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Design document

Coordinator
The coordinator is used by the administrator to add and remove nodes from the hash ring, as well as detecting if a storage node is not responding. When the coordinator accepts a new node, it should also inform the other nodes in the system about the new node in the hashring by including the new node info in heartbeat response.

Receive heartbeat messages to make sure a node is alive, if a node do not send a heartbeat in the expected time then it will be removed from the hashring. The coordinator will den include the updated list to members of the hashring.

The coordinator should also be able to respond to the client with system information, this include available cluster storage, total number of requests handled, and a list of all the nodes in the system.

Storage nodes
One key feature with this DFS is the zero-hop distributed hash table, this means that each *storage node* needs to be able to redirect a request to the correct node to store or retrieve a file. To do this, each storage node needs to have a hashing algorithm, and a list of all nodes in the hash ring to determine where to reroute the request. This will be accomplished by using the SHA-1 hash algorithm.

A storage node should also contain a list of all the available files in the cluster. So every time a file is fully written to the cluster a broadcast message is sent out informing all node about the new available file.

Each storage node also has the responsibility of informing the coordinator that its still alive, by sending heartbeat messages.(This heartbeat message could include amount of free space left, number of requests handled).

Another key feature of the system is load balancing, each storage node will use a pipeline to replicate data before responding back to the client.

Client
The main responsibility of the client is to breaking files into chunks, and sending each chunk to a random storage node in the cluster.

It should also be able to send and receive chunks in parallel. If a file already exist in the storage, than it should be overwritten. The client should also be able to send a request to a storage node to retrieve a list of all files stored in the system. It should also be able to request cluster information about the system from the coordinator. This includes available space, number of requests handled and list of active nodes.