CLAIMS

1. An active storage system comprising,

a storage device;

a non-volatile memory; and

an active drive controller, wherein the active drive controller is coupled to the storage device and the non-volatile memory and performs data management and/or cluster management within the active storage system, the active drive controller including a data interface for receiving at least key value data and/or object data, wherein the data interface includes a first interface comprising an object interface for interfacing with the object data and a second interface comprising a key value interface for interfacing with the key value data, the second interface comprising a mapping structure for mapping the key value data to the object data selected from the group comprising a one-to-one key value data to object data mapping structure, a many-to-one key value data to object data mapping structure and a one-to-many key value data to object data mapping structure, wherein the active drive controller is coupled to an active management node and a metadata server and interacts with the metadata server and other active drive controllers in the active storage system via the active management node for managing and monitoring the storage device and the non-volatile memory.

2. The active storage system in accordance with Claim 1 wherein the key value data includes keys, value data and other data, and wherein the mapping structure of the second interface comprises a one-to-one key value data to object data mapping structure which maps the value data to the object data, maps the keys to object IDs corresponding to the mapped object data, and maps the other data to object metadata corresponding to the mapped object data.

3. The active storage system in accordance with Claim 1 wherein the key value data includes a plurality of key value entries, each of the plurality of key value entries comprising a

key, attributes and value data, and wherein the mapping structure of the second interface comprises a many-to-one key value data to object data mapping structure which maps multiple ones of the plurality of key value entries to one object data, wherein an object ID data corresponding to the

mapped object data corresponds to a range of keys, and wherein the keys and the corresponding attributes are mapped to object metadata corresponding to the mapped object data.

4. The active storage system in accordance with Claim 1 wherein the key value data includes a plurality of key value entries, each of the plurality of key value entries comprising a key, attributes and value data, and wherein the mapping structure of the second interface comprises a one-to-many key value data to object data mapping structure which maps each of the plurality of key value entries to multiple object data, wherein each key is mapped to multiple object ID data corresponding to the mapped multiple object data, and wherein the attributes corresponding to the plurality of key value entries are represented by object metadata of a first one of the mapped object data.

5. The active storage system in accordance with Claim 1 wherein the data management comprises at least one of caching, compression, and Quality of Service (QoS).

6. The active storage system in accordance with Claim 1 wherein the cluster management comprises interaction with the metadata server and peers to discover and join a cluster.

7. The active storage system in accordance with Claim 6 wherein the cluster management further comprises interaction with the metadata server and peers to form and maintain the cluster.

8. The active storage system in accordance with Claim 1 further comprising an installable program to allow user/clients to download and execute the program within the active storage system.

9. The active storage system in accordance with Claim 1 further comprising one or more Hybrid Object Storage Device (HOSD) daemons.

10. The active storage system in accordance with Claim 1 wherein the active storage system controls a programmable switch, and the active management node forwards instructions to the programmable switch to forward data packets to destinations not specified by a sender in order to reduce network traffic.

11. An active drive distributed storage system comprising:

a metadata server; and

one or more active hybrid nodes, each active hybrid node comprising a plurality of active drive storage devices, each active drive storage device comprising an active drive controller, each active drive controller including a data interface for receiving at least at least key value data and/or object data for its corresponding one of the plurality of active storage devices, wherein the data interface includes a first interface comprising an object interface for interfacing with the object data and a second interface comprising a key value interface for interfacing with the key value data, the second interface comprising a mapping structure for mapping the key value data to the object data selected from the group comprising a one-to-one key value data to object data mapping structure, a many-to-one key value data to object data mapping structure and a one-to-many key value data to object data mapping structure, and

wherein the active drive controller of one of the plurality of active drive storage devices in each of the one or more active hybrid nodes is coupled to an active management node, the active drive controller of the one of the plurality of active drive storage devices interacting with the metadata server and other ones of the plurality of active drive storage devices via the active management node for managing and monitoring the active hybrid node.

12. The active storage system in accordance with Claim 11 wherein the key value data includes keys, value data and other data, and wherein the mapping structure of the second

interface comprises a one-to-one key value data to object data mapping structure which maps the value data to the object data, maps the keys to object IDs corresponding to the mapped object data, and maps the other data to object metadata corresponding to the mapped object data.

13. The active storage system in accordance with Claim 11 wherein the key value data includes a plurality of key value entries, each of the plurality of key value entries comprising a key, attributes and value data, and wherein the mapping structure of the second interface comprises a many-to-one key value data to object data mapping structure which maps multiple ones of the plurality of key value entries to one object data, wherein an object ID data corresponding to the mapped object data corresponds to a range of keys, and wherein the keys and the corresponding attributes are mapped to object metadata corresponding to the mapped object data.

14. The active storage system in accordance with Claim 11 wherein the key value data includes a plurality of key value entries, each of the plurality of key value entries comprising a key, attributes and value data, and wherein the mapping structure of the second interface comprises a one-to-many key value data to object data mapping structure which maps each of the plurality of key value entries to multiple object data, wherein each key is mapped to multiple object ID data corresponding to the mapped multiple object data, and wherein the attributes corresponding to the plurality of key value entries are represented by object metadata of a first one of the mapped object data.

15. The active storage system in accordance with Claim 11 wherein each of the plurality of active drive storage devices comprises Hybrid Object Storage Device (HOSD) daemons.

16. The active storage system in accordance with Claim 11 wherein each active drive controller further performs data management comprising at least one of caching, compression, and Quality of Service (QoS).

17. The active storage system in accordance with Claim 11 wherein the active management node instructs data migration within the active hybrid node in response to one or more of an addition of a new active hybrid node, a failure of one of the one or more active hybrid nodes and unbalanced data access to its corresponding active hybrid node.

18. The active storage system in accordance with Claim 11 further comprising an installable program to allow user/clients to download and execute the program within the active storage system.

19. An active drive distributed storage system comprising:

a metadata server; and

one or more active hybrid nodes, each active hybrid node comprising a plurality of active drive storage devices, each active drive storage device comprising an active drive controller, each active drive controller including a data interface for receiving at least key value data and/or object data for its corresponding one of the plurality of active storage devices,

wherein an active drive controller of one of the plurality of active drive storage devices in each of the one or more active hybrid nodes further is coupled to an active management node, the active drive controller of the one of the plurality of active drive storage devices interacting with the metadata server and other ones of the plurality of active drive storage devices via the active management node for managing and monitoring the active hybrid node, and wherein the active storage system controls a programmable switch, and wherein the active management node

forwards instruction to the programmable switch to forward data packets to destinations not specified by a sender in order to reduce network traffic.