

# A STUDY ON SOFTWARE DEFINED NETWORK TOPOLOGY

Priyadharshini.K<sup>1</sup>, Gomathi.S<sup>2</sup>, Premsaagaur.V.M<sup>3</sup>, Gopinathan.G<sup>4</sup>

<sup>1</sup>Research Scholar, Sri Krishna Arts and Science College

<sup>2</sup>Assitant Professor, Department of CS-PG, PSGR Krishnammal College for Women

<sup>3,4</sup>Student , Sri Krishna Adithya collage of Arts and Science

**Abstract:** Software Defined networking (SDN) it is a centralized manager of all networks. It is invent from OpenFlow. Software-Defined Networking is associate an emerging design that is manageable, dynamic, money-making, and flexible, creating it ideal for the high-bandwidth, dynamic nature of today's network applications. In SDN approach the control plane decouples the network administration and forwarding the network functions and it's enabling the network management to be converted into directly programmable and therefore it is underlying the network infrastructure to be abstracted for applications and network services. Software-defined networking is a process to separates the network information, and manages the control and data planes. This allows the intelligence of the device to be split from the packet-forwarding engine and controlled all networks in dynamically, whereas information transport is distributed. We discuss concerning the summary of the existing and proposed system of SDN. Finally, we have to conclude this survey paper with SDN implementation.

**Keywords:** Software-defined networking, SDN, Network virtualization, OpenFlow.

## INTRODUCTION

Computer networks are typically built from a large number of network devices such as routers, switches and numerous types of middle boxes (i.e., devices that manipulate traffic for purposes other than packet forwarding, such as a firewall) with many complex protocols implemented on them. Network operators are responsible for configuring policies to respond to a wide range of network events and applications. They have to manually transform these high level-policies into low-level configuration commands while adapting to changing network conditions. In particular, Software Defined Networking (SDN) is a new networking paradigm in which the forwarding hardware is decoupled from control decisions. It promises to dramatically simplify network management and enable innovation and evolution. The main idea is to allow software developers to rely on network resources in the same easy manner as they do on storage and computing resources. In SDN, the network intelligence is logically centralized in software-based controllers (the control plane), and network devices become simple packet forwarding devices (the data plane) that can be programmed via an open interface.

## DEVELOPMENT OF SDN NETWORKING

### A. EXISTING SYSTEM OF SDN NETWORK

The Open Networking Foundation (ONF) is that the cluster that is the most related to the event and standardization of SDN. It could be a framework to authorize the network directors to mechanically and dynamically manage and management an outsized range of network devices. It is achieved through innovative network programmability. Active networks, in spite of their boundaries, indicate the design that's attempts to provide the edibility that current SDN strategies struggle for user. Learning from the motivational issues that prevented the adoption of active networks, researchers focused on narrower and more clearly dined problems, which led to a focus on a separation between the control planes. And the data plane showed in fig1. This focus was prompted by the increase in track volumes as the Internet grew in size, leading to network administrators to search for a new control interface for their networks. Early technologies attempted different methods of creating a separation between control and data planes.

- Less limitation of active network.
- Communication between data plane and control plane are not connected with network virtualization function.
- It is based upon global and 4D network architecture.



Figure.1 SDN TOPOLOGY

### PROPOSED SYSTEM OF SDN

Data communication networks generally encompass user devices, or hosts interconnected by the network infrastructure. This infrastructure is shared by hosts and employs shift parts akin to routers and switches moreover as communication links to hold information between hosts. Routers and switches are typically “closed” systems, typically with restricted and vendor-specific management interfaces. Recent research into SDN security follows two specific paths in SDN controller that is called OpenFlow. It is great interest in mitigating security problems in the protocol, as it is used in many production settings shown in fig.2. However, other security research in general SDN strategies allow for progress towards new protocols beyond network virtualization.

- Nonstop programmable: Network control is directly programmable because it is decoupled from forwarding functions.
- Abstracting control from forwarding lets administrators dynamically adjust network-wide traffic flow to meet changing needs.
- Centrally managed: Network intelligence is logically centralized by SDN controllers. It is maintain a global view of the network.
- Programmatically configured: SDN lets network managers configure, manage, secure, and optimize network resources very quickly via dynamic, automated SDN programs.

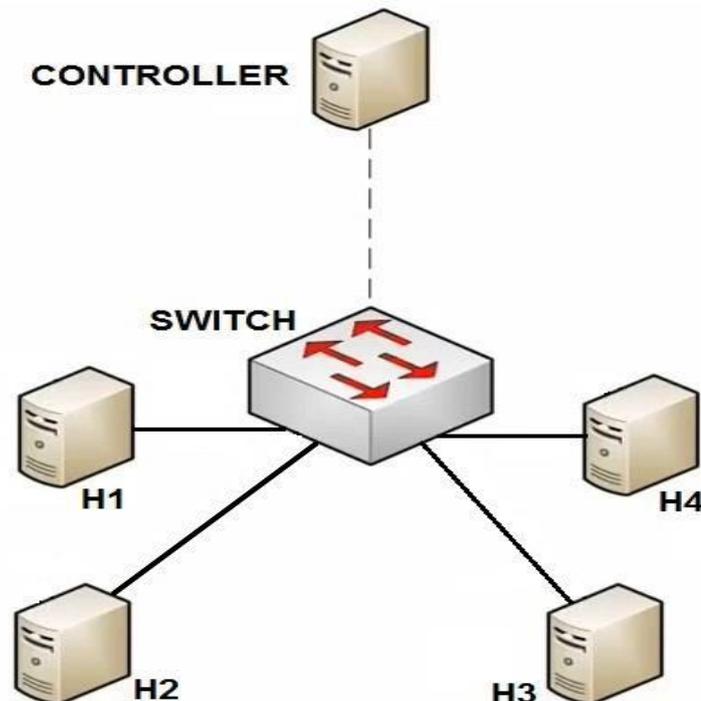


Figure.2 SDN Architecture

## OPENFLOW

OpenFlow is first planned by McKeown et al. with a purpose to allow easy network experiments in a campus network and is currently used in most SDN practices. Early phase experiments using OpenFlow primarily aim at creating a split the software controllable network focusing on controlling forwarding of packets. It provides the firewall protection, and arithmetical analysis of information streams. OpenFlow may be seen as just a protocol specification used in switching devices and controllers interfacing. Creating a separate network solely for network control manifests the key concept of SDN and lays foundation for network programmability and logically centralized control. In the development of SDN and OpenFlow, their concepts and design approaches go hand in hand with each other. On one hand, many concepts in SDN are based on the design of OpenFlow. On the other hand, as the concept of SDN becomes clearer and more mature, then it influences the future development of OpenFlow.

## CURRENT CONCEPT IN SDN: NETWORK VIRTUALIZATION

Network virtualization isn't a new topic as network organizations have a long history implementing techniques such as virtual LANs (VLANs), virtual routing and forwarding (VRF) and virtual private networks (VPNs). However, throughout this white paper, the phrase network virtualization refers to the network proficiency. In particular, network virtualization refers to the ability to provide end-to-end networking that is abstracted away from the details of the underlying physical network. It is based on server virtualization which provides computer resources. In network virtualization the network information's are abstracted. One way to implement network virtualization is as an application that runs on a SDN controller, leverages the OpenFlow protocol and defines virtual networks based on policies that map flows to the appropriate virtual network.

### Advantage of Network virtualization:

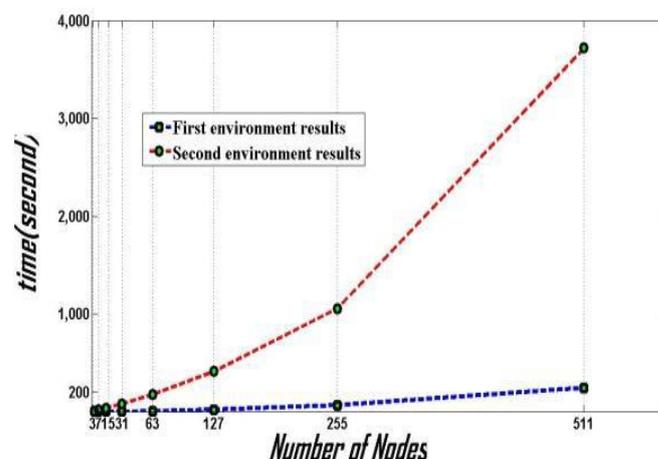
- Reduce the network complexity
- Improve the network application which is more reliability and secured
- In research community provide more workspace
- Providing vendor independence for better application.

Another way to implement network virtualization is to use encapsulation and tunneling to construct multiple virtual network topologies overlaid on a common physical network. This approach is often referred to as overlay-based network virtualization. IT organizations have been implementing network virtualization via overlays for the last few years based on protocols such as VXLAN.

## IMPLEMENTATION OF SDN

More recent approach to implementing the SDN is that network virtualization. This approach features a controller and has architecture similar to the one shown in Figure 2 except that the network elements are either vSwitches or vRouters. One of the primary roles of the controller is to provide tunnel control plane functionality. This functionality allows the ingress device to implement a mapping operation that determines where the encapsulated packet should be sent to reach its intended destination VM.

Software Defined Networking (SDN) architectures to increase speed of application delivery, reduce operating costs, and increase business agility. Cisco Application Centric Infrastructure (ACI) and Cisco Evolved Services Platform allow different IT and network domains, including compute, storage, security, and network in single computerization.



## CONCLUSION

In this paper, we have concluded the execution of the various SDN features such as a control plane of SDN. Overall the concept is that SDN is an open network foundation. Even the traditional companies have noticed the success of open source SDN, so it could become a standard controller of all network application. In this survey we discuss about the further implementation of SDN and also the major techniques of network virtualization.

## REFERENCES

- [1] Open vSwitch. <http://openvswitch.org/>.
- [2] OpenFlow - enabling innovation in your network.<http://archive.openflow.org/>. Open Networking Foundation.
- [3] A. Greenberg, G. Hjalmtysson, D. A. Maltz, A. Myers, J. Rexford, G. Xie, H. Yan, J. Zhan, and H. Zhang. Public Review for A Clean Slate 4D Approach to Network Control and Management. ACM SIGCOMM, pg.no 44-54, 2010.
- [4] D. Tennenhouse, J. Smith, W. Sincoskie, D. Wetherall, and G. Minden. A survey of active network research. IEEE Communications Magazine, 35(1):80-86, 2011.
- [5] A. Dixit, F. Hao, S. Mukherjee, T. Lakshman, and R. Kompella. Towards an elastic distributed SDN controller. Proceedings of the second ACM SIGCOMM workshop on current topics in software defined networking Hot SDN '13, page 7, 2013.
- [6] Ferro, G., OpenFlow and Software-Defined Networking, <http://etherealmind.com/software-defined-networking-openflow-so-far-and-so-future/>, November 2012.
- [7] Yazıcı, V., Sunay, O., Ercan, A.O., "Controlling a Software-Defined Network via Distributed Controllers", NEM Summit, Istanbul, Turkey, <http://faculty.ozyegin.edu.tr/aliercan/files/2012/10/YaziciNEM12.pdf>, October 2012.
- [8] Enterasys Networking (SDN in the Enterprise), [http://www.enterasys.com/companyliterature/SDN\\_tdbrief.pdf](http://www.enterasys.com/companyliterature/SDN_tdbrief.pdf) november 2014.

