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1. **For NameNode, why it’s not necessary to store block locations persistently?**

To be able to serve multiple client request(s) as fast as possible otherwise for every request Namenode will fetch and load metadata information from the disk and start performing various checks on this metadata information. This process will consume more disk seek time for every operations (Reading from and Writing to Disk is a time consuming process.

1. **Why is it important to make the NameNode resilient to failures?**

Because NameNode is the entry point to request data and in case of failure, the whole system in offline.

1. **What details are there in the FsImage file?**

FsImage is a complete persistent checkpoint of the filesystem metadate which contains list of files (paths), size, owner, group, permission, access time and list of blocks for each file, list of DataNodes for each block, block size and replication factor.

1. **What is the purpose of the secondary name-node?**

Secondary NameNode merges the FsImage (File System Image) and the edits Log file periodically (every hour) and keeps edits log size within a limit.

1. **Does the NameNode stay in the safe mode until all under-replicated files are fully replicated? Why or why not?**

Replication of data blocks don’t occur in Safemode because safemode is a read-only mode for the HDFS cluster where it doesn’t allow any modifications to the file system or blocks

1. **What are the core changes in Hadoop 2.x compared to Hadoop 1.x? In other words, state major differences between Hadoop 1 and Hadoop 2.**
   1. Dependency on NameNode – Single point of failure and needs manual intervention to overcome, Secondary NameNode doesn’t substitute NameNode, one namespace per cluster is supported.
   2. Single Job Tracker (Single Point of Failure)

One thread to communicate to handle all Map/Reduce tasks.

Performs many activities like resource management, job scheduling, job monitoring, re-scheduling jobs.

* 1. No multitenancy (Only MapReduce jobs can be run)

Only suitable for Batch Processing of Big Data.

Can’t process Real-Time, Streaming, Graph Analysis, Machine Learning

* 1. Scalability Issue, up to 4k nodes pers cluster, 40k concurrent task.
  2. Use of static slots

1. **What is the difference between MR1 in Hadoop 1.0 and MR2 in Hadoop2.0?**

In MapReduce1 the client used to send his jobs to Job Tracker, Job Tracker distributed to task tracker machine and Task tracker used to run the task/job.

In MapReduce2, client will send his request to Resource Manager and resource will send these tasks to the Node Manager and start the application master will ask the resource manager to provide DataNodes where the blocks located after that job will be performed.

1. **What is HDFS Federation? What advantage does it provide?**

It was introduced in Hadoop 2 to handle the scalability issue in Hadoop 1. Allows HDFS metadata to be shared across multiple NameNode, which aides with HDFS Scalability and also provide data isolation, allowing different apps or teams to run their own NameNodes without fear of impacting other NameNodes on the same cluster.

1. **What is NameNode High Availability and how is it achieved in Hadoop 2?**

High Availability is a technology/System design to ensure the continuity of the system without failing under any circumstances. In Hadoop 2 two redundant NameNodes in the same cluster in an Active/Passive configuration with a hot standby which means. At any point of NameNode failure, either one of redundant NameNode will be in charge as the active NameNode. This failover can be configured to be automatic, negating the need for humans’ intervention.

1. **What is the role of Application Master in YARN application execution?**

The role of application master is managing the life cycle of applications like MapReduce, Spark, Storm...Etc. Moreover, for each application there is associated application master daemon running on the data node/salve machine to manage the life cycle of it.

**Great work!!**

Just a few comments though:

Q1 - Your answer is correct, but you also need to add that NameNode does not store block locations persistently because this information is reconstructed from the data nodes when the system starts as well as from "block reports" that are sent by DataNodes to NameNode as every 10th heartbeat message.

Q3 - FsImage file does not store the DataNodes on which the blocks are stored. Meaning, block locations are not stored in FsImage file.