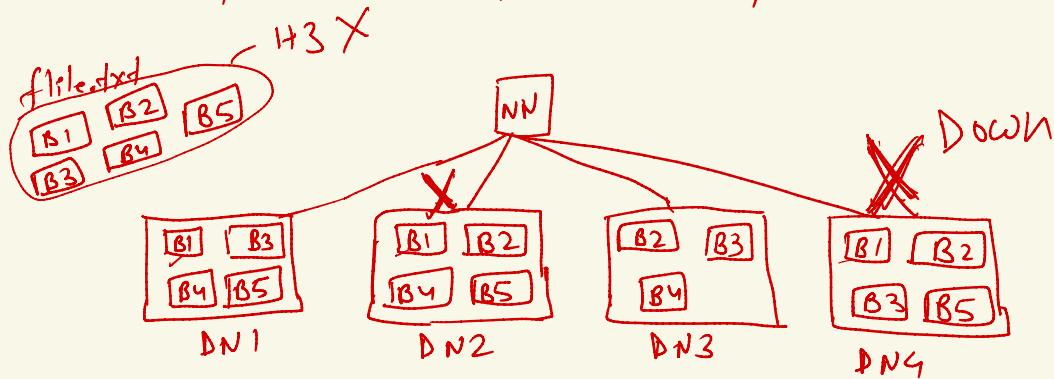

2018



HDFS Continue

Replication Management

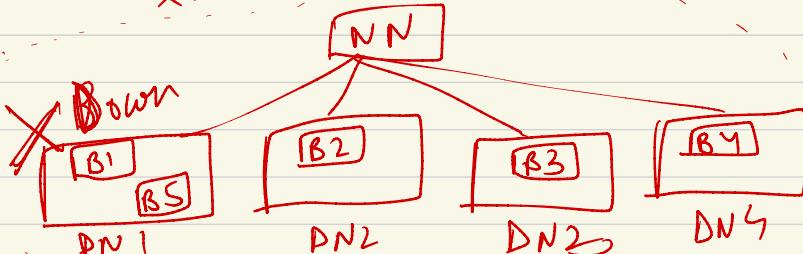
↳ Replication → Multiple copies of same Block.



Property : Replication-factor = 3

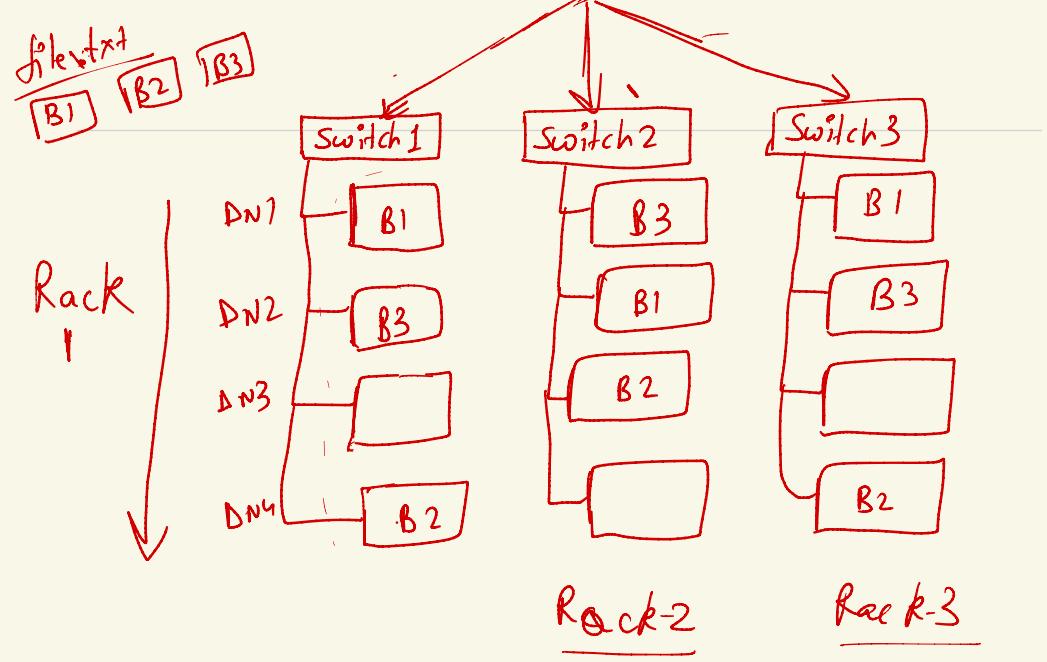
if want to store 10 GB data then actual memory occupied in HDFS?

without Replica

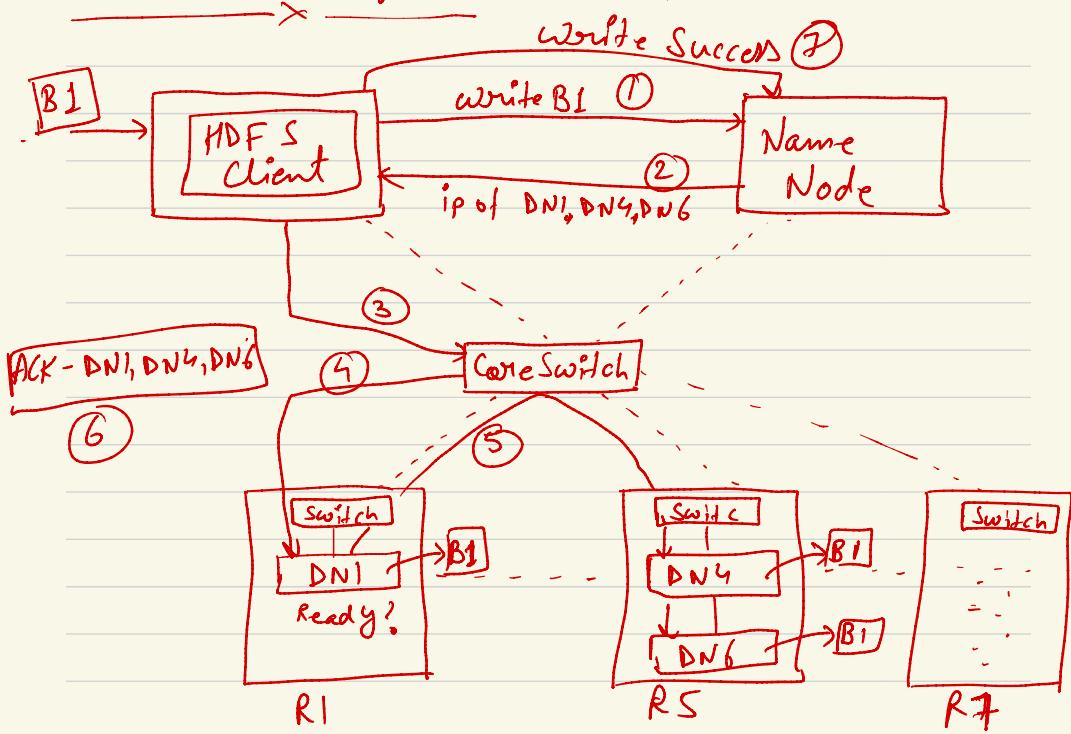


Rack Awareness:





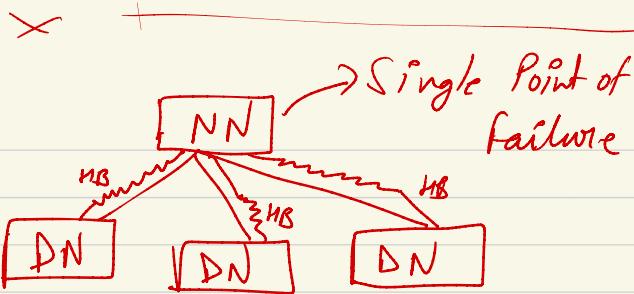
HDFS Write Request i.e., Replication-factor=3



3 Step Process of Data Write in HDFS

- Contact NameNode & get IP of DataNodes for write.
- Data copied & replicated to Data Nodes
- Success or failed Acknowledgment to that NameNode can update the metadata.

High Availability or Fault Tolerance in Hadoop

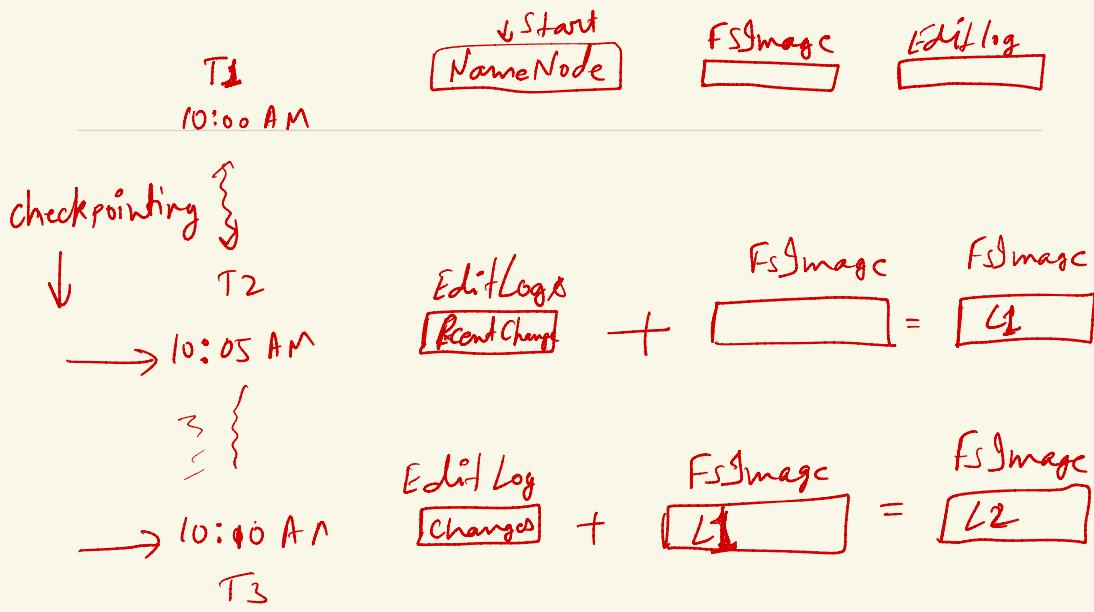


How to achieve HA in Hadoop

① Secondary NameNode

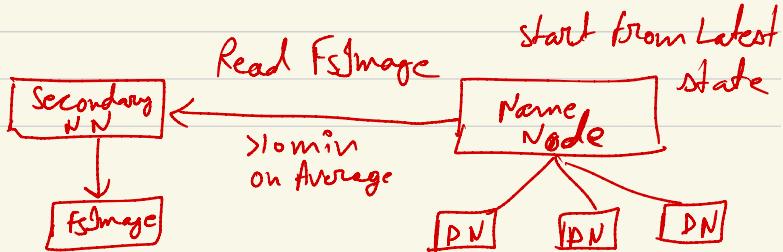
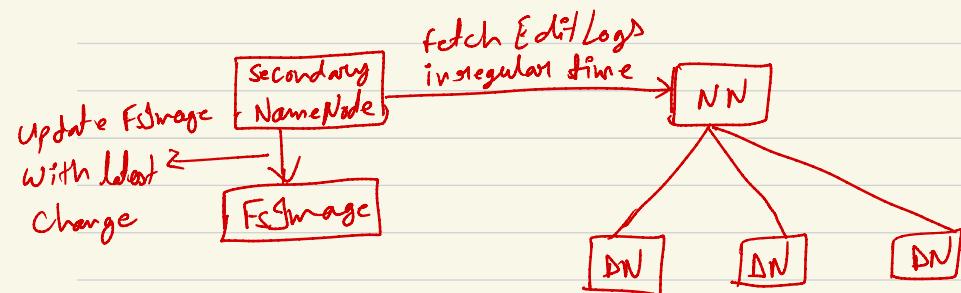
② StandBy NameNode

NameNode Maintains
→ FSImage = It contains the complete state of the file system since the start of NameNode
→ Edit Logs = It contains the recent modifications made to the file system.



ii) Secondary Name Node

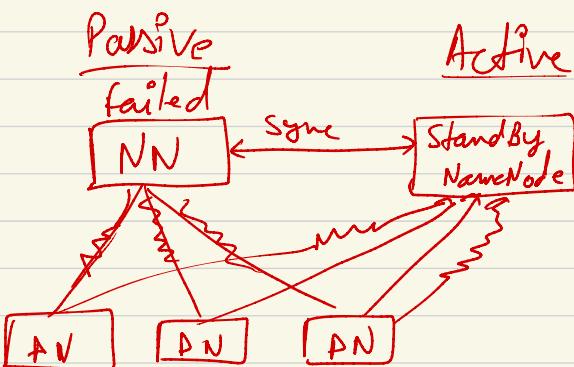
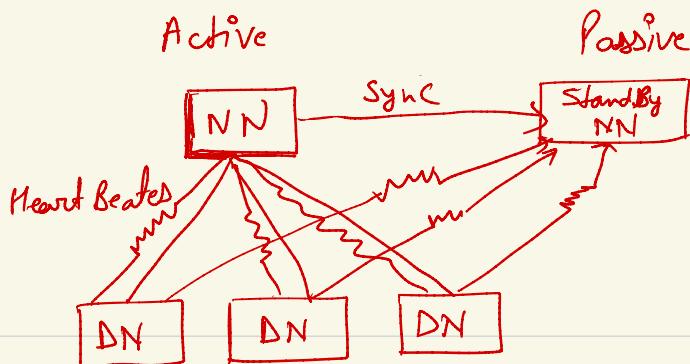
- ↳ Does incremental checkpointing
- ↳ And keeps latest FsImage as a backup file.



Highly Available \equiv Downtime should be very very less

StandBy NameNode

- ↳ Duplicate of NameNode
- ↳ Works in Active-Passive Mode



In less than few seconds

YARN \Rightarrow Yet another Resource Negotiator.
(Resource Management)

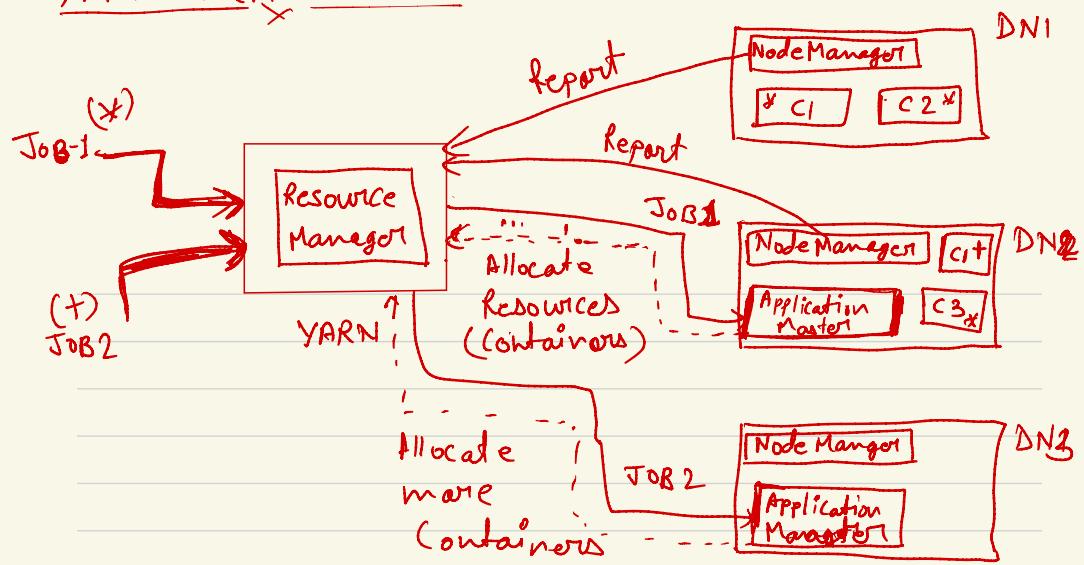
Hadoop 1.X

- ① Map-Reduce = Data Processing + Resource Management
- ② HDFS

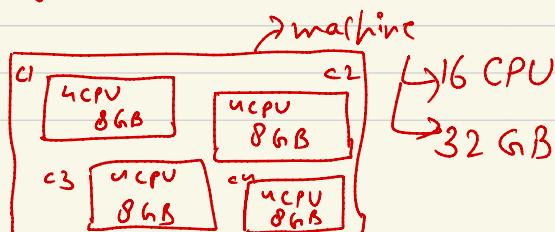
Hadoop 2.X

- ① HDFS
- ② Map-Reduce
- ③ YARN

YARN Architecture



→ Container → Small virtual space in physical machine which consists some CPU cores, memory, network bandwidth.



Steps for Resource Allocation

- ① Client will send a Job submission request to resource manager.
- ② RM will create one Container on a random DataNode and will start Application Master Service in it.
- ③ * Each Job will have separate and only one Application master.
- ④ Application Master will request to RM, to create more containers.
- ⑤ RM will create required number of containers on different DataNodes.
- ⑥ Containers will process actual blocks of Data.

i) Resource Manager

- Authority to allocate resources
- optimizes the cluster utilization like keeping all resources in use all the time against various constraints
- It has two components:

a.) Scheduler

- Responsible for allocating resources
- performs scheduling of jobs based on resource requirement
- Maintains Queues as well

b.) Application Master

- Responsible for Job submission
- Negotiates number of containers from RM
- Manages running application

(ii)

Node Manager

- It takes care of individual nodes in Hadoop cluster and manages jobs & its workflow.
- It sends reports heartbeat with health status to RM
- Monitors resource usage of individual containers (CPU, memory)