Hadoop 2.x

Hadoop Common Module is a Hadoop Base API for all Hadoop Components. All other components works on top of this module .

HDFS stands for Hadoop Distributed File System. It is also know as HDFS V2 as it is part of Hadoop 2.x with some enhanced features. It is used as a Distributed Storage System in Hadoop Architecture .

YARN stands for Yet Another Resource Negotiator. It is new Component in Hadoop 2.x Architecture. It is also know as MR V2.

MapReduce is a Batch Processing or Distributed Data Processing Module. It is also know as "MR V1" as it is part of Hadoop 1.x with some updated features .Remaining all Hadoop Ecosystem components work on top of these three major components: HDFS, YARN and MapReduce.

Major Components

- **Hdfs**
- **Yarn**
- **Mapreduce**

Hdfs

The Hadoop Distributed File System (HDFS) is a distributed file system designed to run on commodity hardware. It has many similarities with existing distributed file systems. However, the differences from other distributed file systems are significant. HDFS is highly fault-tolerant and is designed to be deployed on low-cost hardware. HDFS provides high throughput access to application data and is suitable for applications that have large data sets. HDFS relaxes a few POSIX requirements to enable streaming access to file system data

HDFS follows the master-slave architecture and it has the following elements

Namenode

The namenode is the commodity hardware that contains the GNU/Linux operating system and the namenode software. It is a software that can be run on commodity hardware. The system having the namenode acts as the master server and it does the following tasks:

Manages the file system namespace.

Regulates client's access to files.

It also executes file system operations such as renaming, closing, and opening files and directories.

Datanode

The datanode is a commodity hardware having the GNU/Linux operating system and datanode software. For every node in a cluster, there will be a datanode. These nodes manage the data storage of their system.

Datanodes perform read-write operations on the file systems, as per client request.

They also perform operations such as block creation, deletion, and replication according to the instructions of the namenode.

Block

Generally the user data is stored in the files of HDFS. The file in a file system will be divided into one or more segments and/or stored in individual data nodes. These file segments are called as blocks. In other words, the minimum amount of data that HDFS can read or write is called a Block. The default block size is 64MB, but it can be increased as per the need to change in HDFS configuration.

MapReduce

MapReduce is a processing technique and a program model for distributed computing based on java. The MapReduce algorithm contains two important tasks, namely Map and Reduce. Map takes a set of data and converts it into another set of data, where individual elements are broken down into tuples (key/value pairs). Secondly, reduce task, which takes the output from a map as an input and combines those data tuples into a smaller set of tuples. As the sequence of the name MapReduce implies, the reduce task is always performed after the map job.

The major advantage of MapReduce is that it is easy to scale data processing over multiple computing nodes. Under the MapReduce model, the data processing primitives are called mappers and reducers. Decomposing a data processing application into mappers and reducers is sometimes nontrivial. But, once we write an application in the MapReduce form, scaling the application to run over hundreds, thousands, or even tens of thousands of machines in a cluster is merely a configuration change. This simple scalability is what has attracted many programmers to use the MapReduce model

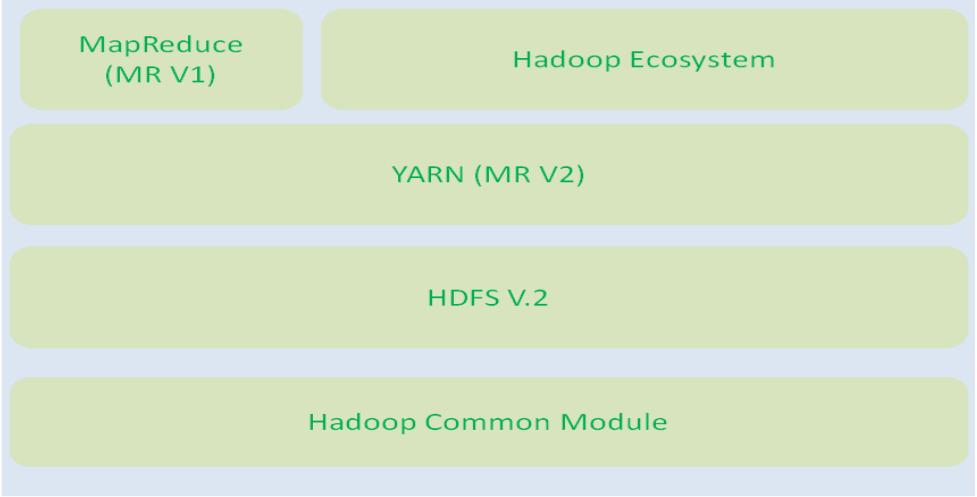
YARN

The fundamental idea of YARN is to split up the functionalities of resource management and job scheduling or monitoring into separate daemons. The idea is to have a global ResourceManager and per-application ApplicationMaster . An application is either a single job or a DAG of jobs.

The ResourceManager and the NodeManager form the data-computation framework. The ResourceManager is the ultimate authority that arbitrates resources among all the applications in the system. The NodeManager is the per-machine framework agent who

is responsible for containers, monitoring their resource usage and reporting the same to the ResourceManager/Scheduler.

The per-application ApplicationMaster is, in effect, a framework specific library and is tasked with negotiating resources from the ResourceManager and working with the NodeManager(s) to execute and monitor the tasks.



Hadoop V.2.x Components