HDFS top interview questions

HDFS INTERVIEW QUESTIONS

**Q1. What does ‘jps’ command do?**

**Answer:**It gives the status of the deamons which run Hadoop cluster. It gives the output mentioning the status of Namenode, Datanode, Secondary Namenode, Jobtracker and Tasktracker.

**Q2.What if a Namenode has no data?**

**Answer:** It cannot be part of the Hadoop cluster.

**Q3. What happens to job tracker when Namenode is down?**

**Answer:**When Namenode is down, your cluster is OFF, this is because Namenode is the single point of failure in HDFS.

**Q4.What is a Namenode?**

**Answer:** Namenode is the master node on which job tracker runs and consists of the metadata. It maintains and manages the blocks which are present on the datanodes. It is a high-availability machine and single point of failure in HDFS.

**Q5.Replication causes data redundancy, then why is it pursued in HDFS?**

**Answer:** HDFS works with commodity hardware (systems with average configurations) that has high chances of getting crashed any time. Thus, to make the entire system highly fault-tolerant, HDFS replicates and stores data in different places. Any data on HDFS gets stored at least 3 different locations. So, even if one of them is corrupted and the other is unavailable for some time for any reason, then data can be accessed from the third one. Hence, there is no chance of losing the data. This replication factor helps us to attain the feature of Hadoop called Fault Tolerant.

**Q6.  What is a Datanode?**

**Answer:** Datanodes are the slaves which are deployed on each machine and provide the actual storage. These are responsible for serving read and write requests for the clients.

**Q7.  Why do we use HDFS for applications having large data sets and not when there are lot of small files?**

**Answer:** HDFS is more suitable for large amount of data sets in a single file as compared to small amount of data spread across multiple files. This is because Namenode is a very expensive high performance system, so it is not prudent to occupy the space in the Namenode by unnecessary amount of metadata that is generated for multiple small files. So, when there is a large amount of data in a single file, name node will occupy less space. Hence for getting optimized performance, HDFS supports large data sets instead of multiple small files.

**Q8.Explain the major difference between HDFS block and InputSplit.**

**Answer:** In simple terms, block is the physical representation of data while split is the logical representation of data present in the block. Split acts a s an intermediary between block and mapper. Suppose we have two blocks:

Block 1: ii nntteell

Block 2: Ii ppaatt

Now, considering the map, it will read first block from ii till ll, but does not know how to process the second block at the same time. Here comes Split into play, which will form a logical group of Block1 and Block 2 as a single block. It then forms key-value pair using inputformat and records reader and sends map for further processing with inputsplit, if you have limited resources, you can increase the split size to limit the number of maps. For instance, if there are 10 blocks of 640MB (64MB each) and there are limited resources, you can assign ‘split size’ as 128MB. This will form a logical group of 128MB, with only 5 maps executing at a time.However, if the ‘split size’ property is set to false, whole file will form one inputsplit and is processed by single map, consuming more time when the file is bigger.

**Q9.What is a ‘block’ in HDFS?**

**Answer:** A ‘block’ is the minimum amount of data that can be read or written. In HDFS, the default block size is 64 MB as contrast to the block size of 8192 bytes in Unix/Linux. Files in HDFS are broken down into block-sized chunks, which are stored as independent units. HDFS blocks are large as compared to disk blocks, particularly to minimize the cost of seeks. If a particular file is 50 mb, will the HDFS block still consume 64 mb as the default size? No, not at all! 64 mb is just a unit where the data will be stored. In this particular situation, only 50 mb will be consumed by an HDFS block and 14 mb will be free to store something else. It is the MasterNode that does data allocation in an efficient manner.

**Q10.Explain what happens if during the PUT operation, HDFS block is assigned a replication factor 1 instead of the default value 3.**

**Answer:** Replication factor is a property of HDFS that can be set accordingly for the entire cluster to adjust the number of times the blocks are to be replicated to ensure high data availability. For every block that is stored in HDFS, the cluster will have n-1 duplicated blocks. So, if the replication factor during the PUT operation is set to 1 instead of the default value 3, then it will have a single copy of data. Under these circumstances when the replication factor is set to 1, if the DataNode crashes under any circumstances, then only single copy of the data would be lost.

**Q11.What are the most common Input Formats in Hadoop?**

**Answer:** There are three most common input formats in Hadoop:

* Text Input Format: Default input format in Hadoop
* Key Value Input Format: used for plain text files where the files are broken into lines
* Sequence File Input Format: used for reading files in sequence

**Q12.  What is commodity hardware?**

**Answer:** Commodity Hardware refers to inexpensive systems that do not have high availability or high quality. Commodity Hardware consists of RAM because there are specific services that need to be executed on RAM. Hadoop can be run on any commodity hardware and does not require any super computer s or high end hardware configuration to execute jobs.

**Q13. What is the port number for NameNode,Secondary NameNode,DataNodes,TaskTracker and JobTracker?**

**Answer:**

* NameNode 50070
* Secondary NameNode 50090
* DataNodes 50075
* JobTracker 50030
* TaskTracker 50060

**Q14. Explain about the process of inter cluster data copying.**

**Answer:** HDFS provides a distributed data copying facility through the DistCP from source to destination. If this data copying is within the hadoop cluster then it is referred to as inter cluster data copying. DistCP requires both source and destination to have a compatible or same version of hadoop.

**Q15. What is a heartbeat in HDFS?**

**Answer:** A heartbeat is a signal indicating that it is alive. A datanode sends heartbeat to Namenode and task tracker will send its heart beat to job tracker. If the Namenode or job tracker does not receive heart beat then they will decide that there is some problem in datanode or task tracker is unable to perform the assigned task.

**Q16. Explain the difference between NAS and HDFS.**

**Answer:** NAS runs on a single machine and thus there is no probability of data redundancy whereas HDFS runs on a cluster of different machines thus there is data redundancy because of the replication protocol.NAS stores data on a dedicated hardware whereas in HDFS all the data blocks are distributed across local drives of the machines.In NAS data is stored independent of the computation and hence Hadoop MapReduce cannot be used for processing whereas HDFS works with Hadoop MapReduce as the computations in HDFS are moved to data.

**Q17. Explain about the indexing process in HDFS.**

**Answer:** Indexing process in HDFS depends on the block size. HDFS stores the last part of the data that further points to the address where the next part of data chunk is stored.

**Q18. What is a rack awareness and on what basis is data stored in a rack?**

**Answer:** All the data nodes put together form a storage area i.e. the physical location of the data nodes is referred to as Rack in HDFS. The rack information i.e. the rack id of each data node is acquired by the NameNode. The process of selecting closer data nodes depending on the rack information is known as Rack Awareness.The contents present in the file are divided into data block as soon as the client is ready to load the file into the hadoop cluster. After consulting with the NameNode, client allocates 3 data nodes for each data block. For each data block, there exists 2 copies in one rack and the third copy is present in another rack t0 ensure if any entire rack fails we still have one copy in another rack.This is generally referred to as the Replica Placement Policy.

**Q19. How NameNode Handles data node failures?**

**Answer:**Through checksums. every data has a record followed by a checksum. if checksum doesnot match with the original then it reports an data corrupted error.

**Q20. What is HDFS?**

**Answer:**The Hadoop Distributed File System (HDFS) is a sub-project of the Apache Hadoop project.HDFS uses a master/slave architecture in which one device (the master) controls one or more other devices (the slaves). HDFS is a file system designed for storing very large files with streaming data access patterns, running clusters on commodity hardware.