CS 476 - Winter 2017

Cloud SDN and Load Balancer

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I. Project Description

For this project, we have chosen to work on the ”traffic load balancing through software-defined networking” project, with the twist that we will use a cloud platform. The project has three major components, the first being the creation of some cloud virtual machine on a service such as AWS or the Google Cloud Platform. Once the VM is set up, we can set up a local virtual network using Mininet. Lastly, we will set up a simple load balancing service on top of the SDN service.

II. Motivation

These problems are real problems in industry, and are very applicable to our team's education and future employment. Cloud technologies are becoming more and more relevant with the rise of large-scale cloud platforms in enterprise computer. Learning about basic cloud technologies, SDN, and load balancing will all come in handy in the future.

III. Solution Method

For the first part of the project, we plan on using a free, enterprise based platform, such as Amazon Web Services Free-Tier, or Google Cloud Platform's free trial, to initialize a Virtual Machine online. After the VM is created, we will use Mininet to create a virtual network layer inside the VM. Using that network layer, we can then spin up a few web servers to act as our individual nodes. Then, using the established framework, add a simple load balancing service on top of the SDN. We will use a simple load balancing algorithm, such as round robin.

IV. Evaluation Method

We will evaluate the network performance using third party tools such as Wireshark, or build in Mininet utilities like *iperf*.[1] We can also do basic analysis and evaluation of the performance drop of a SDN vs non-SDN. The load balancer performance can also be evaluated to see how well it distributes load over the Mininet Hosts.

V. Execution Plan

The project goals will be divided into three parts:

1) Environment Construction, setting up the testing environment, SDN, and load balancing service. Cody will work on setting the VM up, as well as setting up the SDN with Mininet. Dan will focus on the SDN and load balancer. Andy will work with Dan on the SDN and load balancer.
2) Testing, gathering statistics on Mininet hosts as to network performance, and load balancing effectiveness. This will be split up throughout the team when the environment has been set up. It will be a group effort to gather data on different aspects of the project, such as latency, and load balancer effectiveness.
3) Evaluation, writing up report on test results, and evaluation of results. This will, again, be split up throughout the team to use statistical analysis to understand the results of the test data.

Dividing the project into these parts will give us a clear indication of where we are in terms of progress, and a good idea if we've hit a roadblock on any individual piece.

VI. Bibliography

References

[1] U. D. D. Idris Zoher Bholebawa. (2015, July) Design and performance analysis of openflow-enabled network topologies using mininet. [Online]. Available: http://www.ijcce.org/vol5/469-CT013.pdf