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LITERATURE REVIEW: IMPROVING THE QUALITY OF SERVICES IN CLOUD COMPUTING ENVIRONMENT

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ABSTRACT
Cloud computing is an archetypal for conveying data know-howfacilitiesand users get all the resources through internet. Itexpedite pay-per usevalue model for computing services .The requirement has suddenly increased for cloud computing services as the companies have move to cloud for their services and the cloud providers necessitate to offer services based on the likely quality requirements. The main task in cloud computing is to manage the quality of services (QoS) i.e. which is the difficulty of assigning resources to the applications to pledge service based on performance, availability and reliability. In this paper, we have presented a survey on the quality of service (QoS) in cloud computing with reference to techniques used, advantages anddisadvantages. Wecombined all the related works of quality of service in cloud computing.The aim of this paper is to present a study of previous works done on QoS methods used in the cloud computing environment.
KEYWORDS - Cloud Computing, Quality of Service (QoS), Service level Agreement (SLA), Software Defined Network (SDN).

1. INTRODUCTION

The emergent tendency in know-how in this present era is cloud computing. It's a service oriented technology over the internet. It's a unique kind of a service over the internet as it provides computing as a service. Cloud computing is a kind of work out technology which can be well thought-out as a novel model of computing.Over the internet many cloud users required a variety of services as per their needs. So, there is proper demand and supply ratio but due to limited resources, it is very difficult for cloud providers to provide all the users desired services. From the cloud providers, it's a perception that cloud resources must be assigned in a coherent manner.
And it is difficult to meet cloud users satisfaction and QoS requirements .With the growing development internet is very important in every field of business, research and many other fields ,so cloud computing provide the whole lot of services either it is in the form of software, hardware or platform.
Cloud Computing made of two words: Cloud and Computing, where cloud is a bank of services which contain interfaces, hardware, network& software for the end users and Services in the clouds can be software, platform & infrastructure as a service which are delivered to client via use of internet. With the help of Cloud computing any users can accessany resources without the need to purchase it, sometimes it provide the Cloud Computing come apart in two words i.e. cloud and computing. In which cloud is a bank of services which contain interfaces, hardware, network, and software for the end users.
A service in the clouds refers as software, platform and infrastructure as a service which are delivered to client via use of internet. It facilitate client to carry out any work on the computer or any other devices which can access internet and perform task with easy installing of any software without buying it, or can pay some amount to get access of that service. The service level agreement signed by the client and vendor before delivering the services to the client. [1].

1.1 Models of cloud computing

Cloud Computing works on SPI model. The framework for cloud computing includes Software-as-a-Service (SaaS), Infrastructure-as-a-Service (IaaS), and Platform-as-a-Service (PaaS) [3]. These are described as under:

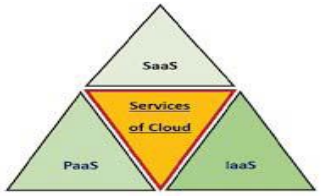

Fig 1: Services Provided by a Cloud

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a) Software-as-a-Service (SaaS)

A Software Distribution model in which applications are hosted by service providers and made available to the clients on the internet, thereby minimizing the need to install and executes the application on the client machine. The key provider who uses SaaS is Amazon Web Service, Salesforce, Google Apps, Facebook and many more.

b) Platform-as-a-Service (PaaS)

A computing platform where user does not need to buy or install the hardware and software in the cloud infrastructure. It consists of applications for computing that are required by the consumer. PaaS also provides various resource management functions for on-timer scheduling of processes.

c) Infrastructure-as-a-Service (IaaS)

It consists of various resources like storage, network and processing capacity required by the user. The client can regulate the cloud environment as a service and client has to pay only for the duration of time whenever they avail the services. This results in the faster service delivery with low cost. The client can still use the service without the awareness of the storage location. This is also called Hardware-as-a-Service (HaaS).

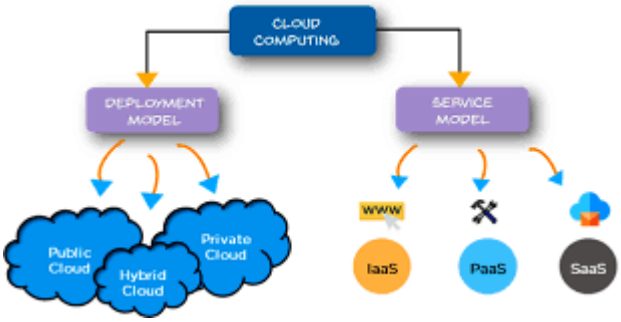

Fig 2: Cloud Development Model

1.2 Cloud Deployment Models

a) Private cloud: A private cloud is owned by a singleorganization. Private cloud enables an organization tousecloud computing technology as a means ofcentralizing access to IT resources in the organization.The actual administration of a private cloudenvironment may be carried out by internal oroutsourced staff. This model has tremendous valuefrom a secure to point of view[2].

b) Public cloud: A public cloud is a publicly accessiblecloud environment owned by a third party cloudprovider. The IT resources on cloud computing areusually provisioned and offered to cloud providers at acost. The cloud provider is responsible for the creationand on-going maintenance of the public cloud and itsIT resources.

c) Hybrid cloud: A hybrid cloud is a cloud environmentcomprised of two or more different cloud deployment models. This deployment model helps business to takeadvantage of secured applications and data hosting onprivate cloud, while still enjoying the cost benefit bykeeping shared data and applications on the publiccloud.

d**) Community cloud**: A community cloud is similar topublic cloud except that its access is limited to aspecific community of cloud users. The communitycloud may be jointly owned by the communitymembers or third-party cloud provider that provisionsa public cloud with limited access.

2. QUALITY OF SERVICE (QoS) TECHNIQUES

Quality of Service (QoS) indicates the level ofperformance, reliability, availability obtainable by anapplication and by the platform or infrastructure thathosts it. QoS is elementary to cloud users, who look forward to providers to deliver the presentcharacteristics, and for cloud providers, who necessitate finding the right trade-off between QoS levels and operational cost [4].

Finding out the finestsubstitutionis not an easy decision dilemma because it rivetsService Level Agreements (SLAs) which spell outQoS targets and economic penalties coupled withSLA violations. Service providers need to act in accordance withSLA contracts which conclude the profits andpenalties on the foundation of the accomplishperformance level[5].

Service Level Agreements (SLA‟s) areprecursor between the service provider and the Customerwhere SLA violation does something as major restraint. SLAviolation is concentrated through mechanisms concerningmonitor [6].

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In particular, the author proposed a mechanism called DEDCA (Dynamic Enhanced Distributed Channel Access) to deal with the channel access in wireless networks, and a framework that make possible its performance in 802.11-based wireless networks using SDN technology. The key facet of this alternative solution is be in command over the contention window size of the wireless terminals. Thus, an adequate response to dynamic and short-term Quality of Service (QoS) requirements can be accessible to services running on these networks. DEDCA mechanism relies in the lead of use of a scalar parameter called gain. The mathematical model which has endorsed us to attainthis parameter is obtainable and calculates in this paper[7].

In this paper[8], the author spotlight on Quality of Service (QoS) as an high-flying factor make a difference to service provider's outlook in choosing between a centralized SDN versus a distributed traditional routing network. The proposed prototype of the SDN expresses comparable QoS performance to traditional networks. This paper uncovers ways to diminish latency and suggests improvements in QoS using a practice built OpenFlow controller based on Floodlight. The networking tool iPerf is worned to assess the QoS performance characteristics. The results point towards capital cost savings of 20% and operational cost savings slam to 43% upon relocation to a white box SDN from traditional networks.

The comprehensions of the Quality of Service (QoS) conception happen to understandable with SDN in a convenient way. In this paper [9] center of attentionis on the active architectures parameters such as response time, switch capacity and bandwidth isolation and we assesses these parameters here. Open Flow as the best-known SDN standard so far defines a standard protocol for network control. These interpretations of change variety may provide SDN application developer's insights when realizing QoS concepts in an SDN-based network.

[10] In this survey paper, we aim at building a picture of QoS-motivated narrative in OpenFlow-enabled SDN networks by exhaustively surveying appropriate research studies. We systematize the related studies according to the grouping that are the most important ways in which QoS can benefit from the concept of SDN: Multimedia owe routing mechanisms, inter-domain routing mechanisms, resource reservation mechanisms, queue management and scheduling mechanisms, Quality of Experience (QoE)-aware mechanisms, network monitoring mechanisms, and other QoS-centric mechanisms such as virtualization-based QoS provisioning and QoS policy management etc.

[11] In this paper, a two-step approach is projected for SDN controller selection. First, the controllers are ranked with analytical network process (ANP) according to their qualitative features which persuade the performance of these controllers and then a performance comparison is achieved to verify for the QoS improvement. The most importantpart of this paper is read-through the applicability of theANP for controller selection in SDN taking into consideration its features and performance analysis inreal-world Internet and Brita topologies. The recreation results illustrate that the controller work outthrough the proposed approach outperforms the controller selected with activeapproaches. The selection of a most favourable controller with ANP results in a diminution of topology discovery time and delay in the normal and traffic load scenario.

Though QoS properties have inward boundconstant attention even prior to the development of cloudcomputing, performance and heterogeneity andresource isolation system of cloud platformshave notablyintricate QoS analysis, prediction and assurance. Thus, several researchers arelook into automated QoS management methodsthat can influence the high programmability ofhardware and software resources in the cloud [12].

P. C. Hershey et al. [13] proposed a SOS approach to facilitate QoS monitoring, management andresponse for enterprise systems that convey computingas a service all the way through a cloud environment. EnterpriseMonitoring, Management and Response Architecturein Cloud Computing Environments (EMMRA CC) unmitigated previous work to make available structure fromwhich to identify points within the administrativedomains where QoS metrics may be monitored andmanaged. A realinstance was endow with forapplying the new SOS approach to a real worldscenario (viz, distributed denial of service (DDoS).The approach is very effectual but it was not appliedto federated clouds in real time.

M. Salam et al. [14] proposed a QoS-orientedcome together cloud computing framework where multipleindependent cloud providers can lend a handeffortlesslyto make available scalable QoS-assured services. The keyelements for smooth the progress of cloud federation used wereCloud Coordinators (CC) and Federation Coordinators (FC). The distinct feature of the projected federationframework is its QoS-orientation that can activate theon-demand supply provisioning across multiplecontributor, hence ration to maximize QoS targets andresources usage, reduce SLA violations andaugment SLA formalization. However, intricateservices were not assembling using a mixture ofservices from different cloud providers and nocondition was made for distributed denial of service(DDoS) attacks.

W. C. Chu et al. [15] proposed a prescribedmodel to assist not only the ECC services design andconstruction through SaaS, PaaS, IaaS but also theconcurrent monitoring and self-motivated analysis on theQoS factors for the promises from QoS serviceproviders and the service level agreements (SLA) formultiple ECC consumers. Foundation on the formal model,analysis model and testing model was produce tosupport automatic testing as well as runtimemonitoring to pledge the contentment to thedesires/SLA constraints. This work had someprecincts such as not get used to the features andsolutions of IOT into the framework as well as thefield experiment.

M. M. Hassan et al. [16] premeditated and experiencedthe workload of big data by consecutively a group of typicalbig data jobs on Amazon cloud EC2. They formed alarge simulation scenario and evaluate the proposedmethod with other approaches. Though, the

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projectedapproach was cost effective, performance metrics suchas delay, delay variable and throughput were no takeninto thoughtfulness.

R. Karim et al. [17] proposed a method tomap the users‟ QoS requirements of cloud services tothe right QoS specifications of SaaS then map them tothe best IaaS service that propose the optimal QoSguarantees. The end-to-end QoS values were consideredas a result of the mapping. They proposed a set ofrules to carry out the mappings process. The QoSprovision of cloud services was hierarchicallymodelled using the analytic hierarchy process (AHP) method. The AHP based model lends a hand to make possible themapping process athwart the cloud layers and to rankthe candidate cloud services for the end users. A casestudy was used to exemplify and authenticate the solutionapproach. No presentation of evaluation was donebased on real QoS datasets of cloud service.

S. Lee et al. [18] proposed an architecturethat engaged the agent technology to holdthescrutinize of requested Quality of Servicerequirements and service level agreements, to supportverification and validation. Moreover, the agenttechnology enthusiastically analysed resources allocationand deployment. This work's weedy point was being deficient in ofself-learning algorithm to conclude the instant ofinvoluntary allocation of system resources.

L. Bin et al. [19] et al. proposed a newQoSawarevibrant data imitation delete approach for disks space and upholding cost saving purpose.Investigational results specific that the DRDSalgorithm can set aside disk space and maintenance costsfor distributed storage system while the availabilityand performance quality of service requirements areguarantee. However, increased overhead on update andirregularity of data is usually connected with datareplication.

P. Zhang et al. [20] obtainable a QoSframework for mobile cloud computing and anadaptive QoS management process to administer QoSpledge in mobile cloud computing environment.Moreover, they presented a QoS managementmodel foundation on fuzzy cognitive map (FCM). No good qualitymodel with appropriateconstruction was generated.

Y. Xiao etal. [21]accessibleacompetentreputation-based QoS provisioning scheme, which can diminish the cost of computing resources, whilerewarding the needed QoS metrics. They well thought-outthe arithmetic probability of the response time as amatter-of-fact metric rather than the typical mean responsetime. More so, QoS provisioning algorithm was notused to incorporate security and privacy metrics.

M. Xu et al. [22] commence a numerous QoSinhibited scheduling strategy of multi-workflows (MQMW) to tackle the issue of multiple workflowswith dissimilar QoS requirements. The projectedstrategy could schedule several workflows whichwere taking place at any time though QoS restriction suchas availability and reliability were not added toworkflows.

Table 1: Comparison Table for QoS Techniques

S.No.	Technique Used	Simulator Used	Algorithm Used/Parameter counts	Result Obtained
[1]	Simulation	Cloud analytic simulator	Equally Spread Current Execution(ESCE)	Better result in overall response time and data center processing time.
[2]	Simulation	CloudSim	Cluster Based Load Balancing Algorithm	Clustering can also be implemented at the client side. We can divide our tasks/cloudlets into different clusters depending upon their task length, cost and priority.
[3]	Simulation	CloudAnalyst	Round-Robin, Throttled, ESCE	The Throttled algorithm used in load balancer in cloud computing simulations using CloudAnalyst is the average response rate is still within the average range between UB1 and the other.
[4]	Simulation	CloudSim	Works on CSA gateway.	Results prove that the CSA(Cloud Service Agent) based approach fared better in terms of throughput and service time as compared against the already existing approaches.

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[5]	Simulation	CloudSim	Proposed an algorithm named Reverse filling LB Algorithm and Compare with Round Robin Algorithm.	Proposed an algorithm that reduces the waiting time of the machines along with the overheads in the system resulting in lesser cost than existing approach. The future work includes modifications in the system leading to greater resource utilization and performance.
[6]	Analysis	Proposed a method for Load Re-balancing.	Honeybee Foraging Algorithm, Active clustering algorithm and Ant Colony Optimization.	None of the methods has considered the execution time of any undertaking at the runtime. In this manner there is an objective to grow such load balancing method that can enhance the execution of cloud computing alongside most extreme asset usage.
[7]	Analysis	Proposed an improved ACO	Ant colony optimization(ACO)	The advantage of the approach lies in the fact that the task of each ant is specialized rather than being general and the task depends on the type of first node that was encountered whether it was overloaded or underloaded.
[8]	Simulation	CloudSim	Novel dynamic load balancing algorithm	Execution analysis of the simulation shows that change of MIPS will effects the response time. Increase in MIPS vs. VM decreases the response time.
[9]	Simulation	MATLAB R 2010 toolkit, Cloud Analyst	Improvised Genetic Algorithm and Round Robin Algorithm.	Experiment has been conducted by varying the number of nodes in a VM available in a cloud configuration of single data center. The results show the use of other soft computing techniques is needed to be studied for further improvement.
[10]	Analysis	Proposed a Load Balancing Algorithm	Round Robin Algorithm	By developing new load balancing algorithms and model, the dynamic situations on servers can be easily handled and overloading problem can be avoided.
[11]	Simulation	Cloud Analyst	Throttled Algorithm, Round Robin Algorithm, Active Monitoring Load Balancing Algorithm	Throttled Algorithm proves to be better compared with other two algorithms and gives better response time.
[12]	Analysis	Adopting CLBVM(Central Load Balancing Policy For Virtual Machines).	Central Load Balancing Policy	By Adopting the CLBVM policy the throughput of the system will increase.
[13]	Simulation	Cloud Analyst, CloudSim	Round Robin and Equally Spread Current Execution Load.	The response will become very less with MY Load Balancer .The parameters considers are overall response time and Data Centre Processing time.
[14]	Simulation & Analysis	Cloud Analyst Simulation toolkit	Round-Robin and Throttled Algorithm	With the modified Throttled Algorithm, if the Number of VM increases it will reduces the response time and processing time of cloud data centers.

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3. CONCLUSION

In thisreview, Table 1,various Quality of Service methods in cloud computing environment are analysed, we found that till now much research workhas been done to improve the QoS in cloud computing architecture. In this paper we studied the techniques which are used till now to enhance the quality and some pros n cons of these methods. Further work on to reduce the limitations and considering those areas where system is requiring improving the QoS (Quality of Service). In Future, more workcan be done by considering those parameters and design a new efficient algorithm that helps to achieve better QoS in Cloud Computing environment.

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