What is claimed is:

1. A method of operating a storage device, the method comprising:

receiving, at the storage device, a meta information transfer command based on a data read request, wherein the meta information transfer command comprises logical address information indicating at least one logical address for a data read operation, and is received from a host device;

receiving, at the storage device, a data read command corresponding to the data read request and the meta information transfer command, wherein the data read command is received from the host device;

receiving, at the storage device, a plurality of meta data corresponding to the data read request and the meta information transfer command, wherein the plurality of meta data comprises information associating the at least one logical address with a plurality of physical addresses for performing the data read operation, and is received from the host device; and

performing the data read operation, at the storage device, based on the data read command and the plurality of meta data.

2. The method of claim 1, wherein:

the meta information transfer command includes a meta information transfer identification (ID), and

the data read command includes a read ID corresponding to the meta information transfer ID.

3. The method of claim 2, wherein the meta information transfer ID and the read ID have a same value.

4. The method of claim 3, wherein the plurality of meta data includes logical-to-physical mapping information indicating a correspondence relationship between a plurality of logical addresses and the plurality of physical addresses.

5. The method of any one of claims 1 to 3, wherein performing the data read operation comprises:

obtaining the plurality of physical addresses based on the plurality of meta data;

reading target data based on the plurality of physical addresses; and

outputting the target data.

6. The method of claim 5, wherein, when a time difference between a first time point at which the meta information transfer command is received and a second time point at which the data read command is received is shorter than a first reference time and when reception of the plurality of meta data is not completed, a wait time is implemented in which the target data is read based on the plurality of meta data after the reception of the plurality of meta data is completed.

7. The method of claim 5, wherein, when a time difference between a first time point at which the meta information transfer command is received and a second time point at which the data read command is received is longer than a second reference time and when reception of the plurality of meta data is completed, the target data is pre-read based on the plurality of meta data before the data read command is received, and the target data is output immediately after the second time point at which the data read command is received.

8. The method of claim 7, wherein at least one operation other than the data read operation is performed between the first time point and the second time point.

9. The method of any one of claims 1 to 8, wherein the data read request is a large-scale read request in which a large amount of data greater than a predetermined size are read at one time.

10. The method of any one of claims 1 to 9, wherein the data read request is a single read request.

11. The method of any one of claims 1 to 10, wherein the plurality of meta data are transmitted through a direct memory access (DMA) interface.

12. A storage device, comprising:

a plurality of nonvolatile memories configured to store a plurality of data; and

a storage controller configured to control an operation of the plurality of nonvolatile memories,

wherein the storage controller is configured to receive a meta information transfer command based on a data read request, to receive a data read command corresponding to the data read request and the meta information transfer command, to receive a plurality of meta data corresponding to the data read request and the meta information transfer command, and to perform a data read operation based on the data read command and the plurality of meta data, wherein the meta information transfer command comprises logical address information indicating at least one logical address for the data read operation, and the plurality of meta data comprises information associating the at least one logical address with

a plurality of physical addresses for performing the data read operation,

wherein the meta information transfer command, the data read command, and the plurality of meta data are received from a host device.

13. The storage device of claim 12, further comprising:

a buffer memory configured to temporarily store target data that is pre-read based on the plurality of meta data before the data read command is received when a time difference between a first time point at which the meta information transfer command is received and a second time point at which the data read command is received is longer than a reference time and when reception of the plurality of meta data is complete.

14. The storage device of claim 13, wherein the buffer memory includes a volatile memory.

15. The storage device of any one of claims 12 to 14, wherein the storage device is a universal flash storage (UFS).

16. A method of operating a storage system comprising a host device and a storage device, the method comprising:

transmitting a plurality of meta data stored in the storage device to the host device;

storing the plurality of meta data in a host memory included in the host device;

transmitting a meta information transfer command from the host device to the storage device based on a data read request, wherein the meta information transfer command comprises logical address information indicating at least one logical address for a data read operation;

transmitting a data read command corresponding to the data read request and the meta information transfer command from the host device to the storage device;

transmitting first meta data corresponding to the data read request and the meta information transfer command from the host device to the storage device, wherein the first meta data is a part of the plurality of meta data, and comprises information associating the at least one logical address with a plurality of physical addresses for performing the data read operation; and

performing the data read operation on the storage device based on the data read command and the first meta data.

17. The method of claim 16, wherein, when at least one of the plurality of meta data is changed, the changed meta data is transmitted to the host device and the plurality of meta data stored in the host memory is updated based on the changed meta data.

18. The method of claim 16 or claim 17, wherein:

the host memory includes a volatile memory, and

a capacity of the host memory is greater than a capacity of a buffer memory included in the storage device.

19. The method of any one of claims 16 to 18, wherein the storage system is one of a mobile phone, a smartphone, a tablet computer, a laptop computer, a personal digital assistant (PDA), a portable multimedia player (PMP), a digital camera, a portable game console, a music player, a camcorder, a video player, a navigation device, a wearable device, an Internet of things (IoT) device, an e-book reader, a virtual reality (VR) device, an augmented reality (AR) device, and a robotic device.