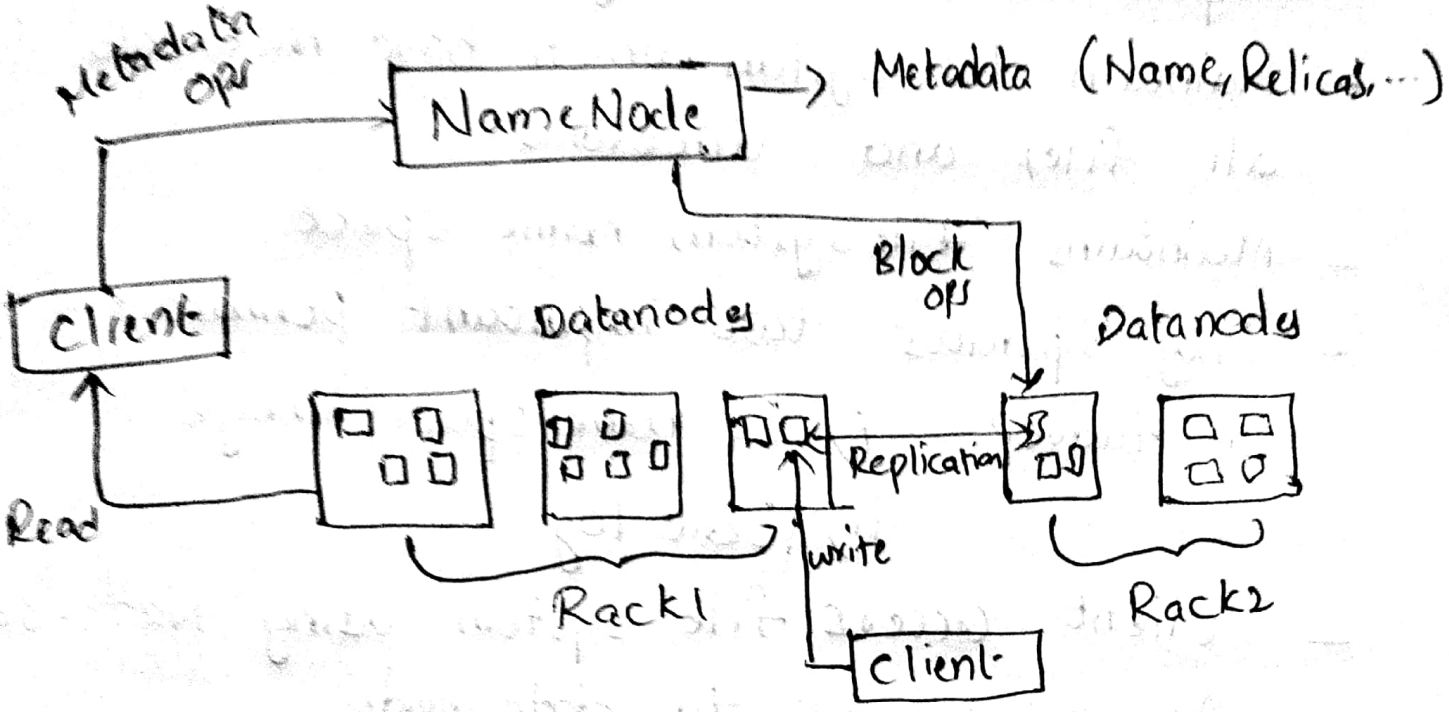
HDFS Architecture



Data Storage in HDFS

* Files are divided into blocks of equal size

Blocks: Size of Block in HDFS is 128 MB.

- Files are broken in to block sized chunks that are stored as independent units

  Ex:- 1GB file is stored in 8 blocks

- To recover failure (corrupted blocks), each block is replicated to small no. of machines typically 3. If a block is unavailable, it be read from copy.

HDFS Metadata

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- Every file contains certain attributes such as Name, path, replication factor block size etc., This is HDFS metadata.
- Mapping Between file and blocks and their corresponding locations on Datanodes.

Namenode: (Master Node)

- Responsible for maintaing meta data of HDFS
- Maintain File System which have metadata for all files and directories
- Maintains file system name space
- Only updates two important permanant files of Hadoop i) Fs name space image
  ii) Edit log
- Client access file system using Namenode
- Assign blocks to data nodes
- keeps tracks of live Nodes (Heart Beats)

Data Node: (Slave Node)

- placehold of data
- store and retreive blocks, reporting to name node
- A cluster consists of several datanodes
- Data is broken into blocks and stored in datanodes

Heartbeat: DataNode regularly communicates with Namenode (default every 3 seconds)

* If a DataNode misses 10 heartbeats then Namenode masks it as Dead

* NameNode and Jobtracker daemons are master daemons

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* DataNode and Task tracker daemons are slave daemons

General Hadoop Daemons

- Name Node (Runs on Master node for HDFS)
- Data Node (Runs on slave node for HDFS)
- Resource Manager (Runs on master node for YARN)
- Node Manager (Runs on slave node for YARN)
- Secondary Name Node

Secondary Name Node: [Runs on machine different from Namenode]

- Helps in restarting Namenode faster when it fails
- But it is'nt hot standby
- Job is to create check points of file system at regular Intervals
  1. Gets fsimage from NameNode
  2. Gets Editlogs " "
  3. Apply Editlogs to fs image
  4. Copy updated fsimage back to Namenode

Fsimage:- fsimage file is persistant check point of filesystem metadata

Editlog:- client operations first recorded in edit log

- Record every change occurs to filesystem metadata

Rack: DataNodes connected to sameswitch is Rack