Networking Monitoring Technique in SDN using RYU controllers
Fazil Sarfaraz, Twain Pereira, Prof. Chao Li Tarng
Department of Electrical Engineering, San Jose State university, San Jose, California 95112.

Introduction
Current computer networks are in a phase of consistent growth and evolution, the internet these days and usage of the internet applications has increased sharply since more than a decade. Keeping this increase in mind and the increase of service applications over the internet it is required to have a large, strong, balanced and reliable framework of network. To achieve this computer networking giants are competing in developing advanced switching, routing, load balancing and QoS techniques and various protocols to support these developments. This highly potential field networking has introduced Software Defined Networking (SDN) which is currently the hottest technology in computer networking and is getting much of attraction from computer networking companies. Being relatively new there is a vast potential of development in this field and is said to be the future of networking in which a command is used over the routers, switches to control the traffic and hence the routers and switches can be made less intelligent and cheap. This give rise to load balance the traffic in SDN which is very crucial to maintain the QoS."

Methodology

OpenFlow is a protocol. This is the protocol followed by the controller to communicate with the switch. A switch following OpenFlow protocol is called as an SDN switch or a OpenFlow switch. The below diagram show how the connections actually look like. The OpenFlow connection is an SSL secure connection."

Architecture

The block diagram of our network topology consists of controller module which will do the controlling and managing part of the network as explained above and the second block consist of the distributed SDN controller part these are more than one and we are working on optimizing this part of the topology. OpenFlow enabled switches are connected which are programmed to create the routing policies and we will implement algorithm to help them migrate and control traffic whenever needed.

REST API

This project uses Mininet VM to define default and custom topologies. Mininet VM provides command line interface to define these topologies. Along with that it provides pinging operations within the defined network. To extract the packet contents, RYU controller are used which provided REST API to fetch data. The API provided ease in programming.

RYU Controller

RYU is a java based controller. This project contains a python script that invokes various RYU modules which extract the desired data from the virtual network. This is a simulation of an actual SDN deployed network wherein you can program your control plane to extract data from your forwarding plane and offers a variety of operations that can be performed in data extraction.

Key References


Acknowledgements

Our Team would like to thank and gratefully acknowledge the help, guidance and support of our advisor for this project Professor Chao Li Tarng. We would also like to thank our project co-advisor Professor Nader F. Mir to guide us whenever we needed him. Moreover, we thank Professor Thuy T. Le and Professor Morris Jones for their valuable guidance and direction during the final stages of our project.