

# A Generalized Study on Simulation Tools of Cloud Computing And Its Impact On The Computing Industry

**Rudra Thorat<sup>1</sup>, Ritvik Tiwari<sup>2</sup>**

Student, Information Technology, Svkm's-Nmims, India<sup>1</sup>

Student, Information Technology, Svkm's-Nmims, India<sup>2</sup>

**Abstract:** When we look at Cloud computing on the whole part, it is a term often related to the workspace which takes place on the internet and gives us the virtual representation without actually using the computer's processes. These are the hardware and software services which the organisation or set of people might access when these tools are deployed over the cloud workspace. They reduce the cost of establishment of the organisation in several ways, with this in mind we look at how the Cloud simulation tools make it easier for the average users to choose which of them are the most suited cloud simulation tools for their platform. These simulation tools can be decisive as they can decrease the operational cost of the organisation. This paper enlists some of the simulation tools that give us the Analysis of simulation tools of cloud computing from the standpoint of a user who chooses to create and deploy their services on cloud for the organisation.

**Keywords:** Services of cloud computing, simulation tools, cloud services and its types, cloud Computing, Comparison between simulation tools, Services of Cloud Computing, Components of Cloud Computing.

## I. INTRODUCTION

In today's advanced era of technology cloud computing is one of the most sought after services. It can be overlooked as the environment of collaboration between the computing services which includes servers, storage, databases, analytics and intelligence. The key factor about cloud computing is its ability to deliver constant performance without being physically close to the hardware. The idea of cloud computing was introduced to the people by amazon through their services back in 2006 which came to be widely known as amazon web services. Publicly launched on March 19, 2006, the cloud computing services offered, Simple Storage Service (S3), Elastic Compute Cloud (EC2) and Simple Queue Service (SQS).

Cloud computing architecture is simple and easy to understand as it clearly states the components and subcomponents that are embedded in it and there's no question that cloud computing is a technology to which many people look forward to. It has a great influence in our day to day lives, as it offers many advantages in terms of flexibility, storage, sharing, maintenance, and much more. Simulation tools and its techniques have been outgrowing and becoming a powerful factor for deciding the best conditions on pay-as-you-go scenarios. This is the case of public cloud infrastructures, where a number of different providers present you with their services and it is upto to the user's decision to pick what is more beneficial and suited for their organisation.

## II. BACKGROUND

An extensive study on cloud computing and analysis of the various simulation tools. These simulation tools help users to change input very easily as when needed, which provide better results as an output. The list of Cloud simulators that we have encountered are: CloudSim, CloudAnalyst, GroudSim, Network CloudSim, iCanCloud.

## III. SERVICE MODELS

These are the following services which are provided by cloud computing.

Infrastructure as a service (IaaS): Also known as a hardware service it allows its customers to offshore their IT infrastructure such as servers and virtual machines and other resources after which the customers can access those resources according to their needs.

Platform as a service (PaaS): A model in which the cloud provider delivers a computing platform. This platform comprises operating system, programming language execution environment, database and web server.

Software as a service (SaaS): This model helps the organisation to provide access to the application software and the databases to the user without compromising on the performance.

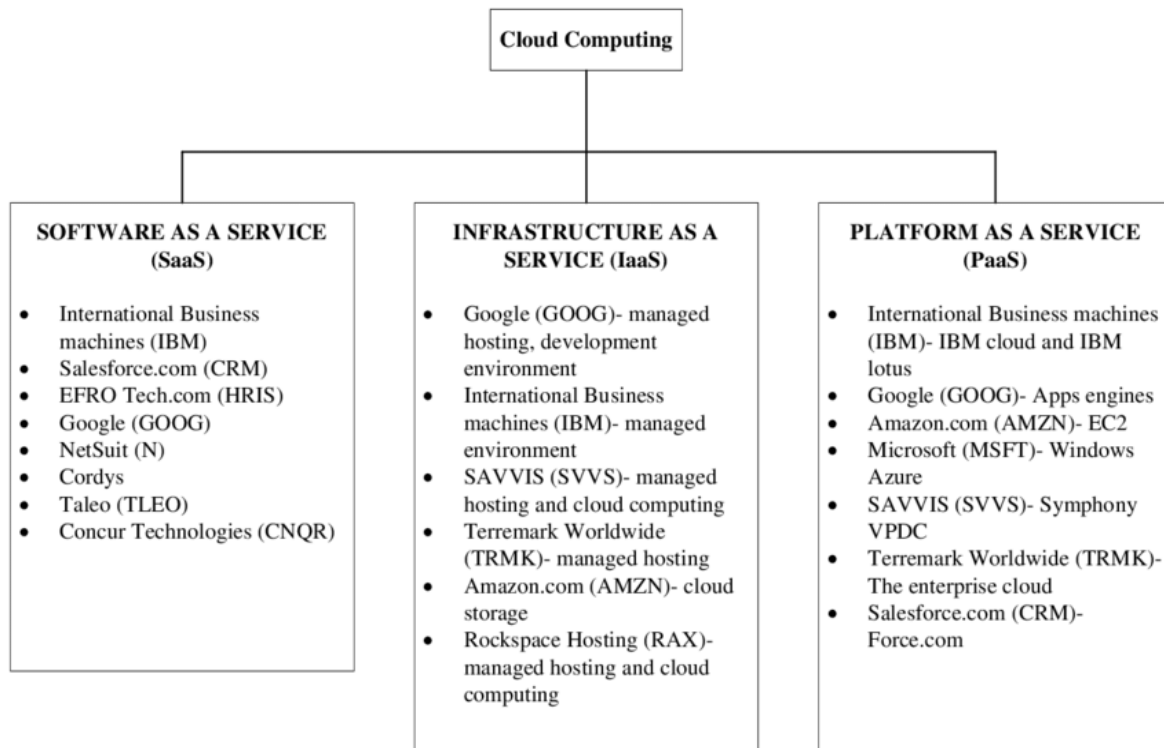


Fig. 1 cloud computing types [\[link\]](#)

#### IV. RESEARCH METHODOLOGY

A survey conducted by right-scale tells us that about 96% of the respondents from different organizations have adopted cloud technology in various ways. When we look at various reports and surveys conducted over the years we see that cloud computing has been a very sought after technology for many users.

The simulation tools have become a part of many big organisations and many top companies have deployed it in their cloud services and the leading examples are Microsoft Azure, Amazon web services (AWS), Google Cloud, Alibaba Cloud, IBM Cloud, Oracle, Salesforce, SAP Rackspace Cloud, VMWare. The effect of latest advancements in the versions of cloud simulators resulted in the solving of many modern day problems which are encountered during the cloud deployment. Some of them are as follows

- The tools solves the latency issues and improves data processing requirements and reduces IT operating costs by giving good accessibility to access data and digital tools.
- This helps businesses to easily scale up and scale down their new cloud resources by providing a flexibility feature which gives businesses a competitive advantage.
- Not only does it result in better disaster recovery but also provides high security.
- The simulation services automatically updates its services simultaneously by encouraging remote working and promotes team collaboration effectively.

Comparing open source cloud computing simulators

Simulator	Platform	Type	Programming language	Cost modelling	GUI	Communication model	Simulation time
CloudSim	SimJava	Open source	Java	Yes	No	Limited	Second
CloudAnalyst	CloudSim	Open source	Java	Yes	Yes	Limited	Second
GreenCloud	NS-2	Open source	C++, oTCL	No	Limited	Full	Minute
iCanCloud	SIMCAN	Open source	C++	Yes	Yes	Full	Second
EMUSIM	CloudSim, AEF	Open source	Java	Yes	No	Limited	Second
GroudSim	-	Open source	Java	No	Limited	No	Second
DCSim	-	Open source	Java	No	Limited	No	Second

Fig. 2 Different cloud computing simulation tools and it’s comparison [\[link\]](#)

### V. COMPUTING WITH SIMULATION TOOLS

From what we have seen over the past years about cloud, we see that it is used as a software or a platform extensively. These demands depend upon the client's requirement. The compatibility makes it easy for the user in the back end to control and make the changes remotely. When we emphasize on the service part of the cloud, it is noticeable that service is one of the most important components in the architecture. It becomes a utility along with the tools to create the cloud environment. These simulation tools help to store and maintain various audio as well video files over the internet. The simulation tools use various storage services such as amazon S3, oracle cloud storage and microsoft azure storage to name a few. The simulation tool's strategy varies depending upon the storage service availability in the market. Another important aspect of simulation tools is its ability to manage and automate. It helps to allot tasks to the resources for performing various functions of the cloud environment simultaneously. It manages components like an application, task, service, security, data storage. In simple terms, simulation tools help to establish coordination among the cloud resources. Security of the simulation is one of the most important challenges while working along with it. It forms an integral part of back-end cloud infrastructure. Simulation tools provide secure cloud resources, systems, files, and infrastructure to end-users. The implementation of it helps the security management of the cloud server to enable virtual firewalls which prevents data loss. One of the tough challenges that one faces is the scenario of computing is moving the data center offsite to a third party and buying services rather than maintaining onsite applications directly.

In this section, we provide a comprehensive overview of the various cloud computing simulation tools which can be used by the users to evaluate, compare and optimize designs, plans and policies.

**CloudSim:** It is a new and highly generalized simulation tool that is implemented in java. This tool, developed by the CLOUDS Laboratory of the Computer Science and Software Engineering Department of the University of Melbourne allows various researchers and developers in testing the performance of a cloud application in such an environment that is easy to set up and control it. CloudSim also provides support for modeling and simulation of large-scale implemented cloud computing models.

**GridSim:** Usually in a grid computing environment the resources are spread widely across multiple domains and each domain is handled or owned by multiple organizations which makes it difficult for managing those resources with respect to the security domain and repeatedly changing conditions and policies. So here GridSim computing technology comes to play its part as it is widely used to aggregate computing resources for distributed systems and resources for a large - scale problem solving in the field varying from science and technology to commerce. This toolkit provides support for modelling and simulation of resources and application models by providing basics of task creation and mapping to their resources.

**CloudAnalyst:** Since there are several cloud providers available and each one provides a different pricing model and are also located in different regions, this arises a concern for application developers in selecting providers and data centers for the application. Also, there is a shortage of tools that could enable the users in evaluating large scale cloud applications. So, cloud analyst is the tool which can be used in simulating large scale applications using a novel approach. Being graphical in nature it provides us with better visualization results and also performs simulations in a fast and an easy manner even with a slight change in parameters.

**iCanCloud:** It is a tool which is used for modeling and simulating cloud computing systems. A simulation tool containing features such as flexibility, scalability, alongside having a good usage with a decent performance. It is designed in such a way that it can be used for conducting large experiments in an easy manner. It is also very flexible and customizable and has a user friendly GUI for configuring and launching simulations.

**SimIC:** SimIC stands for simulating the inter cloud. It is a simulation toolkit which is based on the process oriented simulation package of simjava. The SimIC simulation tool has features such as interoperability, flexibility, service elasticity and also accepts an optimization of a variety of selected performance criteria for a large number of entities.

## VI. CONCLUSION

In this paper we have used the most suitable simulation tools and discussed the comparison amongst them. While each of them have their own pros and cons, all of them contribute to make the user's cloud exploration better and the people, today, are shifting from traditional computing towards the cloud as it provides higher reliability, fault tolerance, broad network access, on demand usage etc. As the cost of cloud resources is very high, the solution is to use Simulation tools for designing a cloud service and form experiments with the same.

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## BIOGRAPHY

**Rudra Thorat** is a 3<sup>rd</sup> year undergraduate student pursuing Bachelor Of Technology with majors in Information Technology. Having done the courses and curriculum pertaining to cloud engineering, he has done research and authored a paper on cloud computing and has come up with a generalized study of cloud computing and simulation tools associated with it.

**Ritvik Tiwari** is a 3<sup>rd</sup> year student of Bachelor Of Technology with majors in Information Technology. Having done the courses and curriculum pertaining to cloud engineering, he has done research and has co-authored the paper on cloud computing and the analysis of its various simulation tools.