SDN BASED LOADBALANCER AND FIREWALL

PRESENTED BY GROUP 6:

AARTHI VISHWANATHAN

ANIRUDH SARMA

ARCHIT BANSAL

HAVISH CHENNAMRAJ

SHREYA RAJKUMAR

Georgia Tech

CREATING THE NEXT®

PROJECT MOTIVATION AND OBJECTIVE

Motivation:

- Load balancers and Firewalls are dynamic in nature.
- Need a way to Configure networked machines remotely in the cloud environment.
- To Scale the networked environment
- Flexibility in deploying policies network wide.
- Maintenance and fault tolerance of the services provided.

Objective:

Develop a SDN based load balancer and firewall which are updated dynamically depending on the state of the Network.

IMPLEMENTATION – WHAT DID WE DO?

Load Balancer:

- A module which dynamically inspects links between source and destination and applies a rule or a policy to direct flow through less utilized links.

Firewall:

- Provide for a way to enforce user given policies and rules to be pushed across the network without manual effort in configuring individual switches/routers.

IMPLEMENTATION – HOW DID WE DO?

Georgia Tech

Technology and Tools Stack:

Floodlight Controller

- Based on the OpenFlow protocol.
- Exposes API for ease of configuring the Network.

Mininet

- Allows setting up a network topology to test the functioning of the SDN load balancers and firewalls.

We wrote our application in python which interacts with the controller. We then inspected traffic on wireshark on various nodes in the mininet topology to study our setup.

IMPLEMENTATION – HOW DID WE DO?

Load Balancing:

- Our load balancer inspects transmission link rate (in bits per second)

- For every link between source and destination, we calculate the cumulative sum of the transmission rate

- Instruct controller to push policy such that it uses the flow with least sum.

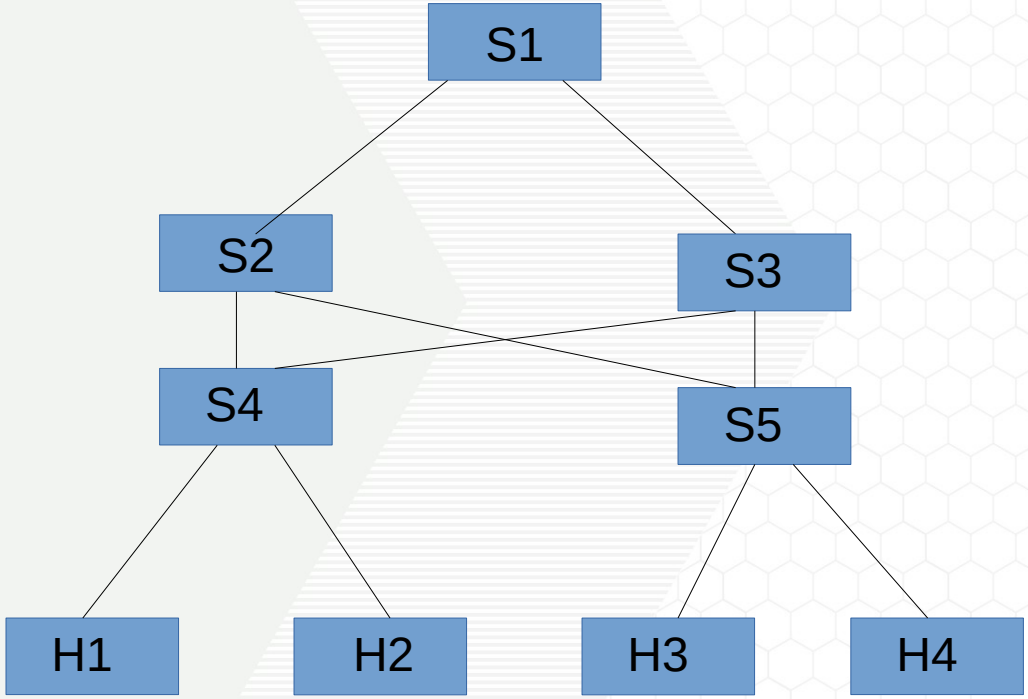
Firewall:

- Issue policies via command line to the Floodlight controller.

- Applied recursively for all switches across the network to enforce the policy network wide.

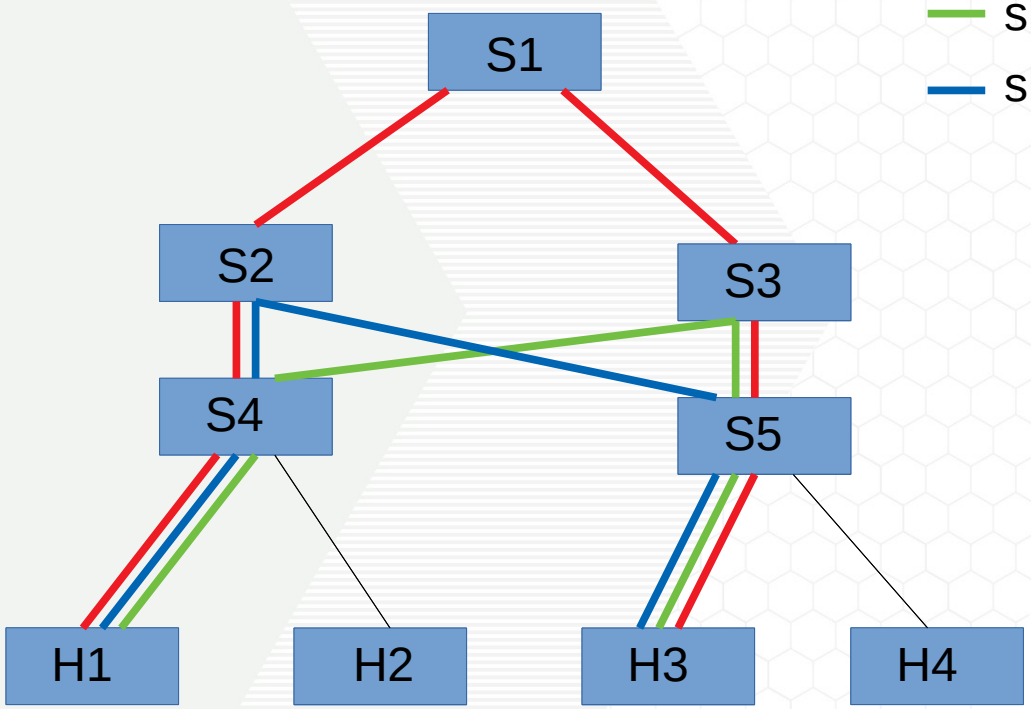
Georgia Tech

TOPOLOGY



Georgia Tech

TOPOLOGY H1 to H3 paths



Georgia Tech

DEMO

IMPROVEMENTS

Load Balancing:

- Current: Algorithm based on transmission rate(bits per second through links)

Future:

- Calculate based on link characteristics (rate of loss, RTT etc)
- priority and content based load balancing
- User flexibility in selecting algorithm

Firewall:

- Current: Policy rules based on IP and port

Future:

- Fine grained control over packet contents
- Access lists for set of nodes.

Georgia Tech

THANK YOU