

# A Review of Evaluation of Various Cloud Based Simulators

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**Abstract**— In this review paper we have conducted a summary of tools used in cloud simulation. We have been able to explore features and benefits of six cloud computing based simulations and have found that which tool need improvement in which area. We find that many tool support many features but there is no tool that support MPI and workflow applications. But Network cloud sim , which is an extension of Cloud sim that support MPI and workflow applications.

**Index Terms**— IaaS , PaaS , SaaS , Cloud computing simulations , MPI & Workflow applications

## 1 WHAT IS A CLOUD COMPUTING?

Cloud computing is the delivery of computing services over the Internet. Examples of cloud services are online file storage, social networking sites and webmail. By using Cloud computing users can use data and services from around the world in a pay-as-you-go model.[1]

Cloud computing services are mainly classified into three main categories. Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS).[2]

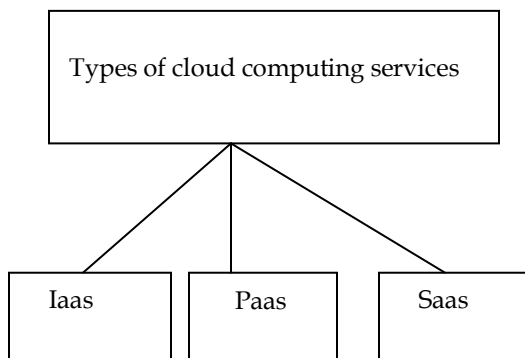


FIG 1: CLOUD COMPUTING SERVICES

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### 1.1 IaaS

It stands for Infrastructure as a service. Infrastructure as a Service (IaaS) is the delivery of hardware and associated software as a service.. it can be purchased with either a contract or on a pay-as-you-go basis.[3].

### 1.2 PaaS

It stands for Platform as a service. PaaS facilitates development and deployment of applications without the cost and complexity of buying and managing the underlying infrastructure. it provides all of the facilities required to support the complete life cycle of building and delivering web applications and services entirely.[4]

### 1.3 SaaS

It stands for software as a service. It is currently the most popular type of cloud computing service. It provides high flexibility and scalability, high performance better availability, and less maintenance. [5]

Service	Pricing Struc- tor	Ex- am- ple	Unit of De- ploy- ment	Descrip- tion
IaaS	Com- pute usage per hour, data trans- fer in/out Per GB etc.	Ama- zon's Elas- tic	Virtual ma- chine image	User modi- fy VM & Charges based on capaci- ty & Size.
PaaS	Maxi- mum 500 mb storage & 10 apps free for devel- opers	App En- gine and Goo- gle apps	Use hosted services such as mid- dleware & OS.	Enable user tode- velop& run web app lications.
SaaS	Pay as you go cost model. Per user per month	Face- book, Yout ube , Salesf orce.c om	The SaaS vendor does business directly with the End User	Offers web Applica- tions for e- mail, wordproce ssingetc.

**FIG:2 FEATURES OF SERVICES USED BY CLOUD COMPUTING**

## 2 NEED OF SIMULATIONS IN CLOUD COMPUTING

There are number of reasons for conducting simulations in cloud computing.

1) With the help of Simulation researchers rapidly evaluate the performance and reliability of their new algorithm on a large heterogeneous cloud infrastructure.

2) Cloud simulations are used for cloud system testing and to decrease the complexity .

3) Solution of cloud computing on real test bed is not so easy. There are several reasons that make cloud computing difficult on real test beds are:-

(i) Public clouds resources (hardware , software) , supply pattern and system size varies.

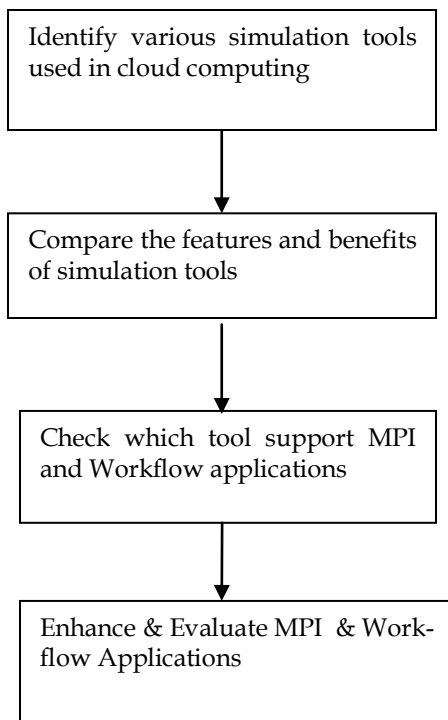
(ii) Several other factors that effect that effect the performance of cloud systems are QOS (Quality of Service ) [6] requirements ,varying workload and complex interaction between computing elements.

(iii) Real experiments on large scale distributed platform are time consuming.

The solution of all these type of problems is to use simulation framework so that bottleneck , problems and issues do not come in real life as solutions to such problems have already been explored and found using simulations [7]

## 3 A REVIEW OF METHODOLOGY

The methodology to define different simulators be given below:



**FIG. 3 PROCEDURE TO DEFINE OF DIFFERENT SIMULATION TOOLS IN CLOUD COMPUTING AND CHECK TOOL THAT HAVE SUPPORT FOR MPI AND WORKFLOW APPLICATIONS.**

### 3.1 Identify & Describe various simulation tools used in cloud computing

First of all we will identify the various simulation tools used in cloud computing. Simulation tools used be Green cloud , CDO sim , Tech Cloud , MDC Sim and Cloud Sim and network cloud sim. Description of tools be given below.

#### 3.1.1 Support for TCP/IP

The MDCSim[8] , CloudSim and Network cloud simulator does not provide support TCP/IP. While the Green Cloud Simulator supports full support of TCP/IP. In CDO sim and Tech Cloud this service is not available.

#### 3.1.2 Programming language

Different simulators use different programming language.Green cloud Use C++/OTcl on the other

hand CDO Sim ,Tech cloud , MDC Sim , Cloud Sim and Network Cloud sim all uses java language.PL help in implementations.

#### 3.1.3 Platform

MDCSim and CloudSim simulators are the event based simulators. The Green Cloud simulator is actually developed as an extension to NS2 simulator which is coded in C++ with layer of OTcl libraries and network cloud sim support cloud sim platform.

#### 3.1.4 Availability

Availability matters a lot. The availability of MDCSim simulator is Commercial seconds.While others like network cloud sim , CloudSim and Green Cloud simulators are released under open-Source GP licence.

#### 3.1.5 Simulation Time

The time required for hardware and software as well. MDCSim , CloudSim and network cloud sim are event based simulators so its simulation time is in seconds. The Green Cloud Simulator is not an event base simulators. It achieves reasonable simulation time .

#### 3.1.6) Support for MPI and Workflow

Cloud sim do not have support for MPI & Workflow applications , but network cloud sim is one that have limited support for MPI & workflow applications.[9]

### 3.2 Compare various simulation tools Features and Benefits

Comparison of simulation tools based on different characteristics given below in figure 4 .This figure

Simulation Software	Programming Language	Support of TCP/IP	Platform	Availability	Simulation Time	Support for MPI and workflow
Green Cloud	C++/O Tcl	Full	NS2	Open Source	Ten of minutes	Not-Available
CDO Sim	Java	Not-Available	Not-Available	Not-Available	Not-Available	Not-Available
Tech Cloud	Java	Not-Available	Not-Available	Not-Available	Not-Available	Not-Available
MDC Sim	Java	None	CSIM	Commercial Seconds	Seconds	Not-Available
Cloud Sim	Java	None	Sim Java	Open Source	Seconds	No
Network cloud sim	Java	None	Cloud sim	Open source	seconds	Limited

**Fig 4- COMPARE FEATURES OF SIMULATORS**

show which tool follow which feature and benefits. we define 6 simulation software in this paper & compare there features and benefits.[10]

**3.3 Check which tool support MPI and Workflow Applications**

After analyze these tool we conclude that cloud sim have no support for MPI & Workflow , Network Cloud have limited support to MPI & Workflow applications.

**3.4 Enhance & Evaluate MPI & Workflow applications**

At final stage when we evaluate MPI & Workflow applications , we find that Network Cloud Sim is be the only one that support MPI & Workflow applications .But its support to MPI & Workflow be limited.

**4) CONCLUSION**

In this paper we have studied various simulators used in cloud computing. Role of each simulator in cloud computing is different because each follow different characteristics. Two widely used simulators be cloud sim & network cloud sim. CloudSim is becoming increasingly popular in the Cloud computing community because it is flexible, scalable, efficient by considering the needs of today's Cloud researchers, but cloud sim do not have support for MPI & Workflow applications. On the other hand Network cloud sim which is an extension of cloud sim as a simulation framework that support MPI & Workflow application .Network cloud sim is one that have a high degree of accuracy for MPI applications.

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