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Performance Evaluation of Cloud Computing System and Ontology based on efficient Parameters

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***Abstract*—**In the computing world everywhere, everything and every time service on demand to end users is the motive of the cloud computing. The cloud computing aim is to work on as a service model. The cloud computing is designed with the significant architecture, special models for deployment and its features. The concept of cloud computing saves the time, cost and efficiency of everyone. In this research paper, there are some serious issues which are being tried to be solved by the proposed algorithms. These issues are basically occurring between the providers and the users. The proposed algorithm solved some of the issues. The observation clarifies the results of the algorithm. To get the efficient and effective results the algorithm uses the concept of the Ontology system. The ontology system clarifies the cost, time and pathway of the information. What should be the minimum cost of the system so the data is accessed with the high speed? The efficient algorithm is being designed on the specific platforms of the Ontology and the cloud simulator. At last this paper got the best service for the requested users at the best time.

Keywords— Performance Parameters; Cloud Computing; Scheduling Algorithms; Ontology Algorithms; Ontology Simulators; Cloud Simulator.

I. INTRODUCTION

The most widely used technology is that the cloud computing technology today. This uses the many systems situated in worldwide positions. Cloud computing provides services that are being maintained by the cloud suppliers and knowledge center's area unit providing the managed data or information to the end users. There are various applications operate by each and every knowledge centers. The computing provides the services on the premise of the Pay-and-use model. The cloud computing performing on the idea of as a Service model [1, 2]. The cloud computing provides the tip users all kinds of software package and application while not putting in their own system. The resources will embody the services and applications, Infrastructure in that they are doing many operations.

According to NIST [4,5] "Cloud Computing is that the model that deals with the on-demand, ubiquitous, convenient that is being accessed to share the resources which might be Provisioned and supplied with least interaction" Cloud Services use the network system and central remote servers to keep up the knowledge and also the applications (Figure 1). It provides the most effective performance-based mostly service that is simpler and economical for the tip users on Pay-per-use model. The overall introduction defines the cloud computing system and its features.

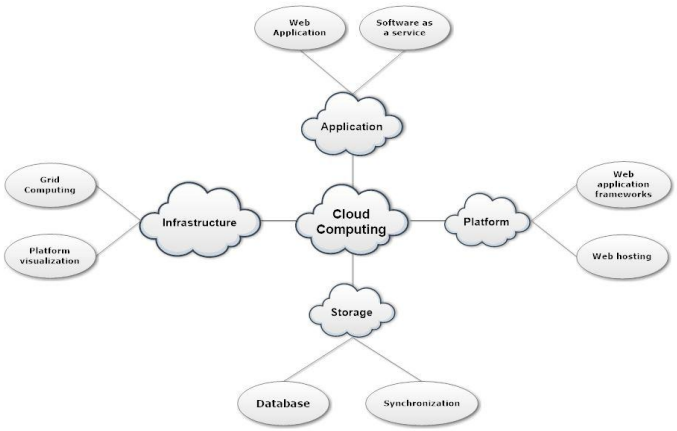

Figure 1. Various Paradigms of Cloud Computing Services.

II. STATE-OF-ART

With the innovation of computing, the concept of Cloud Computing inception forms the rapid use of it. It's used all the technical, commercial strategies, profit-based standardized services. The major issues of it are internal such as management, availability, reliability etc. The external issues of cloud computing are its protocols, standardized system of maintaining the services. The research challenges in the cloud computing are as follows [1, 2, 8]:

1. The general application has the Information and data use within the potency approach. Why would the user like these resources? What area unit controls given to the tip users? What ought to be the standards for deleting the knowledge? However, the information is maintained within the accounts?

2. Cloud computing deals with the high level of the privacy in data. The info and data keep within the cloud are viewed by the supplier. However, privacy ought to be maintained by the providers, what ought to be the legal problems against the privacy?

3. Cloud Service networking system connects the devices. However the management of devices ought to be maintained, what area unit device agreements toward connection? What is the way to connect the devices? What ought to be the channel by that the devices ought to be connected? etc.

4. Cloud Accountability in cloud computing is getting used by the tip users. If the system fails then, however, the users ought to connect? However, the information ought to be maintained between the CSP's?

5. Cloud Security is the info that is being unbroken is incredibly vital and sensitive for the users, that the privacy is an incredibly vital issue. What area unit have the safety arrangements done by the CSP's? Ought that algorithm to be used for the safety of data? At the time of transmission of data within the network that security ought to be kept?

6. Cloud knowledge Management is incredibly vital that is being kept within the cloud system. What's the importance of the cloud knowledge centers? However, info ought to be recovered? However, knowledge or info ought to be segmented?

The basic properties on which the researches made the concept of cloud computing. The properties are being standardized by the organizations. The properties have the service level agreements of the cloud. The properties which affect the performance of the computing are as follows [6, 7, 8]:

A. The strength of Cloud Computing

The strength of the cloud computing is the services. These service area unit provided in such an easier way such that the rise within the economical of the property of the no of systems at a time. The cloud maintained with the good computing power is computing, accessibility and dependable.

B. User-based mostly computing

It primarily works for the tip user's profit. The tip users use the service terribly simply. The tip users area unit most secure and sharing of data between them.

C. Service familiarized Computing

The main target of the cloud is predicated on services. There are unit many applications that area unit used with a specific approach.

D. Cloud Computing Intelligence and Accessibility

Cloud suppliers fast services from multiple suppliers with the high speed. There's no loss of knowledge or supplier. Cloud computing uses various effective and intelligent algorithm for the purpose of data management.

E. Computing Programming

Cloud Computing is programmed in such an approach that if any surprising error or downside happens then it ought to be solved in an exceedingly fast way. The services mustn't be plagued by the interrupt. It will handle each and every scenario of computing.

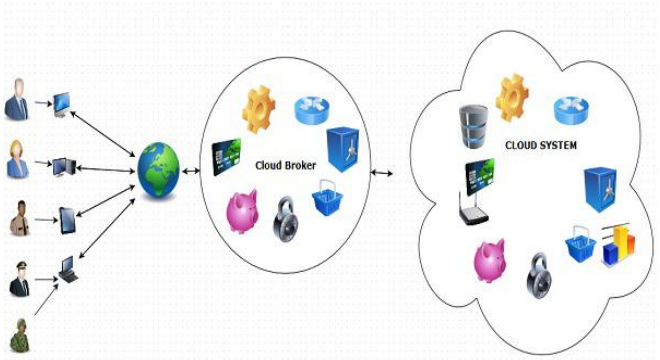

Figure 2. Ontology System in Cloud Computing

The Cloud resources are being derived to the users on the basis of the properties. The services are provided on the basis of pay-as-go. The demanded services are being provided in an efficient manner. The common known services are being measured on the performance basis.

A. *Software as a Service (SaaS):*

The software services are being provided for the users without installing in their systems. The software services are provided for many applications and projects. The only need is the proper connectivity of the several devices [5, 9, 14].

B. Infrastructure as a Service (IaaS):

Cloud provides the capability to the end users to use the cloud services such as information management, Hardware

devices used, Operating system, networking devices used [5, 9, 14].

C. Platform as a Service (PaaS):

These services provide a platform where the providers and end users provide their services. The platform as a service is being used for many applications and softwares. VM is also being developed and deployed in it [5, 9, 14].

III. PERFORMANCE PARAMETERS

The performance can be measured in cloud computing with the factors affects. The performance is being measured in the real-time processing manner. The major parameters which the researchers have taken care of are as follows [6, 7, 8]:

1. The throughput of the system defines the number of services provided within the regular interval of your time. The most purpose of this parameter is to optimize the resources for the incoming info. Service on demand is that the main parameter of cloud computing handling the SLA provided to each side.

2. Latency rate of data offer informs the execution time and waiting time of the request. Its main aim is to estimate the waiting time of the system.

3. The Network property forms the capability and its standards. Its available deals with the networking from the various devices like mobile, laptops, desktops, etc. The speedy increase of capabilities wills kind the resources that provide the big range of finish users at whenever.

4. For improving the potential and utilization of resources management of resources are to be done in a balanced manner. The energy is measured from all the devices.

5. Lightness is that the technology that forms resources in simple use and expensively for users. The metering system of the cloud resources should measure on the idea per consumer. The metering is done on a regular interval basis.

6. Gatherings of the resources of service supplier are provided to multi-tenants by multiple physical and virtual information. Consistent with the demand based mostly services the top users haven't any info regarding the information location.

7. The Service menstruation deals with usage which might be monitored, controlled, and reported providing transparency for each the supplier and consumer of the used service. Service reliable deals with the disaster management of the knowledge.

8. The price of the services should be minimum than the sizable amount of users. Rather than purchase the resources, users will use resources provided by a third-party and pay as per usage. The management and maintainability of the system in the cloud is incredibly important to accesses the resources in an exceedingly speedy speed.

IV. PROPOSED WORK

The research deals with several mechanisms of virtualization of the resources. The proposed algorithms working to justify the best perform algorithms in the cloud.

- End Users square measure the vital side that deal the service on the request basis to the service from cloud servers. The server is that the management tool accustomed manages the servers. The servers are also original or virtual.

- The Resource allocation tools for the grid to deliver on the desired computer code. These resources square measure being monitored and metered at the particular time. Service classification defines the resources in an affected manner for the CSP's, Users, knowledge centers. The management of services may be a sturdy issue.

- Computing Model square measure the manner in which services square measure being provided to the users. The Hybrid computing that is that the combination of each. a number of the services square measure open and a few square measures closed below some SLA. Hybrid computing is completed by several corporations like Salesforce.com, Google, Microsoft, etc. The community computing is given for the entire organization or company to the user its services.

- Virtualization may be a main feature of the cloud. it works for each of the perimeters i.e. computer code or hardware. It works for the dynamical knowledge centers wherever servers offer the set of resources and therefore the applications to cipher, store, and method it. It involves multiple virtual machines to support take a look at, development, and staging activities.

- Cloud supported the market methods might work with the QoS. The main objectives are to require care of the QoS. It works with the idea of client-driven service management supported customer profiles and requested service necessities.

- The Middle was therefore referred to as cloud brokers beware of each facet of the computing method. Service Request square measure was taken care of with full management. The value of the service on QoS.

Evaluation is a basis for managing the provision and demand of computing resources inside the info Center and facilitates in prioritizing resource allocations effectively.

A. *Scheduling Algorithms*

A typical process involves both I/O time and CPU time. This is possible only with process scheduling [13, 15, 17]. In Cloud computing, the need for scheduling is very important to find the best service allocation to the need of the users and insufficient time and amount. The following are some of the algorithms working with the cloud computing are:

Ontology Methodology for Cloud Services

Input: Set of Cloud Performance Parameters (CPP), Set of Ontology Performance Parameters (OPP) Cloud Service Providers (SP), Cloud Broker (CBO), Set of Datacenters (DC), and User (US).
Output: Getting the Efficient Services Using Ontology.

Method:

```
While (CPP ≠ Ø)
{
        SP = select (DC)
        Provide the DC to CBO
        If DC is selected
        {
                SP= SP- 1
        }
}
While (OPP ≠ Ø)
{
        Provide the Knowledge Information
        If OPP is selected
        {
                OPP= OPP- 1
        }
        Design the New OPP for Next Coming Knowledge
}

Select (Rendered Output)
{
        Flag bit = Match (Best SP provided to DC)
        If (flag == True)
        {
                The Suitable service of Cloud is provided by SP to the DC.
                If (flag == True)
                {
                        The Suitable service of Cloud is provided by CBO to the US.
                }
        }

}
Efficient Service is provided by the CBO to Users US.
```

Figure 3. The Proposed Algorithm.

1. The stat of programming with FIFO computer hardware primarily employed in map cut back issues of huge knowledge. This algorithm work with honest computer hardware in Facebook and capability computer hardware in Yahoo, square measure typical examples that serve the cloud systems with economical and just resource management. However the QoS isn't been taken care of and thus such form of services don't seem to be applicable to the soft period of time required applications and services, that have become a lot of and a lot of vital and necessary within the hybrid cloud atmosphere.

2. Dynamic programming rule deals with the value effectiveness of flow of services or info. It started with the thought of the grid and also the clusters for the demand of service and pay as you go model in cloud computing. It uses the dynamic effects within the value because of a continuous flow of knowledge over the web. In such algorithms VM square measure the most problems.

3. Associate degree organic process multi-objective (EMO) advancement programming reduces the issues of value and span. a number of the main operations in several fields square measure supported such algorithms like binary coding, real-valued coding and also the corresponding variation. In these algorithms, the value and time of observation aren't taken into consideration.

4. A programming methodology for job programming with an unknown period within the cloud atmosphere. The work sizes square measure assumed to be unknown not solely at arrival, however conjointly at the start of service. The throughput-optimal programming and load-balancing rule for a cloud knowledge center are introduced, once the work sizes square measure unknown. This rule relies on victimization queue lengths for weights in Max-Weight schedule rather than the employee.

5. A value economical task programming methodology utilizes for the massive quantity of the program. The performance isn't solely to require care off however conjointly the overall time taken by the method.

The overall conclusion of the research comes into the picture to satisfy the major issues of the cloud scheduling algorithms like increasing cost, time, QoS, Management of Information, SLA, Security of information and many more.

B. *Ontology Algorithms*

In the world of ontology system, the research develops the algorithms so that the knowledge can be used with the technology. The Ontology plays an important role in the performance of computing (Figure 2). The ways by which researchers are using the concept of ontology are [4, 5, 6, 7, 15]:

1) *Sharp Ontology System*: There is that the use of categories within the metaphysics. The category attribute area unit creating the relations with the opposite attributes. Ontology's area unit wide unfolds to the data information. Axioms additionally play a crucial role within the metaphysics. This area unit addressing the linguistic communication for making ready the metaphysics. It works like an associate degree interface.

2) *Snap Ontology:* It ought to supply an abstract foundation for a spread of anticipated tasks, and therefore the illustration ought to be crafted in order that one will extend and specialize the metaphysics monotonically.

The user's area unit able is used to outline any terms in keeping with their use.

3) *Marginal Ontology commitment:* The means the ontology's area unit sharing the data ought to be its marginal commitment. Metaphysics commitment relies on the consistent use of vocabulary; metaphysics commitment is decreased by specifying the weakest theory.

The marginal secret writing bias tells the dependency construct. Secret writing bias ought to be decreased, as a result of knowledge-sharing agents could also be enforced in numerous illustration systems and designs of illustration.

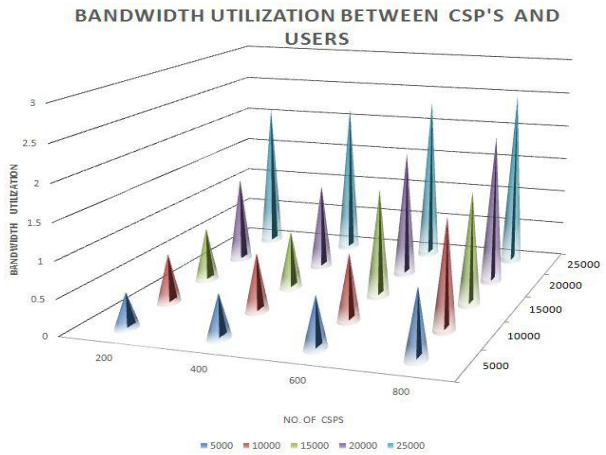

Figure 4. Bandwidth Utilization between CSPs and Users

The research proposed their own algorithm that deals with the concept that fulfills the requirements of the basic obstacles to get the best and efficient results.

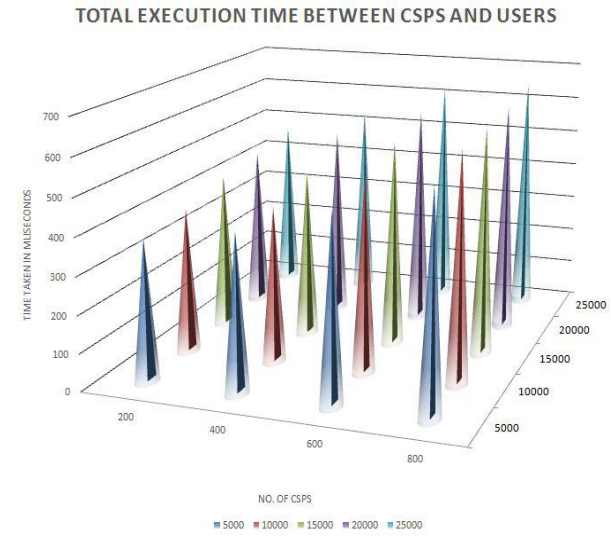

Figure 5. Total Execution Time between CSPs and Users

V. RESULTS AND SIMULATION

The evaluation of the performance is being measured for the proposed algorithm based on an ontology system and cloud services provided on the basis of the parameters. The research also focuses in future about the comparison with the existing algorithms in the service schedule so that the performance which is being calculated for the total time execution, the total cost of the execution, the hardware cost, the bandwidth size and total utilization of the CPU in an efficient way.

The VMs play an important role in the user's needs. The parameters on which users are being checked are memory (RAM, Cache, ROM, etc.) in maps, bandwidth bits per second (bps), Size (MB/GB/TB), Speed (msec), etc.

A. Cloud Simulator

Cloud Computing has a lot of simulators which are working in an efficient way. The aim of Clouds is a new generalized and extensible simulation framework that enables seamless modeling, simulation, and experimentation of emerging Cloud computing infrastructures and management services [9][10][11].

B. Ontology Simulator

Ontologies are being simulated with several tools which get the information and design the new ontology system. It has a richer set of operators - e.g. intersection, union, and negation. It is based on a different logical model which makes it possible for concepts to be defined as well as described. Complex concepts can, therefore, be built up in definitions out of simpler concepts. Protege is another tool to design the ontology. It is a free, open source ontology editor and a knowledge management system. Protege provides a graphic user interface to define ontologies. It also includes deductive classifiers to validate that models are consistent and to infer new information based on the analysis of an ontology [6][7][8].

C. Obtained Results

The results are being measured in the simulators and the graphs are being designed on the basis of it. Figure 4 explains the bandwidth utilization between CSPs and the Users. The Bandwidth is the amount of data that can be transmitted in a fixed amount of time. It is measured in bits per second (bps). In the x-coordinator, the number of CSPs is taken while along the y-coordinator the Bandwidth Utilization in bps is taken, when the number of users is dynamic in nature.

Figure 5 explains the Total Execution Time taken between CSPs and the Users. The execution time is estimated as the

product of a number of cycles for executing per instruction, time per cycle and the number of instructions. It is measured in millisecond (msec). In the x-coordinator, the number of CSPs is taken while along the y-coordinator the Total Execution Time taken in bps is taken when the number of users is dynamic in nature.

VI. CONCLUSION

In the proposed research the research has done in several parameters of ontology and Cloud Computing. In the future, the research is being extended to the IoTs, Fog Computing, and further technology. The researcher also considers calculating more results on the basis of other parameters which are being discussed in the paper like computation cost, communication cost, CPU utilization, etc. The research also focuses in future about the comparison with the existing algorithms in the service schedule so that the performance which is being calculated for the total time execution, the total cost of the execution, the hardware cost, the bandwidth size and total utilization of the CPU in an efficient way. In this paper, the ontology plays an important role in the calculation of the CPU and the total time taken in the datacenters, cloud service provider, Cloud Parameters and the end users. In the future, the research must be extended with the IoT Technology system and edge computing systems.

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