

An Empirical Analysis on Quality of Service(QoS) in Cloud Computing

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Abstract

Background/Objectives: To analyze the Quality of Service in Cloud Computing and improve its services in the cloud environment. **Method/Statistical Analysis:** With the increasing use of services in cloud environment needs the improvements in the Quality of Services (QoS). Most cloud providers support QoS and it attract the customers due to its services. The Quality of Service (QoS) in cloud making the services efficient in the shared or distributed infrastructure and some companies are providing the cloud services are Microsoft, Amazon, Google and IBM. The use of Quality of Services based on the three approaches is comparison, evaluation and trustworthiness of the services to be analyzed and the QoS also analyzed with the help of scheduling algorithms. **Findings:** Cloud services have some problems in which the data stored in cloud are not secure and occurrence of network dependency. The QoS can be decided for the services are based on the set of parameters such speed of the performance, processing, storage, memory allocation, security, functions, service response time and total throughput. The Quality of Services can be predicted based on the workflow model and the ranking prediction approaches. **Applications/Improvements:** The result observed from this work will serve as the motivation to improve the quality of service in cloud environment. The service response time and total throughput improvement will improve the QoS of cloud services.

Keywords: Integer Linear Programming, QoS, Reference Net Based Workflow, Taverna, TBB

1. Introduction

In Cloud Computing many services and their applications are being delivered through the internet. It need not require any types of devices to delivering the service. Many companies are using the cloud because it is easy for access and also low cost too. Companies such as Google, Microsoft for many users cloud can provide the infrastructure and dynamic provisioning is done automatically using the software automation. It provides high levels of reliability and security.

The underlying administration is Software as a Service (SaaS) - Consumers buy the capacity to get to and utilize an application or administration that is facilitated

in the cloud, where important data for the connection between the buyer and the administration is facilitated as a major aspect of the administration in the cloud. Platform as a Service (PaaS) - consumers buy access to the Platforms, empowering them to convey their own particular programming and applications in the cloud. The Operating Systems and system access are not overseen by the consumers and there may be limitations as to which applications can be sent. Last one is, Infrastructure as a Service (IaaS) - consumers control and deal with the frameworks as far as the working frameworks, applications, stockpiling and system network, however they don't control the cloud foundation. Cloud Computing¹ gives numerous

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advantages, for example, cost sparing, versatility, attainability, upkeep.

1.1 QoS in Workflow System

QoS in workflow system proposed the scientific workflow architecture to provide the QoS in Cloud Environment². This architecture contains the number of pipelined multiple scientific workflows which composed with the number of stages are connected to the physical resources. The approach³ focused on the stages have the capability to perform the data access, computations and data transfer and the amount of data presented in the stages are splitted and allocated to each resource for isolated performance. Figure 1 shows workflow.

This scientific workflow architecture combined with the Token Bucket Based (TBB) data throttling framework as shown in Figure 2. The some of the scientific applications are Taverna⁴ and Reference Net Based workflow. The Reference Net Based workflow embedded with the Taverna workflow and the Taverna workflow consists of data flow model of computation and also processors that are connected with the help of data dependency link. The Reference Net Based workflow is the model computation

to achieve the multiple tasks in parallel and execute task in sequence. It includes the Token Bucket per stream, multiple processing units and autonomic data streaming service. The Token Bucket provides ADDS are:

- To detect network congestion between two stages.
- Reduce data broadcast frequency over the system.
- Store data temporarily onto disk.

The Qos is the important needs in some scientific application and through the workflow system architecture to enhance the Quality of Services.

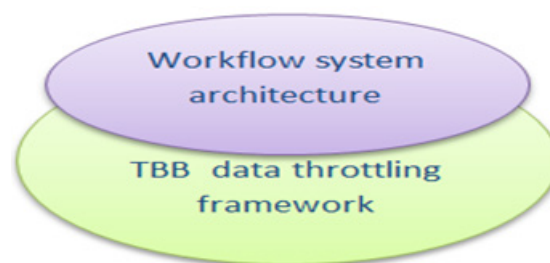


Figure 2. Combination of architecture and framework.

1.2 QoS based on Ranking Prediction

Provide high Quality of Services in the cloud applications

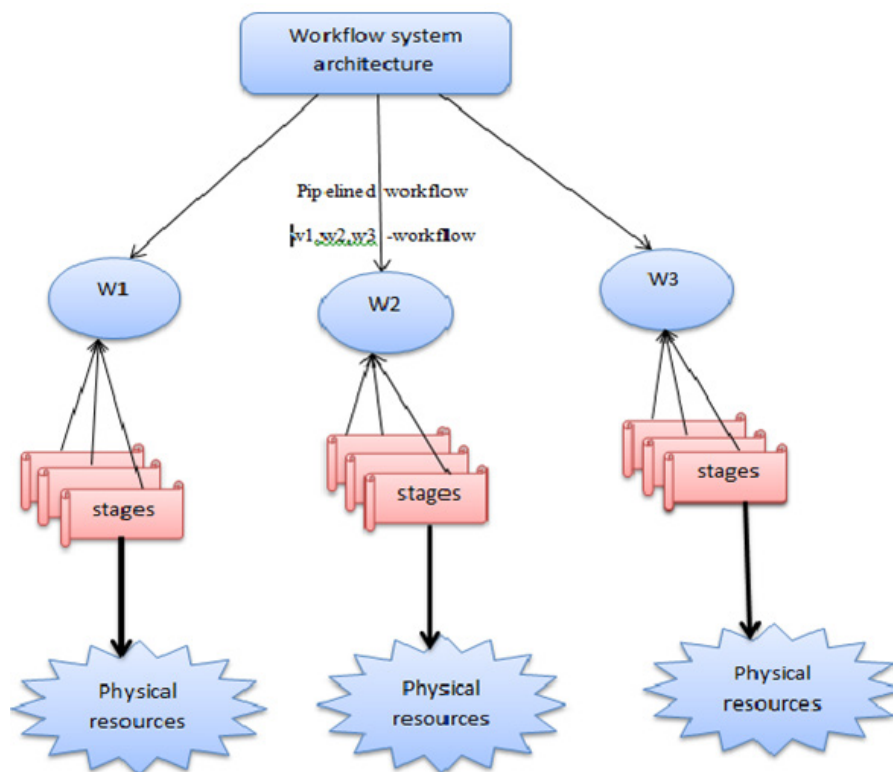


Figure 1. Workflow system architecture.

are the critical research. It is used to evaluate all the services in the user side and the provider side. So provide the QoS ranking prediction framework to address the problem. To find the QoS value using the two algorithms such as cloud rank 1 and cloud rank 2 algorithm.⁵ Focused on this paper proposed the rating oriented Approaches Framework to predict the accurate QoS value of services. The quality of services is having the nonfunctional characteristics of cloud services. The services have the QoS for different priorities of different applications. The accurate value of QoS may not lead to accurate QoS Ranking.

To calculate the QoS based on ranking, Comparison: $S1(m) < S2(n)$. Here service S2 has the high quality when compared to the service S1, Where S1, S2 denotes the services and m and n are the values of QoS.

The Average Quality of Services, $QoS = S1(m) + S2(n)/2$.

1.3 Ranking System

There are two types of approaches - evaluation approaches and ranking approaches. The system provides the quality services when that the system provides the better performance than the existing system.³ Proposed normally ranking analyzed based on the type of services the system to be provided and using the sorting techniques and the quality deals with the accountability, agility, cost, performance, assurance, security and privacy, usability.⁶ The quality service provider must follow the certain metrics to provide the quality services. Service mapper approach under the ranking approach has the three layers. The lower layer is used to get the user needs and analyze whether the service satisfy the user needs⁷. Then the second layer which used to analyze the ranking with the help of matrix techniques. The provider information are stored as rows in the matrix and the quality attributes are stored as columns of the matrix and the final performance result of matrix send to the third layer which have the values of quality. Finally this ranking approach provide the solution as when increases the number of service providers have choices to select the best suitable cloud based services in the shared infrastructure. The Figure 3 shows the various types of approaches are used to predicted the **QoS** of services in cloud environment by evaluating the services and ranking the services based on their functions and performance.

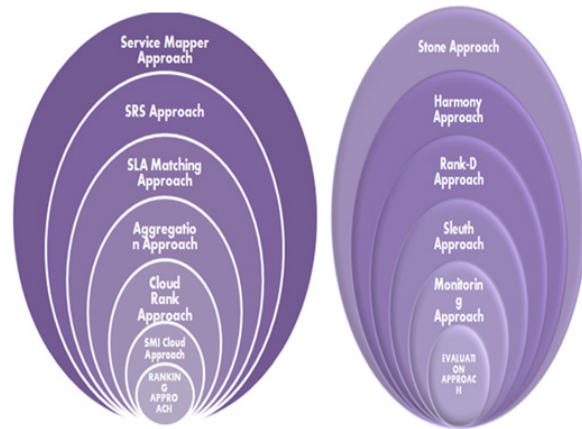


Figure 3. Evaluation and ranking approaches.

1.4 Quality of Services in Virtualization of Cloud Computing

Virtualization⁸ in Cloud Computing system needs the QoS. Because this Virtual Machine (VM) interface provides the delay in data access. Integer Linear Programming (ILP) model in the Virtual Machine interface does not provide the efficient quality of service in the cloud computing⁷. So, this paper proposed the polynomial time heuristic algorithm to provide the efficient Quality of Services. Virtual Machine which allow the hardware resources for sharing and perform the applications virtually with the single OS.⁹ Says, due to the quality lagging in virtualization in Cloud Computing needs to integrating with the QoS and make aware of this problem.

2. Trustworthy in Cloud Computing

The Quality of Service¹⁰ analysed mainly based on the Cloud Service Trustworthiness¹¹ and received the customer satisfaction. Proposed work for this concept have to design the CSTrust (Cloud Service Trustworthiness) framework to improve the Quality of Services and the evaluate the accurate value of QoS. It is proposed based on the collaborative filtering recommendation and also include the utility theory. The trustworthiness framework contains the two types of evaluation and they are online and offline trustworthiness evaluation. Online trustworthiness³ provides the real time dynamic measurement of cloud

services. The offline trustworthiness evaluate the more comprehensive cognition. The aim of CSTrust method is to provide the less cost and time consuming in the real time services of cloud applications¹². Now the offline trust have less security and so proposed the method to improve the trustworthiness by mixing with the multi source assessment data.

3. Challenges

Today's Cloud Computing administrations can challenge different consistence review prerequisites as of now set up. Information area; Cloud Computing security arrangement straightforwardness; and IAM are all testing issues in consistence inspecting endeavors. All are connected with Cloud Computing and albeit some of these may bring about a log jam while conveying more administrations in the cloud. The information¹³ can be stored internally and allowing it to be used in the cloud. Another one is that security mechanism between the organizations and also the cloud need the robust and support for some Hybrid cloud deployment. There are no standards for the cloud now only each groups developing the standards and practices. Cloud is a public one so it does not remain static¹⁴. Major challenges are Quality of Service guarantees, dependence on secure hypervisors, attraction to hackers, security of Virtual OS in the cloud, possibility for massive outages and encryption needs for Cloud Computing.

4. Vision

A cloud is just a unified innovation stage which gives particular IT administrations to a chose scope of clients, offering the capacity to login from anyplace, in a perfect world from any gadget and over any association, including the Internet. Capture IT trusts that a genuine Cloud Computing Administration is one which evacuates the customary boundaries which exist between Software Applications, information and gadgets. At the end of the day, it is the nirvana of Computing¹⁵ from a client's point of view no compelling reason to stress over area, gadget or sort of association, every one of the information and the Software Applications required by the client are completely accessible and the experience remains consistent¹⁶. The most astounding gauges of information security must be a given, whereby clients don't need to consider ensuring

the uprightness of the information they utilize and store. Intercept¹⁷ IT gives a wide range of both application conveyance administrations to its customers, running from the configuration, execution and administration of private clouds, directly through to the procurement of facilitated cloud arrangements conveyed by means of Intercept's own, cloud infrastructure¹⁸.

5. Conclusion and Further Direction

Theoretically data on Cloud Computing is unsafe as it is replicated along multiple machines. The load balancing can be proved with the hybrid genetic algorithm and data stored in the cloud does not have the efficient security. The Quality of Service can be improved by proposing the data security models.

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