Framework For Monitoring the present traffic in the college network and Introduction of SDN for optimum utilization of resources

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ABSTRACT:-

Software Defined Networks or SDN is an emerging technology that facilitates customization at network administrator level for making the network agile and flexible by simplifying the network management paradigm via virtualization. SDN facilitates network engineers and network administrators to configure the networks as per changing business requirements and put it into immediate effect without the traditional way of extracting whole of the network at a huge inconsiderable level; thus making it cost effective and beneficial in many more ways. SDN for optimum utilization of resources and futuristically provide a dynamic allocation of resources.

KEYWORDS:- SDN, Network Topology, Software-defined networks, network function virtualization, middle box, service chain, network virtualization.

I. INTRODUCTION:-

we are going to need 1 policy server 1SDN controller Switches compatible to open flow protocol, This is our design. Now we have to introduce sdn in the clg network. SDN controller- An SDN controller is an application in software-defined networking (SDN) that manages flow control to enable intelligent networking.SDN controllers are based on protocols, such as OpenFlow, that allow servers to tell switches where to send packets. By using sdn controllers we will be able to separate data and the control planes of the routers, Which means the routers used will literally be dumb. Just meant for forwarding. As they've been assigned jobs to forward according to our requirement and not what they are traditionally design force them to do By doing this we get optimum utilization of bandwidth And most importantly

Speedy flow of traffic The problem of Unnecessary utilization of bandwidth by hogging. Or merely by router sending packets to the neighboring router just to say hello is *TOTALLY BANISHED* This gives us 100% results in terms of achieving the best possible utilization of the bandwidth and speed Open Flow protocol-It separates the data plane and the control plane of the switch. And all the forwarding decisions are to be made by *US* ! We are responsible for forwarding packets however we like. How much ever we like! It is done by assigning a standard server (policy server) which does the job of inspecting the traffic. Which is moving on our terms? Or policies set by us This is just a basic lookout on how does Open Flow operate

- **Big sizeable data restricted to user level in a hierarchy**

- **Open Bandwidth**
- **Policies set on the basis of 4 categories**
- **Threshold value set to limited services**
- **Least dynamicity**
- **Efficiency compromised over service**
- **Dedicated metric system**
- **Usage of costly L2,L3 switches**
- **QoS eclipses Firewall policies**
- **Metric system in KB**

II. GOALS AND OBJECTIVES:-

1) Less drain on resources-Dynamically allocating bandwidth at different locations in the campus.
2) Increased uptime-less error prone deployment and configuration errors as everything is software based.
3) Cost savings-Leads to a significant and productive amount of cost efficiency.
4) Automation-Provides the scope for automation of complex operational tasks that make networks faster, more efficient and easier to manage.
5) Network Function Virtualization.

MATHEMATICS ASSOCIATED WITH THE PROJECT:-

System Description:

- S = {Input, Output, Components, Customized DBA, Functions, Success, Failure}
- **Input** = {OVS-Open Virtual Switch(nodes, links, configured in mininet)}
- **Output** = {Customized DBA deployed in Pyretic, best utilization of resources enabled.}
- **Component** = {Generate Nodes, Configure the Privileges, Sense the Network Links, Customized DBA algorithm.}
- **Customized DBA** = {After sensing the IDLE links through the network, apply the policies from the policy server database. Launch the customized Dynamic Bandwidth Allocation policy programmed in the eclipse; enabling dynamic allocation of resources and their optimal utilization.}
- **Function** = {Senseall()- To sense the idle network, cDBA()- To dynamically allocate resources.}
- **Success** = {Dynamic allocation of resources and optimally utilization of the resources.}
- **Failure** = {partially working component}

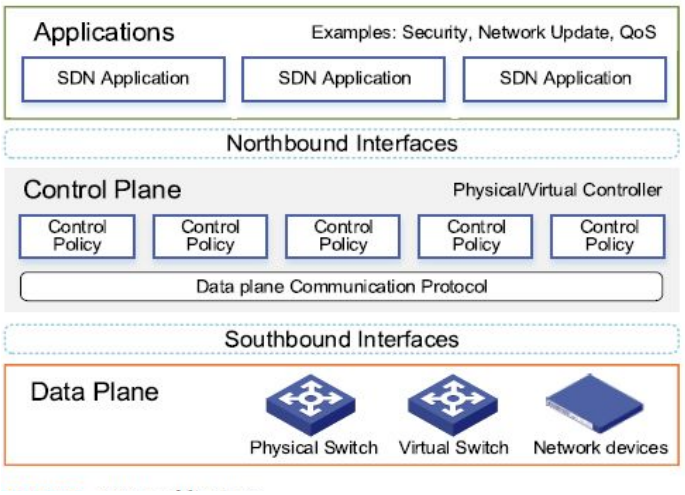


Fig. SDN Architecture

CURRENT NETWORK SCENARIO :-

1. Big sizeable data restricted to user level in a hierarchy
2. Open Bandwidth
3. Policies set on the basis of 4 categories
4. Threshold value set to limited services

5. Least dynamicity
6. Efficiency compromised over service
7. Dedicated metric system
8. Usage of costly L2,L3 switches
9. QoS eclipses Firewall policies
10. Metric system in KB

PROPOSED NETWORK SCENARIO :-

1. Introduction of SDN
2. Dynamic architecture
3. Cost efficient
4. Optimum utilisation of the current bandwidth
5. Programmable as per requirement
6. Comparative demo of current network and proposed network design
7. Drawback of open bandwidth solved in the proposed network design

III. Proposed System

A. *Objectives and Requirements*

1) Creating a Network : Create a virtual network of three switches connected linearly and three virtual hosts, eachhost configured to the corresponding switch.

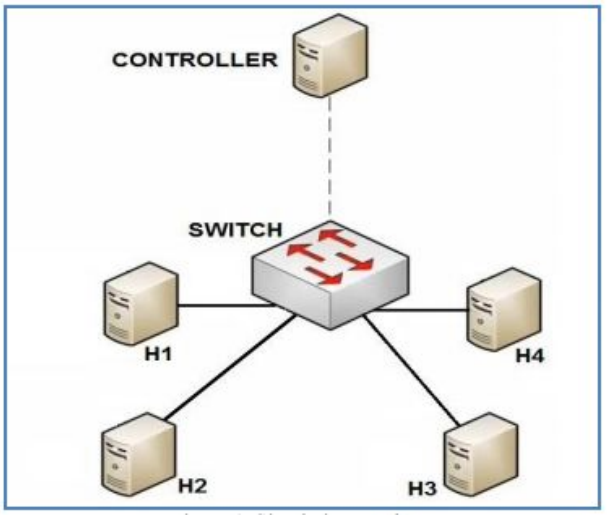
2)Interacting with a Network : In Mininet's the entire virtual network can be controlled, and managed from a single console.

3)Customizing a Network Custom networks with a few lines of Python can be created by Mininet's API.

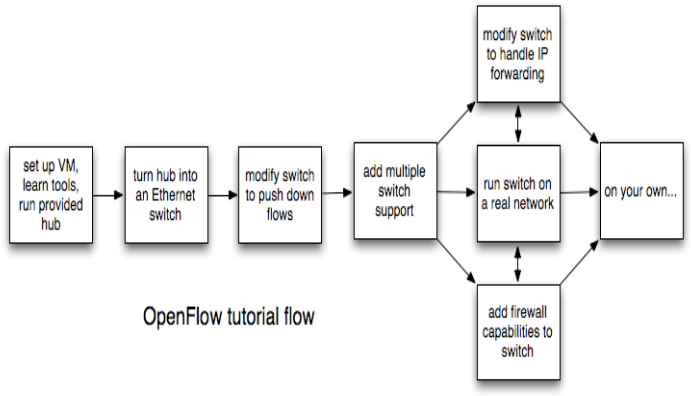
4)Sharing a Network : Mininet supports the capability of sharing the created VM image to other researchers for the purpose of running, evaluating, or modifying it

5)Running on Hardware: The created prototype could be implemented into hardware for testing and validation

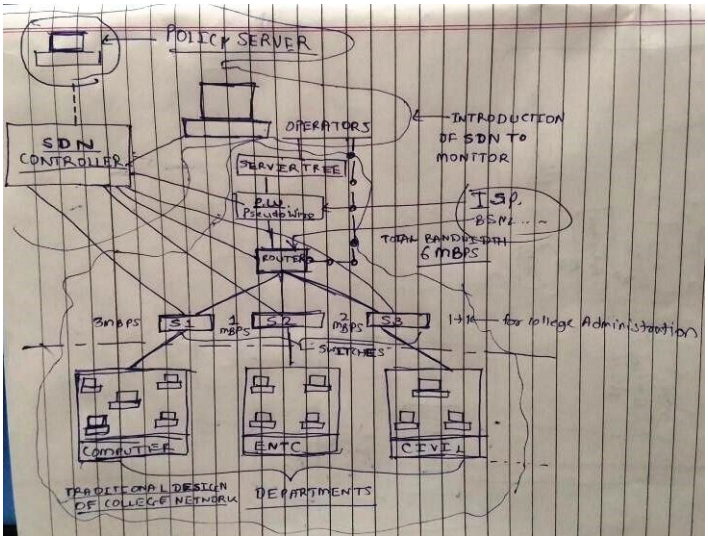
B. *B. System Modules*



Mininet provides an easy way to get correct system behavior (and, to the extent supported by your hardware, performance) and to experiment with topologies. Mininet networks run real code including standard Unix/Linux network applications as well as the real Linux kernel and network stack (including any kernel extensions which you may have available, as long as they are compatible with network namespaces.)Because of this, the code you develop and test on Mininet, for an OpenFlow controller, modified switch, or host, can move to a real system with minimal changes, for real-world testing, performance evaluation, and deployment. Importantly this means that a design that works in Mininet can usually move directly to hardware switches for line-rate packet forwarding



OpenFlow tutorial flow



IV. Conclusion

1) Less drain on resources-Dynamically allocating bandwidth at different locations in the campus.
2) Increased uptime-less error prone deployment and configuration errors as everything is software based.
3) Cost savings-Leads to a significant and productive amount of cost efficiency.
4) Automation-Provides the scope for automation of complex operational tasks that make networks faster, more efficient and easier to manage.

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