A REVIEW PAPER OF AD HOC NETWORKS AND CLOUD COMPUTING

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ABSTRACT:

Ad hoc cloud computing environment providing a way to distributed collaboration. Nowadays distributed collaboration is becoming a need in offices and laboratories. However, computer resources and in offices and laboratories are under-utilized, while conventional cloud computing composed of dedicated servers are not suited to flexibly deploying application ad-hoc. In this work we have done the literature reviews of Mobile Ad hoc network protocols (MANET) like Ad-hoc On Demand Distance Vector (AODV), Destination Sequenced Distance Vector Algorithm (DSDV), and Improved Destination Sequenced Distance Vector Algorithm (I-DSDV). This paper also includes literature review of cloud computing & its performance analysis through simulation models. Simulation results show that I-DSDV compared with DSDV, it reduces the number of dropped data packets with little increased overhead at higher rates of node mobility but still can’t compete with AODV in higher node speed and number of node. Similarly to these studies, our target is measure the performance of ad-hoc cloud networks by using different ad-hoc network protocols using OPNET Simulator 14.5.

Keywords: Mobile Ad hoc-network protocol, ad hoc cloud computing, performance analysis, simulation models, OPNET 14.5.

[1] INTRODUCTION

The cloud computing is a new computing model which comes from grid computing, distributed computing, parallel computing, virtualization technology, utility computing and other computer technologies and it has more advantage characters such as large scale computation and data storage, virtualization, high expansibility, high reliability and low price service. Cloud computing is the use of hardware or software resources that are delivered as service over network. Ad-hoc network: Definition: “Ad Hoc network is a self-organizing multi-hop wireless network, which relies neither on fixed infrastructure nor on predetermined connectivity”.

The decentralized nature of wireless ad-hoc networks makes them suitable for a variety of applications where central nodes can’t be relied on, and may improve the scalability of wireless ad-hoc networks compared to wireless managed networks, though theoretical and
practical limits to the overall capacity of such networks have been identified. Ad-hoc cloud computing means allow cloud services to run on existing heterogeneous hardware. In other words running cloud services on ad-hoc network. Computational and storage resources within organizations are often under-utilized. By using this concept we can increase the utilization of general purpose computers & other hardware devices.

[2] LITERATURE REVIEW

There has been a branch of research activity in assessing the performance of virtualized resources, in cloud computing environments and in general. In paper [13] work is only specific to EC2 of Amazon web services. In this work performance analysis are categorized in two method i.e. Cloud specific evaluation and Infrastructure uncertain evaluation. In cloud specific evaluation, the duration of resource acquisition and release over short time and long periods of time.

In Infrastructure uncertain evaluation they have designed two methods of workload i) SJSI (run one or more Single process jobs on single instance). ii) MJSI (Single misprocess jobs on multiple instances). Also they have done the analysis of Resource acquisition and release, Single instances, multiple instances, Performance of SJSI workloads, Compute Performance, I/O Performance Memory Hierarchy Performance, Performance of MJMI workloads, reliability, HPL performance.

In [15] paper author has focused on performance comparison analysis with low cost with different QoS. This paper has considered the three factors i.e. Network bandwidth, Quality of Service and Cost. The main objective of this paper is performance comparison analysis with low cost with different Quality of Service. This framework is implemented by OPNET SIMULATION Model 14.5.

In study [14] author has considered mainly three protocols that are AODV (Ad-hoc on demand distance vector), DSDV (Destination Distance Vector Algorithm) and I-DSDV (Improvement of DSDV). These Protocols are ad-hoc network protocol which is used to designed ad-hoc network. In the above paper, Performance analysis of ad-hoc network protocols (AODV, DSDV, I-DSDV) was done by using NS-2 simulation model and compared in terms of Packet delivery ratio, end to end delay, routing overhead in different environment like varying number of nodes, speed and pause time.

QoS is the major factor of service performance, which determines the degree of satisfaction of user. There are two concerns of service a) Technology Oriented b) Service oriented. In this work the degree of satisfaction is expressed by the following qualitative measures.

a) End-to-end delay
b) Delay variations
c) Throughput
The process of providing these QoS requirements is called as Provisioning. Some of the main importance of QoS Provisioning is:

a) Traffic can be differentiated and provided different levels of service.
b) The amount of traffic network can be controlled based on the resources.
c) QoS make it possible to implement the policies across devices and end users.
d) QoS can enable networks to deliver defined levels of service with existing network infrastructure.

This main objective in this paper was Investigate an alternative real time distribution and delivery method for multimedia applications such as live video streaming, live TV, Video on demand using on demand cloud as a service.

In paper [16], Comparison of two on demand routing protocols for mobile & ad-hoc networks has been done. Protocols used for these comparisons are AODV, DSR and traditional protocol DSDV. A variety of workload has been tested in this paper like mobility, load and size of network in given scenario. This simulation model has been created by using NS-2 simulator. In this paper, simulation results and observations are carried out by following factors.

a) Packet delivery fraction (PDF).
b) Average End-to-End delay result.
c) Routing overhead.
d) Packet loss as a function of pause time

After result observation author concluded that, AODV and DSR are reactive protocol, while DSDV is proactive protocol. Both reactive protocols performed well in this scenario. DSR generates lower overhead than AODV while DSDV generates almost constant overhead due to proactive nature. DSR has given poor performance in respect of that, Average delay can be accounted to aggressive use of caching and inability to delete state route. DSDV provided high mobility results in frequent link failures and overhead involved in updating all the nodes with new routing information. DSR consistently generates less routing load than AODV.

In paper [17], Cloud security challenges and solutions have been discussed with the help of literature reviews and simulation model created by OPNET TOOL to produce useful statistics to provide optimal security and compliance. By using simulation results author demonstrated that UTM (Unified threat management) may not be feasible solution for security implementation of cloud. Multi cloud model is created by using OPNET Modeler. Model architecture contains –

a) Internet domain with high connectivity switch (1500 concurrent user can connect.
b) UTM cloud model with cloud infrastructure with security.

c) All clouds are internetworked using high end switches with ATM OC-48 links.

d) Seven applications configured with some built in parameters like RDBMS service with high load, Antiviruses and Antispyware applications, Web services with high load data service etc.

After successful creating & running simulation model results were carried out and it was observed by author that, cloud computing security issues can be investigated with special emphasis on governance of security and compliance from the perspective of user companies as well as cloud service provider. Some literatures recommended by NIST (National Institute of Standards and Technology) states that cloud security should be hosted as a service oriented framework and the accountability should with separate security as a service. However, in this paper a report by Gartner recommends that visualization security cannot be implemented in centralized manner following the UTM approach. The simulations results in this paper carried out are supporting Gartner recommendations.

In paper [18], BI and OLAP services along with cloud application have been created by using OPNET Simulation TOOL. The network was design in such a way that loads can be evenly distributed to all RDBMS servers. The application has been configured in a way that all RDBMS server can evenly involve in receiving and processing the OLAP query load. The cloud model in OPNET Simulator comprises two large domains that are BI on the cloud domain and Extranet domain consisting six corporates having 500 OLAP users in each corporate.

BI on the cloud domain is expanded with four CISCO 7609 router so that they can evenly distribute the load. After creating the model simulator were run and results are carried out & observed. Hence In this paper, Author concluded that cloud computing can be implemented in three ways a) Software as-a-Service b) Platform as-a-Service c) Infrastructure as-a-Service. These services may provide depending upon the business requirements. However, SaaS provider needs the settings on Paas and Iaas. In this study, Results have been reflected the ideal scenario for taking BI on cloud. However, Real clouds will not have ideal configuration as made in the OPNET Modeler. Hence real challenges on cloud needs to be identified and addressed to ensure that results can be brought closer to ideal scenario as far as possible.

In study [19], Author has mentioned the way to distribute the load of server in cloud computing providing ad hoc cloud computing environment. In this paper Distributed collaboration term was used for distribution and execution of applications which runs on cloud server to client machine or participating node who can act as a server. This kind of situation mainly occurs ad hoc in offices and laboratories. However, computer resources in offices and laboratories are under-utilized, while conventional cloud computing environments composed of dedicated servers are not suited to flexibly deploying application ad-hoc. This can be easily deployed by using SpACCE (Sophisticated Ad hoc Cloud Computing Environment Built by the Migration of Server to Facilitate Distributed Collaboration). In this study SpACCE is proposed by using CollaboTrays for sharing any kind of Application or Service can be distribute for
execution to participating nodes which may run on cloud server. By using CollaboTray server can be dynamically migrated to another PC with sufficient calculation capacity. In this paper Author has done experiments on PCs that will have more than 50 percentage of its calculation capacity remaining.

Result in this paper after experiments shows that the migration of the server improves the facility of distributed collaboration even if user works on the client. Author concluded in this paper is that SpACCE environment could contribute effective utilization of untapped PC resources in daily work and then can be used in persistently in cloud computing environments.

[3] INTRODUCTION OF TOPIC

Similarly to these studies, our target is measure the performance of ad-hoc cloud networks by using different ad – hoc network protocols. We are having Performance metrics in much broader size and scope. It performs much more in-depth measurements, compares clouds with other off the shelf clusters. The applications used in our study are closer to the mainstream HPC scientific community. The proposed scheme is tested using ordinarily image processing. From the simulation of the experiment results, we can draw to the conclusion that this method is robust to many kinds of watermark images.

Our performance evaluation results extend and match the previous findings and give more insights into the different protocols used for ad-hoc cloud computing (AODV, DSR, ABR, DSDV etc.). On the other hand scientists begin to adapt the cloud infrastructure for their scientific computing. They run their calculations in the cloud [2], extend clusters on demand with IaaS resources [1] and execute big workflows on a resource mix from traditional grids and clouds [6]. This shows the growing importance of IaaS cloud providers for scientific computing and the need to have performance estimates for the different offered types beyond the marketing information offered by the providers.

[4] DESIGN OF PROPOSED MODEL

Our main aim of this project to design the simulation model of ad-hoc cloud network using different scenario to evaluate the performance using various performance metrics and ad-hoc protocols; also provide an optimum solution based on the performance analysis results. For this project we are using OPNET Modeler Tool 14.5. We will create three different scenario of ad-hoc cloud network using different types of protocol in each scenario.

Scenario 1:
Cloud services running on ad-hoc network at server side, In other words servers are implemented using ad-hoc cloud network and client machines are in simple network for accessing the cloud services. This ad-hoc cloud network is implemented by following routing protocols separately.

a) AODV
b) DSR

c) ABR

d) DSDV.

**Scenario 2:**
Cloud services running on ad-hoc network at server side as well as client side. In this scenario both server and client will have same network structure. This ad-hoc cloud network is implemented by following routing protocols separately.

a) AODV

b) DSR

c) ABR

d) DSDV.

Figure 1 explains the sample architecture of ad hoc cloud network using OPNET tool

![Sample Architecture of ad hoc cloud networks using OPNET Simulator 14.5](image)

**REFERENCES**


Author[s] brief Introduction

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