

## Assignment 3

### 1. What are the differences between Hadoop1 and Hadoop2?

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Sr. No.	Hadoop1	Hadoop2
1	Supports MapReduce (MR) processing model only. Does not support non-MR tools	Allows to work in MR as well as other distributed computing models like Spark, Hama, Giraph, Message Passing Interface) MPI & HBase coprocessors.
2	MR does both processing and cluster-resource management.	YARN (Yet Another Resource Negotiator) does cluster resource management and processing is done using different processing models.
3	Has limited scaling of nodes. Limited to 4000 nodes per cluster	Has better scalability. Scalable up to 10000 nodes per cluster
4	Works on concepts of slots – slots can run either a Map task or a Reduce task only.	Works on concepts of containers. Using containers can run generic tasks.
5	Has Single-Point-of-Failure (SPOF) – because of single Namenode- and in the case of Namenode failure, needs manual intervention to overcome.	Has to feature to overcome SPOF with a standby Namenode and in the case of Namenode failure, it is configured for automatic recovery.
6	Does not support Microsoft Windows.	Added support for Microsoft windows.

## **2. Why does the HDFS Block size is 128MB in Hadoop2?**

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To minimize the cost of seek: For the large size blocks, time taken to transfer the data from disk can be longer as compared to the time taken to start the block. This results in the transfer of multiple blocks at the disk transfer rate.

If blocks are small, there will be too many blocks in Hadoop HDFS and thus too much metadata to store. Managing such a huge number of blocks and metadata will create overhead and lead to traffic in a network.

## **3. Why does DataNode require more Disk storage and NameNode requires more RAM?**

-> Unlike the DataNodes, a NameNode is a highly available server that manages the File System Namespace and maintains the metadata information. Therefore, NameNode requires higher RAM for storing the metadata information corresponding to the millions of HDFS files in the memory, whereas the DataNode needs to have a higher disk capacity for storing huge data sets.

## **4. If NameNode and DataNode fail simultaneously, which will you recover first and why?**

-> I will recover DataNode first, as it contains actual data. Once it gets recovered, we can either create a new NameNode which will contain the metadata of the newly recovered file or recover the old NameNode.

## **5. What will be the size of NameNode if we have to store 10PB data in DataNode, considering each object of the file consumes 200 Bytes to store its data in NameNode.**

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10 PB = 10000000000 MB

We have a block of 128 MB each and have data of size 10000000000MB.

So, Number of Blocks Required =  $10000000000 / 128 = 78125000$  Block

Since, we are using the default replication factor i.e. 3, each block will be replicated thrice.

Therefore, we will have  $78125000 * 3 = 234375000$  blocks in total.

Now each block requires 200 Bytes to store its metadata in NameNode

Therefore, Total Memory NameNode need =  $234375000 * 200 = 46875000000$  B

46875MB = 46.875 GB