

Link Utilization Using Link Layer Discovery Protocol In Conjunction with the SDN Implementation

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Abstract: In the field of computer science and IT research, this paper suggests the basic understanding of software defined networks to all the telecom professionals worldwide and provides the foundation of this emerging technology. A new approach has been discussed in this paper which can be used by network vendors, hardware manufacturers or software companies that in turn will help them to utilize the existing resources in the best possible manner with some new innovation. This will definitely provide relevant inputs to new entrants in this area of networks and lay the basic foundation.

Keywords: LLDP, SDN.

1. INTRODUCTION

This paper is all about the Link Utilization between two ports using the link layer discovery protocol or LLDP. Using the LLDP protocol, we can simply find the connected ports in the network device very easily and this helps the network operator or customer to setup the network fast as they don't have to worry about the connections with their network devices.

LLDP plays major role in big networks in which there are several ports and customer is setting up the network for the first time as a green-field project. This is not only helpful in deployment of the network for the first time, but also in post deployment scenario where customer has to debug/look into the connected ports of network devices. Let us first understand the basic parameters which we see in LLDP.

- Connected ports.
- Management addresses.
- Chassis ID
- Port ID etc.

As we all know that in SDN approach we want to be very flexible in network implementation and with SDN, we can fetch several important network parameters from network devices easily. Let's first understand the basics of Software defined networking.

Software Defined Networking or SDN is a new approach for today or next generation networks. It gives us the flexibility to play with networks which we have not been able to do that until now in full sense. As we all know that in traditional networks all the intelligence mainly lies with the network elements only hence it is difficult for user sitting at one location to play around with multiple network elements from different vendors such as Ericsson, HP, Ciena, IBM and many more. In SDN, We want to control the networks through centralized control system irrespective of the vendor types. Let us first understand the behavior of our traditional network. If we talk about a network topology which consists of several routers, all these routers will make their own topology based on the information provided by intelligent protocol

such as OSPF. All the routers will form their routing table based on that they will control the data flow. Hence we can simply say that all the elements are having their individual control planes.

In a new approach, SDN provides you the flexibility to control the network from a single controller and you don't have to worry about which OS is running on network elements etc.

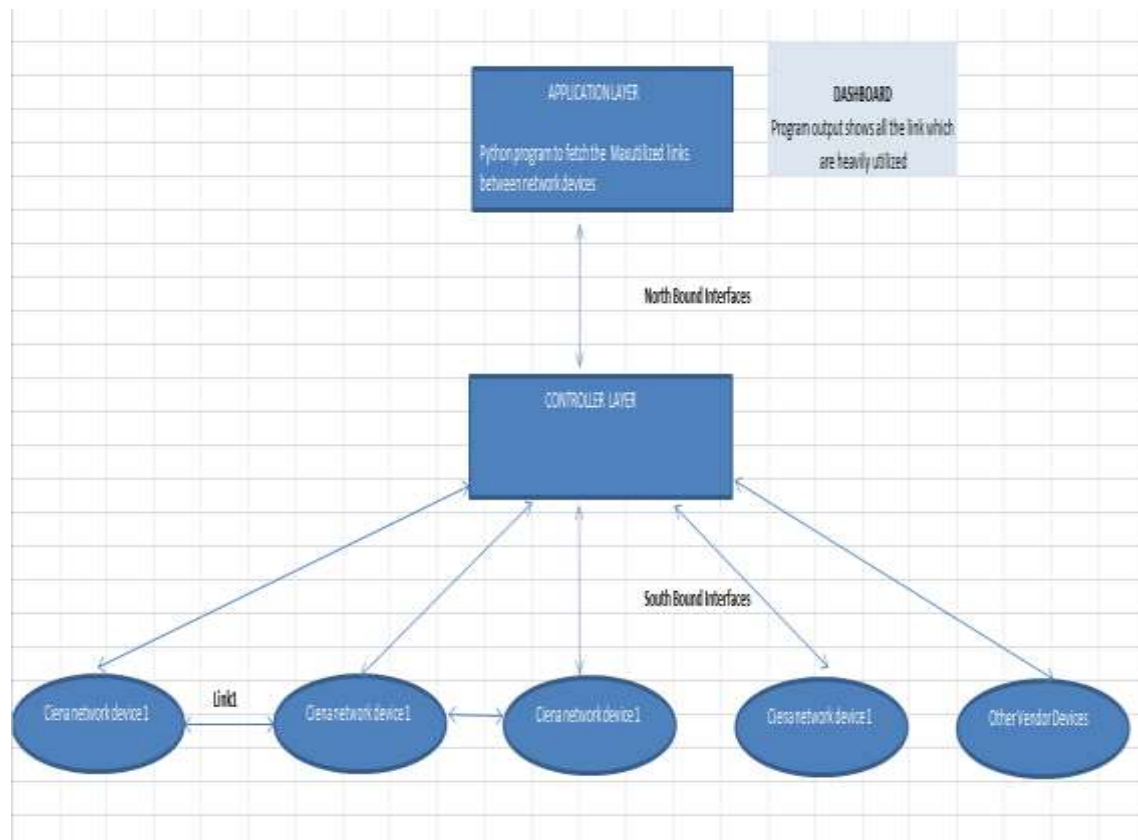
You can program the network / write several scripts to control the network on the application layer. Hence there are three layers of this foundation.

Application Layer: Designer or programmer will use this layer and write the script/program(Example : Python) how he/she wants to control the network and this in turn gives Vendors the flexibility and that opens the gate for lot of innovation.

Control Layer: Beneath the Application layer is the control layer. There will be a controller which will communicate with APP through north bound interface or NBI.

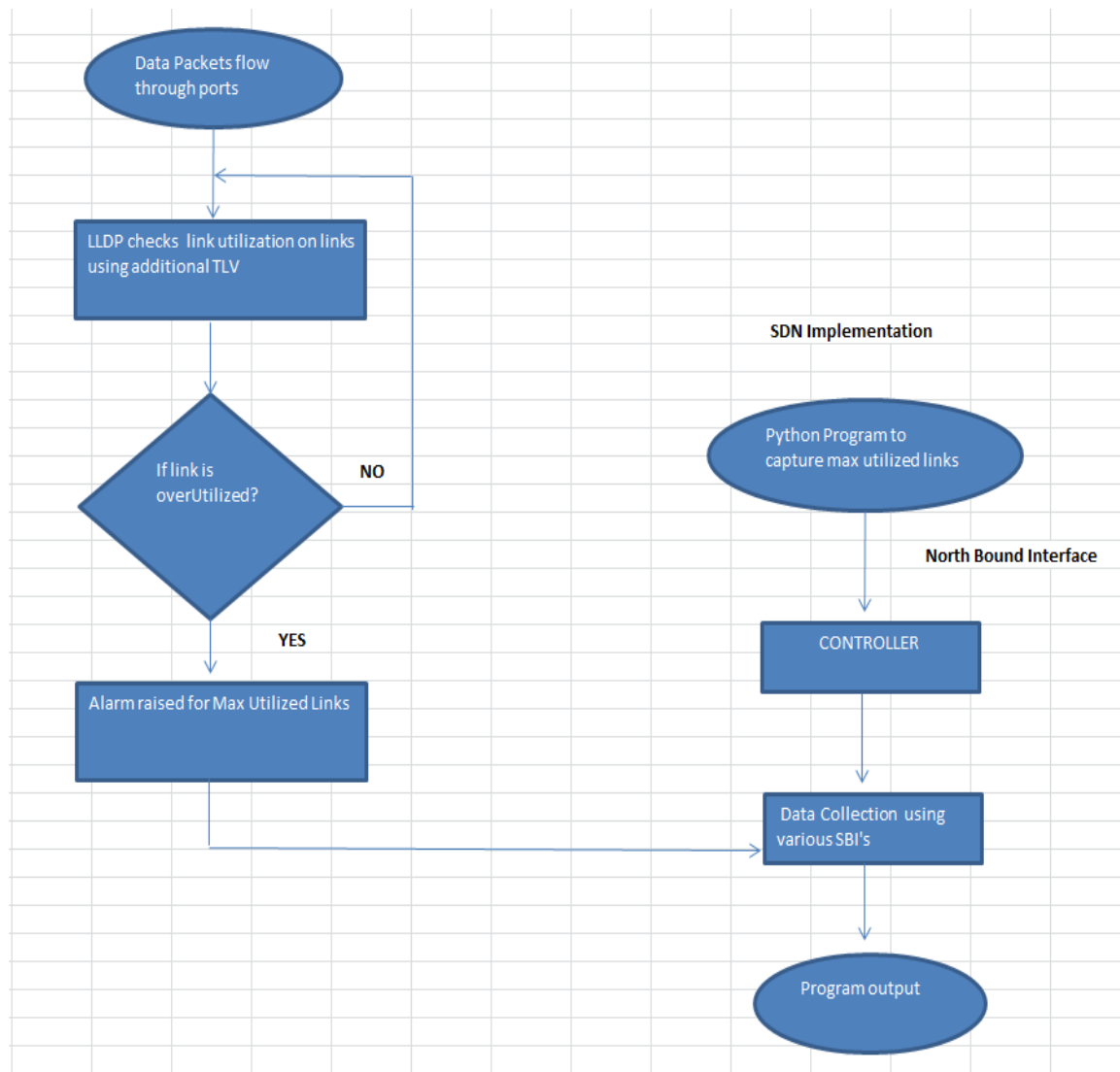
Infrastructure Layer: In infrastructure layer, there can be network elements such as routers of different vendors or of same vendor. And there will be a south bound interface between control layer and infrastructure layer. Now this is important to note here is that, these SBI (south bound interfaces) can be open-flow, NETCONF, Vendor API's.

Please refer the below diagram to develop more understanding on SDN view.



Now our proposed idea is for the calculation of link utilization using LLDP protocol sending additional TLV and raising the alarm if the link is going to be max-utilized. LLDP can keep on checking the link utilization on several links and subsequently raising the alarms for max utilized links. We all know that all the alarms generated on network devices has to be monitored on centralized system hence it becomes very handy information for customers as they monitor their network at any NOC or network operation center.

Below implementation allows customer to actually monitor the max utilized links without logging into each network device and without calculating the in and out packets flow. This will automatically show the customer about the max utilized links with ease which in turn will be helpful for them to react /correct the links rapidly.



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