

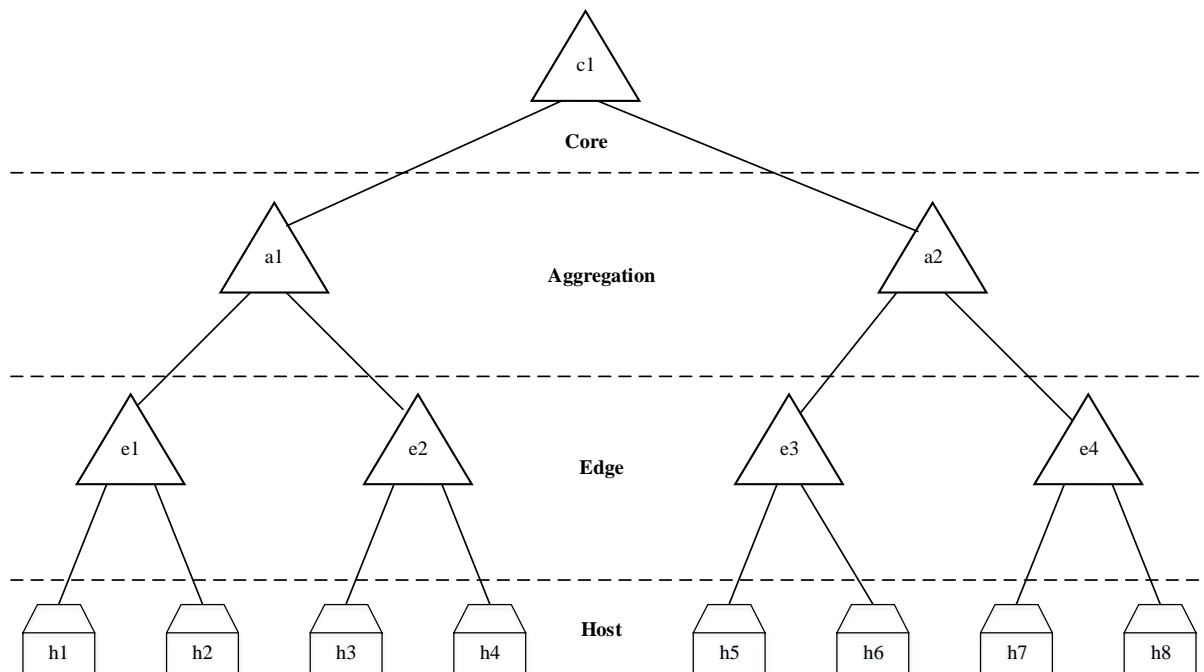
ELEC5517: SOFTWARE DEFINED NETWORKS

PROJECT I

Background

Tree-like topology exists in telecommunication networks. In a basic tree topology, end-hosts connect to top switches, which form edges of the tree. Each switch (excluding the core switch) has a single parent switch. A more complex tree topologies like fat tree can be constructed via adding extra switches and links to improve fault tolerance of the network.

In this project, your task is to create and monitor a simple tree topology based on telecommunication networks. The core, aggregation, edge and host to be composed of a single layer of switches with a fanout of three (3). Below is an example of a tree network topology having a single layer per each level and a fanout of two (2).



Please perform the following tasks based on the required topology as specified in the background section using Mininet:

Task 1 Network Building:

- I. Design a topology that creates an efficient telecommunication network.
- II. Set performance parameters for the links between the following and meet the RTT (Round-Trip Time) requirements:

Links	RTT requirements
Between core and aggregation switches.	A host pings the host that under same core switch: around 160ms.
Between aggregation and edge switches.	A host pings the host that under same aggregation switch: around 80ms.
Between the edge and host.	A host pings the host that under same edge switch: around 40ms.

- III. Set the mac address of each host.
- IV. Break links of two hosts from the network.

Task 2: Network Monitoring:

In telecommunication systems, network monitoring is important, it reflects the real time status of the network and enables engineer to respond to the emergencies in time.

Please use 'wire shark' to monitor the network and catch data by using following rules respectively:

1. Except port 80.
2. UDP protocol.
3. Direction: source.
4. The IP address is equal to the IP address of core switch.

Task 3: Question Answering

Once finishing the task1 and 2, please consider following questions:

1. What are the network factors that can affect the performance of the custom topology designed in 'Task 1 part I' above?
2. What are the benefits and drawbacks of the network topology (Tree-like topology) we built?

Please submit all your codes along with the results of this project.

Good luck

ELEC5517 Teaching Team