**Assignment 3**

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

|  |  |
| --- | --- |
| **Hadoop1** | **Hadoop2** |
| It supports MapReduce processing model only. Does not support non-MR tools | It allows to work in MR as well as other distributed computing models like Hive, Ambari, Pig, Hbase etc. |
| It has limited scaling of nodes. Limited to  4000 nodes per cluster | It has better scalability and is scalable up to 10000 nodes per cluster. |
| Lower Degree of parallelism | Higher Degree of parallelism |
| MapReduce is responsible for both processing and cluster-resource management. | YARN (Yet Another Resource Negotiator) does cluster resource management and processing is done using MapReduce v2. |
| Works on concepts of Fixed sized slots – slots can run either a Map task or a Reduce task only. | Works on concepts of containers. Using containers can run generic tasks. |
| 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. |

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

**Minimize SEEK-COST or DISK I/O**: Larger the block size, lesser the file blocks. Thus, less number of disk seeks. And since this system is used for Big Data where we have PBs of data, having smaller block size can be troublesome. Earlier, it was 64MB which was increased to 128MB for higher efficiency.

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

**->** DataNode is where the actual data is stored and NameNode has only metadata. Hence, DataNode has more storage.

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

**->** If nameNode fails, the secondary NameNode takes it’s place. We should recover the Namenode first because without it the whole cluster might fail. Also, it has the latest edit logs that can be used to recover the Data of the DataNode.

1. **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 it’s data in NameNode.**

**->**

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.

Each block requires 200 Bytes to store it’s metadata in NameNode

Total Memory NameNode need = 234375000 \* 200 = 468750000000 B

46.875 GB