**HADOOP interview questions**

**Simple**

What is Hadoop?

What is need of Hadoop?

What is HDFS? How is it different from other file system?

What are diff daemons running in Hadoop? Explain 5 daemons and its responsibilities??

What is rack awareness?

What is the replication Property of HDFS??

What is single point of failure in Hadoop cluster? How to overcome that?

1. **What is Map Reduce?**

Map Reduce is the system used to process data in the Hadoop cluster

Version of hadoop?

Explain the JobConf?

Have you written MapReduce jobs?

Have you written Python script programs?

How comfortable with Java programming?

More JAVA Quesions

**Scenarios**

**HDFS**

How do you run or execute a Job? how does it executes.

94MB file --- block size 64Mb.------------------------3x nodes…how will it get distributed across all the nodes of cluster??…how will the file be split??

How many task attempts for a task….. ??? ---- certification question add

Explain the process of reading file from HDFS?

Explain the process of writing file to HDFS?

If u have single file of size 100 Mb. How it will be stored on HDFS?

If u have 10 files of 100 MB each then how many map task going to run?

If one of the node is taking too long to process any task. How hadoop is going to handle this case?

Which is best use of HDFS?

To store large number of small files or

To store few number of large files

Why?

How to handle small number of large files?

Use CombineFileInputformat

Sequence files

**MapReduce**

How many versions of mrexists ??

How different is mr1 from mr2??

What brought in the need of mr2 ??

Explain the working of mr2??

**Mapper**

Where mapper does writes its output?

[Map tasks write their output to local disk, not to HDFS. Why is this?](http://www.aptibook.com/discuss-technical?uid=tech-hadoop34&question=Map-tasks-write-their-output-to-local-disk,-not-to-HDFS.-Why-is-this?)

**Reducer**

How keys and values are presented to reducer?

Can we have zero reducers if yes then how to setup?

How many output files will be if I set reduce task to zero?

I want single and sorted output file from my map reduce job , how to achieve that?

When the user define reduce method is first called in a MapReduce job?

**Secondary sort**

I need my values to be in sorted order how to achieve this?

**Combiner**

Why do we need combiner?

Does combiner run every time in a mr job ??

In which scenario you are able to reuse your existing Reduces as your combiner ?

~~In my map reduce job , my map task is generation too many intermediate key values~~

**Partitioner**

What does the partitioner do?

By Default what does partitioner implements and write the code for it??

**Shuffle and sort**

How shuffle and sort take place in map reduce?

**Setup()/cleanup()**

If you have set a variable in u r driver code and want to access it in all mapper function.

How will u achieve this?

If you have created job and you want to test it with different Configuration options for every run.

e.g. I want to change number of reducer for every run

How will you achieve this?

**-D mapreduce.job.reduces=10**

**Input format**

How will you process Image files??

How to implement on how to process video files?

What is a Writable?

As java already have its own data types then what is need of Writable?

What is default Input format?

How to setup a Maponly job??

How to process an XML file in MapReduce ??

Use StreamXmlRecordReader(used for streaming but also can be used in map reduce)

Create your own record reader.

In a MapReduce job, you want each of your input files processed by a single map task. How do you configure a MapReduce job so that a single map task processes each input file regardless of how many blocks the input file occupies?

**Distributed cache**

If I want to send a file (jar file) to each task tracker, how can I send it?

Can u explain function flows that are involved in process of reading file using distributed cache?

**Sequence files/map files**

If I want to read binary file which input format should i use?

What is a Sequence File?

You want to perform analysis on a large collection of images.

You want to store this data in HDFS and process it with MapReduce but you also want to give your data analysts and data scientists the ability to process the data directly from HDFS with an interpreted high-level programming language like Python. Which format should you use to store this data in HDFS?

What is map file?

What is difference between map file and sequence file?

Which input format is used to read map file?

**Joins**

What are different joins available in Map reduce?

What is map side join and when to use it?

What is reduce side join and when to use it?

Which one is fastest joins?

As joining operation using map reduce is more complicated, Is there any other way to join to data sets?

**Oozie**

**When given an option, which one will you use Flume or oozie ??**

In my project i have few map task and hive task .How can i control the execution of each task?

e.g. after successful completion of first task my second task should run.

**Sqoop**

You have user profile records in your OLPT database, that you want to join with web logs you have already ingested into the Hadoop file system. How will you obtain these user records?

**Flume**

You want to understand more about how users browse your public website, such as which pages they visit prior to placing an order. You have a farm of 200 web servers hosting your website. How will you gather this data for your analysis?

**HIVE**

What is the difference b/w External Table & Internal Table in HIVE.

How Partitions can be done on HIVE Tables(partition the file using a Date field), and what Schema you used.

What are the primitive and complex datatypes used in the Hive?.

What is the syntax to insert data into Hive table?

Have heard about UDF's and how comfortable using UDF(User defined functionality)

**HBASE**

**What is the difference between Column oriented database and row oriented database ??**

**Architecture of Hbase ??**

**Various important components of Hbase ?**

**Explain the Read process in Hbase ??**

**Explain the write process in Hbase ??**

**Significance of WAL**

**Explain the various Daemons of HBASE**

**What is a HFILE ??**

**How do you define a Region , store .. a storefile ??**

**What is Memstore ,BLoomFilter ,Blockcache ??**

**Write a GET ,PUT and SCAN for HBASE ??**

**Explain the process of Log splitting ??**

**Explain the process of Region Splitting ??**

**What happens when a Regionserver fails??**

**Explain Schema design of Hbase ???**

**Various Performance tips in Hbase ??**

**Q1. Name the most common InputFormats defined in Hadoop? Which one is default ?**

Following 2 are most common InputFormats defined in Hadoop

- TextInputFormat

- KeyValueInputFormat

- SequenceFileInputFormat

TextInputFormatis the hadoop default

**Q2. What is the difference between TextInputFormat and KeyValueInputFormat class**

TextInputFormat: It reads lines of text files and provides the offset of the line as key to the Mapper and actual line as Value to the mapper

KeyValueInputFormat: Reads text file and parses lines into key, val pairs. Everything up to the first tab character is sent as key to the Mapper and the remainder of the line is sent as value to the mapper.

**Q3. What is InputSplit in Hadoop**

When a hadoop job is run, it splits input files into chunks and assign each split to a mapper to process. This is called Input Split

**Q4. How is the splitting of file invoked in Hadoop Framework**

It is invoked by the Hadoop framework by running getInputSplit()method of the Input format class (like FileInputFormat) defined by the user

**Q5. Consider case scenario: In M/R system,**

**- HDFS block size is 64 MB**

**- Input format is FileInputFormat**

**- We have 3 files of size 64K, 65Mb and 127Mb**

**then how many input splits will be made by Hadoop framework?**

Hadoop will make 5 splits as follows

- 1 split for 64K files

- 2 splits for 65Mb files

- 2 splits for 127Mb file

**Q6. What is the purpose of RecordReader in Hadoop**

The InputSplithas defined a slice of work, but does not describe how to access it. The RecordReaderclass actually loads the data from its source and converts it into (key, value) pairs suitable for reading by the Mapper. The RecordReader instance is defined by the InputFormat

**Q7. After the Map phase finishes, the hadoop framework does "Partitioning, Shuffle and sort". Explain what happens in this phase?**

- Partitioning

Partitioning is the process of determining which reducer instance will receive which intermediate keys and values. Each mapper must determine for all of its output (key, value) pairs which reducer will receive them. It is necessary that for any key, regardless of which mapper instance generated it, the destination partition is the same

- Shuffle

After the first map tasks have completed, the nodes may still be performing several more map tasks each. But they also begin exchanging the intermediate outputs from the map tasks to where they are required by the reducers. This process of moving map outputs to the reducers is known as shuffling.

- Sort

Each reduce task is responsible for reducing the values associated with several intermediate keys. The set of intermediate keys on a single node is automatically sorted by Hadoop before they are presented to the Reducer

**Q9. If no custom partitioner is defined in the hadoop then how is data partitioned before its sent to the reducer**

The default partitioner computes a hash value for the key and assigns the partition based on this result

**Q10. What is a Combiner**

The Combiner is a "mini-reduce" process which operates only on data generated by a mapper. The Combiner will receive as input all data emitted by the Mapper instances on a given node. The output from the Combiner is then sent to the Reducers, instead of the output from the Mappers.

**Q12. What is job tracker**

Job Tracker is the service within Hadoop that runs Map Reduce jobs on the cluster

**Q13. What are some typical functions of Job Tracker**

The following are some typical tasks of Job Tracker

- Accepts jobs from clients

- It talks to the NameNode to determine the location of the data

- It locates TaskTracker nodes with available slots at or near the data

- It submits the work to the chosen Task Tracker nodes and monitors progress of each task by receiving heartbeat signals from Task tracker

**Q14. What is task tracker**

Task Tracker is a node in the cluster that accepts tasks like Map, Reduce and Shuffle operations - from a JobTracker

**Q15. Whats the relationship between Jobs and Tasks in Hadoop**

One job is broken down into one or many tasks in Hadoop.

**Q16. Suppose Hadoop spawned 100 tasks for a job and one of the task failed. What will hadoop do ?**

It will restart the task again on some other task tracker and only if the task fails more than 4 (default setting and can be changed) times will it kill the job

**Q17. Hadoop achieves parallelism by dividing the tasks across many nodes, it is possible for a few slow nodes to rate-limit the rest of the program and slow down the program. What mechanism Hadoop provides to combat this**

Speculative Execution

**Q18. How does speculative execution works in Hadoop**

Job tracker makes different task trackers process same input. When tasks complete, they announce this fact to the Job Tracker. Whichever copy of a task finishes first becomes the definitive copy. If other copies were executing speculatively, Hadoop tells the Task Trackers to abandon the tasks and discard their outputs. The Reducers then receive their inputs from whichever Mapper completed successfully, first.

**Q19. Using command line in Linux, how will you**

- see all jobs running in the hadoop cluster

- kill a job

- hadoop job -list

- hadoop job -kill jobid

**Q20. What is Hadoop Streaming**

Streaming is a generic API that allows programs written in virtually any language to be used as Hadoop Mapper and Reducer implementations

**Q21. What is the characteristic of streaming API that makes it flexible run map reduce jobs in languages like perl, ruby, awk etc.**

Hadoop Streaming allows to use arbitrary programs for the Mapper and Reducer phases of a Map Reduce job by having both Mappers and Reducers receive their input on stdin and emit output (key, value) pairs on stdout.

**Q22. What is Distributed Cache in Hadoop**

Distributed Cache is a facility provided by the Map/Reduce framework to cache files (text, archives, jars and so on) needed by applications during execution of the job. The framework will copy the necessary files to the slave node before any tasks for the job are executed on that node.

**Q23. What is the benefit of Distributed cache, why can we just have the file in HDFS and have the application read it**

This is because distributed cache is much faster. It copies the file to all trackers at the start of the job. Now if the task tracker runs 10 or 100 mappers or reducer, it will use the same copy of distributed cache. On the other hand, if you put code in file to read it from HDFS in the MR job then every mapper will try to access it from HDFS hence if a task tracker run 100 map jobs then it will try to read this file 100 times from HDFS. Also HDFS is not very efficient when used like this.

**Q.24 What mechanism does Hadoop framework provides to synchronize changes made in Distribution Cache during runtime of the application**

This is a trick questions. There is no such mechanism. Distributed Cache by design is read only during the time of Job execution

**Q25. Have you ever used Counters in Hadoop. Give us an example scenario**

Anybody who claims to have worked on a Hadoop project is expected to use counters

To count records as per user rating, e.g how many records for rating 1 and 2 etc...

To count bad records

**Q26. Is it possible to provide multiple input to Hadoop? If yes then how can you give multiple directories as input to the Hadoop job**

Yes, the input format class provides methods to add multiple directories as input to a Hadoop job

**Q27. Is it possible to have Hadoop job output in multiple directories. If yes then how**

Yes, by using Multiple Outputs class

**Q28. What will a hadoop job do if you try to run it with an output directory that is already present? Will it**

- overwrite it

- warn you and continue

- throw an exception and exit

The hadoop job will throw an exception and exit.

**Q29. How can you set an arbitrary number of mappers to be created for a job in Hadoop**

This is a trick question. You cannot set it

**Q30. How can you set an arbitary number of reducers to be created for a job in Hadoop**

You can either do it pragmatically by using method setNumReduceTasks in the JobConfclass

Or set it up as a configuration setting.

**Q31. How will you write a custom partitioner for a Hadoop job**

To have hadoop use a custom partitioner you will have to do minimum the following three

- Create a new class that extends Partitioner class

- Override method getPartition()

- In the wrapper that runs the Map Reducer, either

- add the custom partitioner to the job programtically using method setPartitionerClass or

- add the custom partitioner to the job as a config file (if your wrapper reads from config file or oozie)

**Q32. How did you debug your Hadoop code**

There can be several ways of doing this but most common ways are

- By using counters

- The web interface provided by Hadoop framework

**Q33. Did you ever built a production process in Hadoop ? If yes then what was the process when your hadoop job fails due to any reason**

It’s an open ended question but most candidates, if they have written a production job, should talk about some type of alert mechanism like email is sent or there monitoring system sends an alert. Since Hadoop works on unstructured data, it’s very important to have a good alerting system for errors since unexpected data can very easily break the job.

**Q34. Did you ever ran into a lop sided job that resulted in out of memory error, if yes then how did you handled it**

This is an open ended question but a candidate who claims to be an intermediate developer and has worked on large data set (10-20GB min) should have run into this problem. There can be many ways to handle this problem but most common way is to alter your algorithm and break down the job into more map reduce phase or use a combiner if possible.

**What is default partitioner?**

Hash partitioner

**How to sort file globally by using multiple reducer or partitioner?**

(Use TotalOrderPartioner) By creating pationer which will contains some range of keys and next partioner contains next range.

And then con-cat all files.

**What is limitation of HDFS?**

**How to merge multiple small files into hadoop?**

By creating archive file

Use hadoop archive command

**How to read file?**

**How to write file?**

**How replicas are placed in the on the cluster?**

**How to improve performance of MR Job?**

1. Use combiner
2. Reuse Writables
3. Compress Mapper output
4. Reuse JVM
5. ~~Use appropriate number of Map and reduce task available slot~~

**What are different compression algorithms available? Which one is better?**

**How to optimise mr in shuffle and sort phase?**

**Write mr code for select query**

**What are thing we look when we write join**

**What is purpose of mapper?**

**How to copy record from one cluster to another?**

**How to change owner for hadoop files?**

**What is performance diff bet all java collections?**

**Which component is responsible to send keys to reducer?**

**have u written any partioner?**

**What is data size u were working on?**

12 TB and 18 to 20 nodes

**How to move data from one cluster to another?**

The canonical use case for distcp is for transferring data between two HDFS clusters.

If the clusters are running identical versions of Hadoop, the hdfs scheme is appropriate:

**hadoop distcp hdfs://namenode1/foo hdfs://namenode2/bar**

Is there a way to access existing HBase table records through Hive?

**Yes**

As per the [Hive HBase Integration wiki page](https://cwiki.apache.org/Hive/hbaseintegration.html), it's possible using a create table command like the following:

CREATE TABLE hbase\_table\_1(key int, value string)

STORED BY 'org.apache.hadoop.hive.hbase.HBaseStorageHandler'

WITH SERDEPROPERTIES ("hbase.columns.mapping" = ":key,cf1:val")

TBLPROPERTIES ("hbase.table.name" = "xyz");

However, keep in mind that creating a table like this in Hive 0.8 and before will only allow you to access data from your HBase table that was inserted via your corresponding Hive table. If you had any pre-existing data in your HBase table that wasn't inserted through the Hive table, you wouldn't be able to query it through the Hive table either.

Starting Hive 0.9, [JIRA 1634](https://issues.apache.org/jira/browse/HIVE-1634), will be available which allows the Hive table to access all data present in the HBase table regardless of how it was inserted in it.

**Can hbase is used to store OLAP?**

**Hive vs hbase?**

 HDFS lacks **random read and write access**. This is where HBase comes into picture

**Pig vs hive?**

**what are fn of sec name node?**

**what happens if one of the node goes down while writing data into hdfs?**

**how to get value from multiple column as single value from hive query**

**output format and serde are same in hive**

**how to control number of map task**

**where does log files of each map task are stored.**

**what is adv of writting secondary sort over writting sort logic in reducer**

**how to improve performance in shuffle and sort phase**

**if you have two file**

**1 file**

**id ,name**

**2 file**

**id, url**

**output**

**name,url**

**write map reduce**

**what is adv of distributed cache instead of reading one file from mapper**

**if you have 100 files of 1 mb each**

**then how many map task will be created**

**now for above scenario how can i make only 10 map task**