

# A Review on Software - Defined Networking

Rohini Sharma

Assistant Professor, Computer Science and Engineering Chandigarh University, Gharuan, Punjab, India

## ABSTRACT

### Article Info

Volume 7, Issue 2

Page Number : 11-14

### Publication Issue

March-April-2021

### Article History

Accepted : 01 March 2021

Published : 06 March 2021

Software-defined networking is more of an approach in the field of network management. This approach will help the user in dynamically dealing with the network configuration making it efficient in the programming aspects. This will further improve the network performance and monitoring processes thereby making the whole process as efficient as a cloud computing model comparative to traditional network management.

**Keywords** : Network Management, Cloud Computing, Software-Defined Networking

## I. INTRODUCTION

The concept of software-defined networking can be considered as the approach for network architecture enabling the network to be controlled intelligently are dealt with by making use of software applications. This will be helping the operators in managing the entire network on a consistent basis despite the presence of the underlying Network Technology. The whole idea of the usage of software-defined networking is to improve the efficiency of the existing network approach.

## II. Software-Defined Networking : Challenges and Research opportunities for future Internet

The research paper focuses on the challenges and research opportunities of SDN. The paper also focuses on the necessity of new network architecture and why SDN is considered the ideal networking architecture (Hakiri, Gokhale, Berthou, Schmidt & Gayraud, 2014). The paper also discusses the SDN key

use cases and also discusses several unsolved challenges that can be solved with the help of SDN.

SDN is much advanced when compared to conventional networking architecture. The current architecture employs Ethernet switches that are structured in a tree-like structure. This architecture is not fit for the dynamic computing needs of the present (obviously the needs of the future) and is also an ill-fit for the storage needs as well. The SDN is characterized by high speed, scalability, and robustness.

From the research conducted on the papers on SDN has a common conclusion, the present architecture is inadequate for meeting the computing needs of the features. The existing architecture also consumes a lot of time in the sense that it causes a lot of flaws and errors, thus no time is left for developing an effective architecture. The SDN architecture too faces a lot of challenges, but when compared to the existing one, the former is much better. The challenges are related to network virtualization, operation and mobility

management. While most of the researches based on SDN is focused on the scalability of solutions, control plane and data plane, and distributed versus centralized control plane, very little focus is drawn on the challenges. A proper understanding of this emerging area is required if the person wants to address multiple challenges that will involve the software-defined networking process. The existing Technologies have been served in the paper and the state of art projects have been considered.

### III. A Survey on Software-Defined Networking

The paper “A Survey on Software-Defined Networking” underlines the need for a better networking architecture that has high speed and scalability like no other (Xia, Wen, Foh, Niyato & Xie, 2015). With the expansion of the mega-trends, the need for higher bandwidth and better accessibility is more evident. The current architecture in no way would support these needs, thus the paper suggests SDN as the best alternative and also focuses on the challenges that have to be addressed.

The SDN is defined by two integral characteristics – one is the decoupling of the data and control planes and other the programmability of the control plane. Data planes are simply the essential function and processes that transfer packets from one interface to another interface. Whereas control planes are the functions and processes that decide which path/way to utilize.

The benefits of switching on to SDN architecture is also clearly detailed in the paper. The challenges faced by the current networking architecture can be easily solved with the help of SDN. With that said, the paper concludes on the note that even though SDN is projected as the next big thing in the networking field, its major challenges have to be

studied deeply and necessary measures have to be implemented before SDN based systems go live. The paper also accept the general definition given for the software-defined networking process, however, takes into account two different characteristics and potential benefits of the network point then, three-layer structure is taken starting from the infrastructure layer to the application layer and the substantiate layer has also been taken into consideration to give an overview of the implementation. A lot of suggestions have been given in this paper helping other researchers to work on the topic further.

### IV. A Systematic Literature Review on Software-Defined Networking

The paper “A Systematic Literature Review on Software-Defined Networking” is basically a literature review of Software-Defined Networking, abbreviated as SDN. The research paper focuses on classifying the existing papers that reviewed SDN and the opportunities associated with it in the future. For the research, the authors decided to go for IEEE articles and articles available on Google Scholar.

Software-Defined Networking is a type of networking architecture that has been introduced recently and deals with the separation of data and control planes. The research paper pointed out the fact that SDN is capable of dealing with the security controls in a totally different manner when compared to traditional security controls (Alsmadi, AlAzzam & Akour, 2016). This means that the programmability features of the SDN allow a programmer to develop custom-made security services, which are much more strong and secure than conventional security services.

The research papers also revealed the fact that the currently implemented security controls, therefore,

have to be revisited according to the SDN, to ensure maximum security. The SDN's programmability features give the programmer multiple controls on network traffic and switches. But when viewed from a security perspective, this can be quite dangerous.

The literature review paper explores numerous journals and articles based on SDN and is more focused on the programmability feature of the same. The paper stayed true to its goals and objectives and was also successful in reviewing quite a number of articles thoroughly. The research paper also opens new frontiers to people who are interested in exploring the opportunities in the field of SDN. The research regarding networking has been evaluated on the basis of the questions related to the formulation. The results that bring outline information related to the aspects of the active research areas.

## V. METHOD COMPARISON

The research papers have focused on the frontiers concerning opportunities and successful implementation with respect to the architecture. The Microservice architecture is costlier to develop upfront but there are many advantages to it. In Microservice architecture, the application is broken down into a series of modules. Each module of the architecture is associated with specific business objectives. Specific architectural changes have to be made in order to keep the security and privacy of the infrastructure within the networking area. Many solutions have been referred by the experts keeping in mind the usage of cloud computing services by most of the companies in recent times.

## VI. BEST METHOD

The best method for the companies who have been working on networking infrastructure with cloud platforms for computing purposes could be Cloud

Edge. It will allow the device to compute and make decisions locally. The device could do so at high speed without affecting the efficiency. The time to send the query from the device to the network and getting back the reply is reduced. The Cloud Edge collects a lot of information but it only sends the processed data to the cloud. It lowers the quantity of data that might be at risk in the cloud. There is no risk of network failure or slow connection with Cloud Edge. It is especially great for operations in remote locations where getting a reliable network connection is not possible.

## VII. CONCLUSION

As discussed in the report, the software-defined networking brings in a lot of advantages including the programmability of traffic, agility and helps the company in coming up with network supervision driven by the policies. It will further implement the network operation and automation. The creation of framework and improvement in efficiency seems to be the greatest advantage from the list and companies can make use of it in order to support data-intensive applications.

## VIII. REFERENCES

- [1]. Hakiri, A., Gokhale, A., Berthou, P., Schmidt, D., & Gayraud, T. (2014). Software-Defined Networking: Challenges and research opportunities for Future Internet. *Computer Networks*, 75, 453-471. doi: 10.1016/j.comnet.2014.10.015
- [2]. Xia, W., Wen, Y., Foh, C., Niyato, D., & Xie, H. (2015). A Survey on Software-Defined Networking. *IEEE Communications Surveys & Tutorials*, 17(1), 27-51. doi: 10.1109/comst.2014.2330903
- [3]. Alsmadi, I., AlAzzam, I., & Akour, M. (2016). A Systematic Literature Review on Software-

Defined Networking. Studies In Computational Intelligence, 333-369. doi: 10.1007/978-3-319-44257-0\_14

- [4]. Mckeown, N., Anderson, T., Balakrishnan, H., Parulkar, G., Peterson, L., Rexford, J., henker, S. Andturner, J. Openflow: Enabling Innovation In Campus Networks. *Acm Sigcomm Computer Communication Review* 38, 2, 2008.
- [5]. S. Hassas Yeganeh and Y. Ganjali, "Kandoo: A framework for efficient and scalable offloading of control applications," in *Proceedings of the First Workshop on Hot Topics in Software Defined Networks*, ser. HotSDN '12. New York, NY, USA: ACM, 2012, pp. 19–24.
- [6]. M. Yu, J. Rexford, M. J. Freedman, and J. Wang, "Scalable flow-based networking with difane," *SIGCOMM Comput. Commun. Rev.*, vol. 41, no. 4, pp. –, Aug. 2010.
- [7]. A. Tootoonchian and Y. Ganjali, "HyperFlow: a distributed control plane for Open Flow," in *Proceedings of the 2010 internet network management conference on Research on enterprise networking*, ser. INM/WREN'10. Berkeley, CA, USA: USENIX Association, 2010, pp. 3–3.
- [8]. T. Koponen, M. Casado, N. Gude, J. Stribling, L. Poutievski, M. Zhu, R. Ramanathan, Y. Iwata, H. Inoue, T. Hama, S. Shenker, Onix: a distributed control platform for large-scale production networks, *Proceedings of the 9th USENIX conference on Operating systems design and implementation*, p.1-6, October 04-06, 2010, Vancouver, BC, Canada.
- [9]. A. Alghadhban, B. Shihada, Delay Analysis of New-Flow Setup Time in Software Defined Networks, *IEEE/IFIP Network Operations and Management Symposium -NOMS*, 2018
- [10]. Jagdish Jangid, "Efficient Training Data Caching for Deep Learning in Edge Computing Networks" *International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJSRCSEIT)*, ISSN : 2456-3307, Volume

6, Issue 5, pp.337-362, September-October-2020.  
Available at doi :  
<https://doi.org/10.32628/CSEIT20631113>

**Cite this article as :**

Rohini Sharma, "A Review on Software Defined Networking", *International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJSRCSEIT)*, ISSN : 2456-3307, Volume 7 Issue 2, pp. 11-14, March-April 2021. Available at  
doi: <https://doi.org/10.32628/CSEIT21728>  
Journal URL : <https://ijsrcseit.com/CSEIT21728>