A Survey of Network related Challanges in Cloud Computing: Current Status and Open Issues

Shiv Raj Pant*
School of Electrical Engineering and Computer Science
Washington State University
Pullman, WA
Email: *shiv.pant@wsu.edu

***Abstract*—Recent advancement in computer technology especially the abundance of cheap storage, high-speed networks, and computing power has resulted in emergence of cloud computing where verious computing resources and services can be utilized via Internet. While cloud computing model has provided a myrad of benefits such as cost savings, flexibility, on demand service, pay-as-you-go, scalability, and reliability, it poses several challanges. One of the challanges lies in the fact that the cloud resources are accessed remotely over the Internet. In this paper, we present a detailed survey of networking and communication related challanges in cloud computing. Several issues have been identified in the literature where some of the issues have been addressed and resolved while some still remain open. We will investigate into challanges such as performance, reliability, security, existing networking protocols etc. The overall goal of this survey paper is to provide a comprehensive study of the network and communication related challenges in latest advancement of cloud computing. The challenges addressed in the literatue will also be evaluated in terms of their success and limitations. Our study is expected to make a significant contribution as a reference resource in current ongoing research efforts in cloud computing.**

***Index Terms*—Cloud computing, Computer networks, Computer communication**

I. Introduction

Cloud computing is a technology where resources like storage, infrastructure, softwares, etc are made available on demand over the network or the Internet. Thus, network is an essential component of cloud computing. With explosive growth of Internet and developement of other computing technologies, the use of cloud resources has also been tremendously increased. Cloud computing is providing a flexible, on-demand, and dynamically scalable computing infrastructure for many applications [1]. With its major services including software-as-a-service, infracture-as-a-service, and platform-as-a-service, cloud computing is advancing the information technology processes and the IT marketplace. Cloud computing actually is a specialized distributed computing technique which provides features such as massive scalability, dynamically configured services (e.g. via virtualization) and delivered on-demand.

Several studies have shown that billions of dollars have been spent on cloud services worldwide [2]. This scenario raises a plethora of challanges that are directly related with the networks and communication technologies being used in cloud solutions. For example, virtualization is a crucial technology behind the success of cloud computing but it creates several networking challanges [3]. Some general challanges associated directly and indirectly with network and communication aspects of growing cloud are lack of trust and privacy, and QoS (Quality of Service) control. Several studies have been done regarding the network related challanges in utilizing cloud services [4]. As in the other areas of computing, security remains one the major challange. Because of remote access of infrastructure and services, privacy is also an important concern for cloud users [5].

This paper presents an insight into the past and present issues in networking and communication for clouds as well as emerging issues in the future in an attempt to provide a comprehensive assessment of technologies that have been proposed for the solutions.

The key expected contributions of this paper can be summarized as follows:

- Provide a concise summary of challanges in cloud computing with a focus on network and communication
- Empirical evaluation of existing solutions to cloud network related challanges
- Identify open and emerging issues related to cloud networks
- Propose possible solutions to open and emerging issues related to networking and communication in cloud.

II. Technique and Evaluation

The study will focus on the network and communication aspect of cloud computing. First, a comprehensive literature survey will be performed where a list of challanges will be curated. Then, proposed solutions to tackle the challenges will be assessed quantitavely and qualitatively. The results along with further investigation will used to identify future challanges and their possible solutions. Empirical method will be utilized to produce the results.

III. Expected results and Conclusion

Despite being development of fast and secure networks, challanges remain to be addressed for cloud networks. Only a comprehensive study of the literature can help understand the problem and overcome such challanges. The results of this study aims at the very purpose providing a thorough evaluation

of the key network and communication challanges experienced in cloud based solutions. This paper will to show criticality of the challanges which will be helpful in suggesting new solutions for future enhancement of network technology for clouds.

REFERENCES

[1] B. Furht and A. Escalante, *Handbook of cloud computing*. Springer, 2010, vol. 3.

[2] J. Moura and D. Hutchison, "Review and analysis of networking challenges in cloud computing," *Journal of Network and Computer Applications*, vol. 60, pp. 113–129, 2016.

[3] A. Mishra, R. Jain, and A. Durresi, "Cloud computing: networking and communication challenges," *IEEE Communications Magazine*, vol. 50, no. 9, pp. 24–25, 2012.

[4] S. Azodolmolky, P. Wieder, and R. Yahyapour, "Cloud computing networking: Challenges and opportunities for innovations." *IEEE Communications Magazine*, vol. 51, no. 7, pp. 54–62, 2013.

[5] H. Takabi, J. B. Joshi, and G.-J. Ahn, "Security and privacy challenges in cloud computing environments," *IEEE Security & Privacy*, vol. 8, no. 6, pp. 24–31, 2010.