Unit 3.

3.1 Purpose Scheduling

- In computing, scheduling is the method by which process manager handles the removal of a running/finished process from CPU and selection of another process based on a parituclar scheduling algorithm.
- A scheduler may aim at one or more of many goals such as:
  - Allowing multiple users to share the system resource effectively
  - Keep all computer resource bysu, as in load balancing
  - Maximizing throughput (total amount of work completed in unit time)
  - Minimizing wait time (time from work becoming ready untill first point it begins execution)
  - Minimizing latency or response time (time from becoming ready to first response)
  - Maximizing Fairness (Sharing time between process according to workload)
  - Avoiding deadlock when sharing the CPU resources between process

3.2 Types of Scheduling Algorithm

- Linear (Tradition) Scheduling algorithm : FCFS, SJF, RR, Priority Scheduling
- Distributed Scheduling algorithm

3.2.1 Linear Scheduling Algorithm

3.2.2 Distributed Scheduling Algorithm

- These algorithm helps to schedule the clould services on cloud environment
- Generally cloud scheduling probelms as NP-Hard problems which cannot be solved using Linear Scheduling algorithm, that is why distributed algorithms are used to scheduling cloud services.

- Some exapmle of distributes scheduling algorithm are: Max-Min algorithm, Min-Min algorithm etc.

3.3 Introduction to Cloud Simulator

3.3.1 Cloud Simulator

- A cloud simulator helps in modelling various kinds of cloud applications by creating virtual data centers, virtual hosts, VMs, cloudlets that can be configured easily.
- It provides real-time and real-world evaluation of the cloud services inside a programm, so that cost effective and practical cloud services can be developed and analyzed easily.

3.3.2 Benifits of cloud simulators

- Minimal Cost: Purchasing software costs less when compared to purchasing hardware and proprietary software (operating systems, hypervisor etc). Also many simulators are available free of cost.
- Repeatable and Controllable: We can test our experimental set up (simulation) as many times as we want until we get the desirable output.
- Environment: A simulator provides environment for evaluation of various scenarios under different workloads.

3.3.3 CloudSim

- CloudSim is a cloud simulation tool for modeling and simulation of cloud computing infrastructures and services.
- CloudSim is the most popular simulation tool available for cloud computing environment.
- It is an event driven simulator built up on the core of grid simulator GridSim.
- Base programming language for CloudSim is Java and that is why CloudSim modules are easy to extend.

3.3.3.1 Features of CloudSim

- Support modeling and simulation of large scale computing environment.
- Supports simulation of both single and inter-networked cloud (federation of clouds)
- Flexibility to switch between space shared and time shared allocation of processing cores to virtualized services.
- Support for simulation of network connections among the simulated system elements

- Avalability of virtualization engine allows creation of multiple and independent co-hosted virtual cloud services on a data center node.

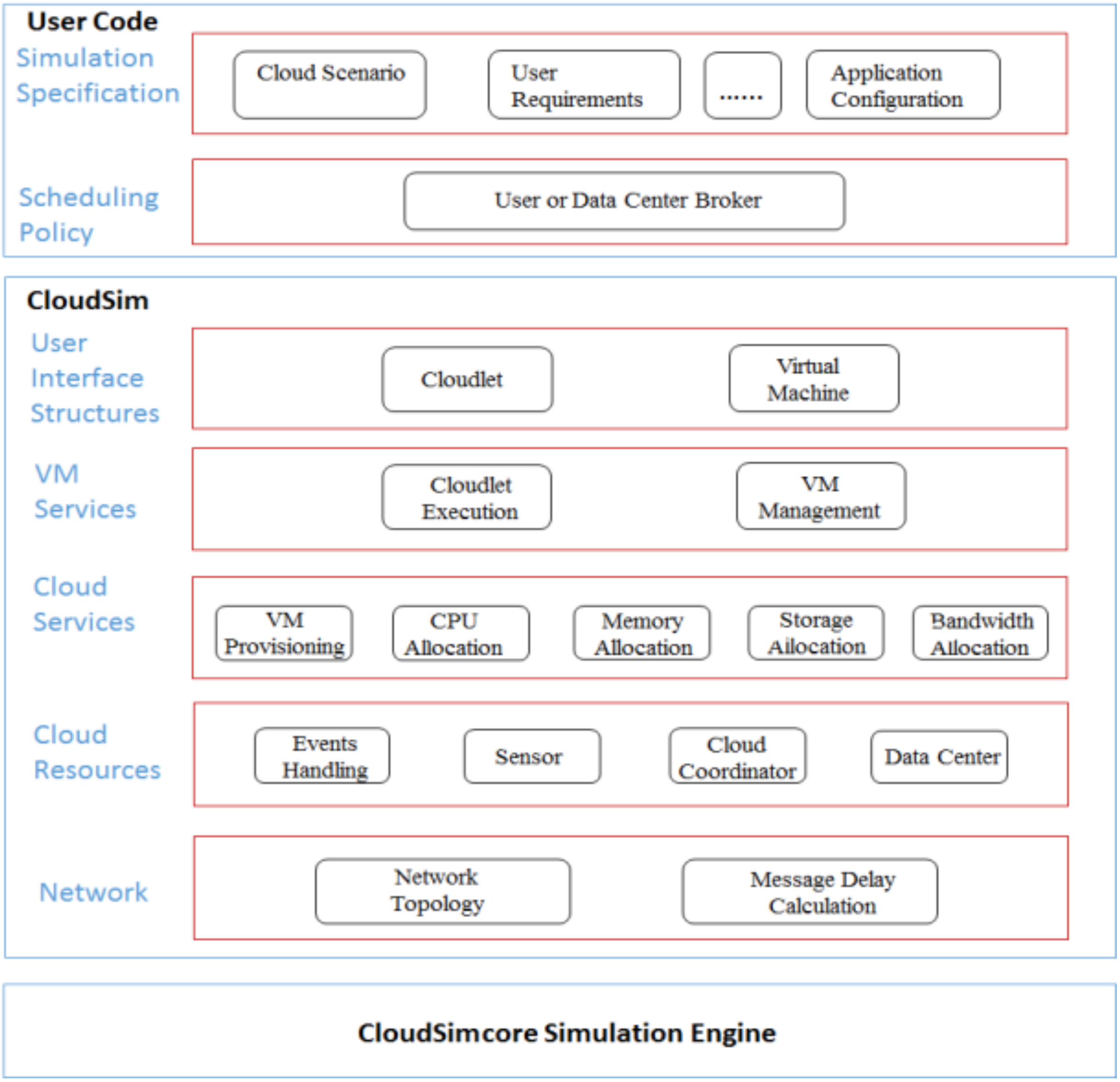


Fig:1. Architecture of CloudSim

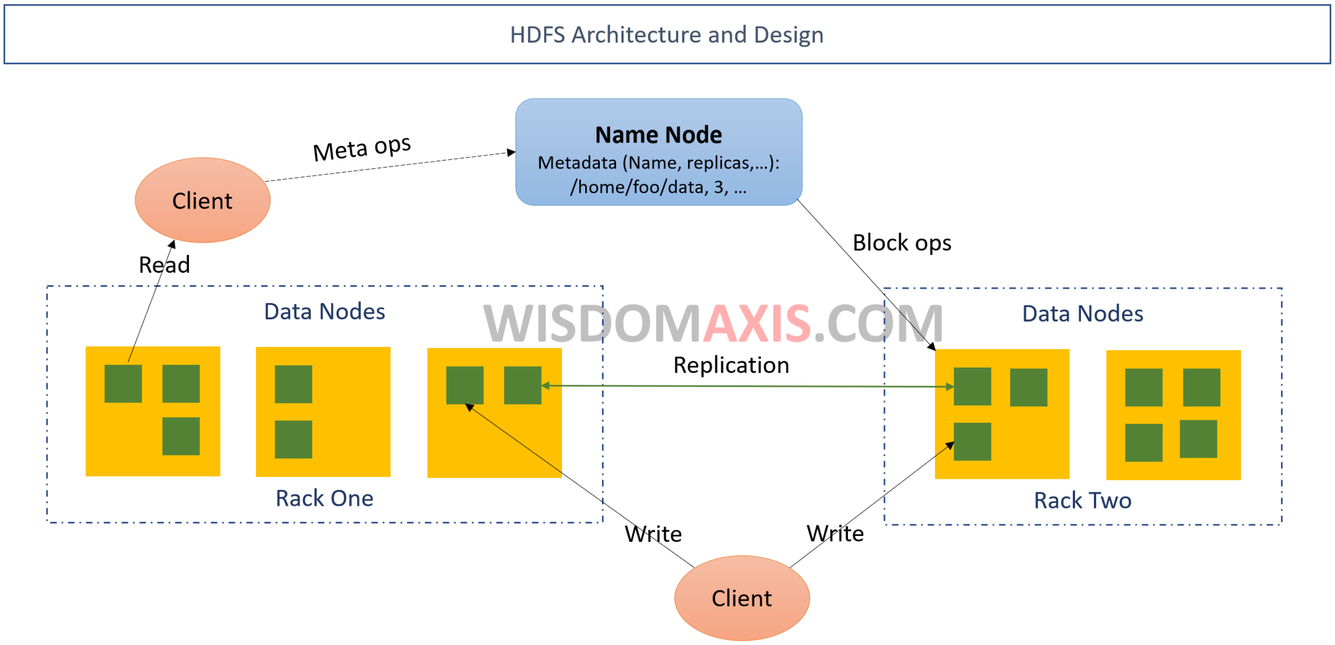
3.3.4 HDFS (Hadoop Distributed File System)

- HDFS stands for Hadoop Distributed File System, developed on the basis of distributed file design.
- HDFS is a unique design that provides storage for extremely large files with streaming data access pattern and it runs on commodity hardware.
- It holds large amount of data and provides easier access to the data.

- It is higly fault tolerant and the files are stored in redundant fashion so that data recovery can be easier in case of any failure.

3.3.5 Feature of HDFS:

- It is suitable for the distributed storage and & processing.
- It provides a command line tool to interact with HDFS.
- Allows streaming access to to file system and data.
- It has various file premission and authentication functionality.
- It has high throughput.
  HDFS are highly fault tolerant.



Components of HDF Architecture

- DataNode
- NameNode
- Client Node

> DataNode
>
> - Containes structured or unstructured data
> - Stores the matadata.
> - Replication is also done by datanodes

> NameNode
>
> - It executes file system to provide services to client
> - It is the primary entity which supports the communication between client and data node

> ClientNode
>
> - It is the node which writes or requests the data from HDFS file system.