than a maximum value of the second sequence level range.

11. A storage device, comprising a storage controller, a first storage area, and a second storage area, wherein the first storage area comprises data space and reserved space, and the second storage
20 area comprises data space and reserved space, and

the storage controller is configured to:

receive a write request, wherein the write request carries a logical address and data;

determine a feature of the write request;

25 write, when the feature of the write request meets a first condition, the data carried in the write request to a first storage address of the reserved space of the first storage area; and

establish a mapping relationship between the logical address and the first storage address;

write, when the feature of the write request meets a second condition, the data carried in the write request to a second storage address of the reserved space of the second storage area; and

30 establish a mapping relationship between the logical address and the second storage address,
and

wherein the reserved space of the first storage area is smaller than the reserved space of the second storage area, or

a ratio of the reserved space of the first storage area to the data space of the first storage area is less than a ratio of the reserved space of the second storage area to the data space of the second

storage area, and

wherein the storage controller is specifically configured to determine a randomness level of the write request, wherein

the first condition is a first randomness level range, the second condition is a second randomness level range, and a maximum value of the first randomness level range is less than a minimum value of the second randomness level range.

12. A storage device, comprising a storage controller, a first storage area, and a second storage area, wherein the first storage area comprises data space and reserved space, and the second storage area comprises data space and reserved space, and

the storage controller is configured to:
receive a write request, wherein the write request carries a logical address and data;
determine a feature of the write request;
write, when the feature of the write request meets a first condition, the data carried in the write request to a first storage address of the reserved space of the first storage area; and

establish a mapping relationship between the logical address and the first storage address;
write, when the feature of the write request meets a second condition, the data carried in the write request to a second storage address of the reserved space of the second storage area; and
establish a mapping relationship between the logical address and the second storage address,
and

wherein the reserved space of the first storage area is smaller than the reserved space of the second storage area, or

a ratio of the reserved space of the first storage area to the data space of the first storage area is less than a ratio of the reserved space of the second storage area to the data space of the second storage area, and

wherein the storage controller is specifically configured to determine a size of the data carried in the write request, wherein

the first condition is a first data range stored in the first storage area, the second condition is a second data range stored in the second storage area, and a minimum value of the first data range is greater than a maximum value of the second data range.