MININET

Satyam Prakash

MTech CSE

OVERVIEW

WHAT IS MININET?

- Mininet is a network emulator which creates a network of virtual hosts, switches, controllers, and links.

- It runs a collection of end-hosts, switches, routers and links on a single Linux kernel.

- Mininet's virtual hosts, switches, links, and controllers are the real thing – they are just created using software rather than hardware and for the most part their behavior is similar to discrete hardware elements.

- It is usually possible to create a Mininet network that resembles a hardware network, or a hardware network that resembles a Mininet network, and to run the same binary code and applications on either platforms.

FEATURES OF MININET

- It is fast, starting up a simple network takes just few seconds. Running, editing and debugging process can be very quick.

- It can be used to create custom topologies like a single switch, or a larger internet like topology, or anything else.

- Using python scripts, one can create and run Mininet experiments.

- Mininet can run on a laptop, on a server, in a VMs, or in the cloud.

- Results produced in one machine can be shared and replicated in any other machine.

- Mininet is an open source project.

MININET INSTALLATION

- To install natively from source, first get the source code from github repository

```
~$ git clone git://github.com/mininet/mininet
```

- Once we got source code then command to install Mininet is :

```
~/mininet/util$ ./install.sh
```

EXPERIMENT I : CREATE TWO HOSTS CONNECTED VIA SWITCH

- This topology is default topology in Mininet and is called minimal topology.

- It includes one OpenFlow kernel switch connected to two hosts, and one OpenFlow reference controller.
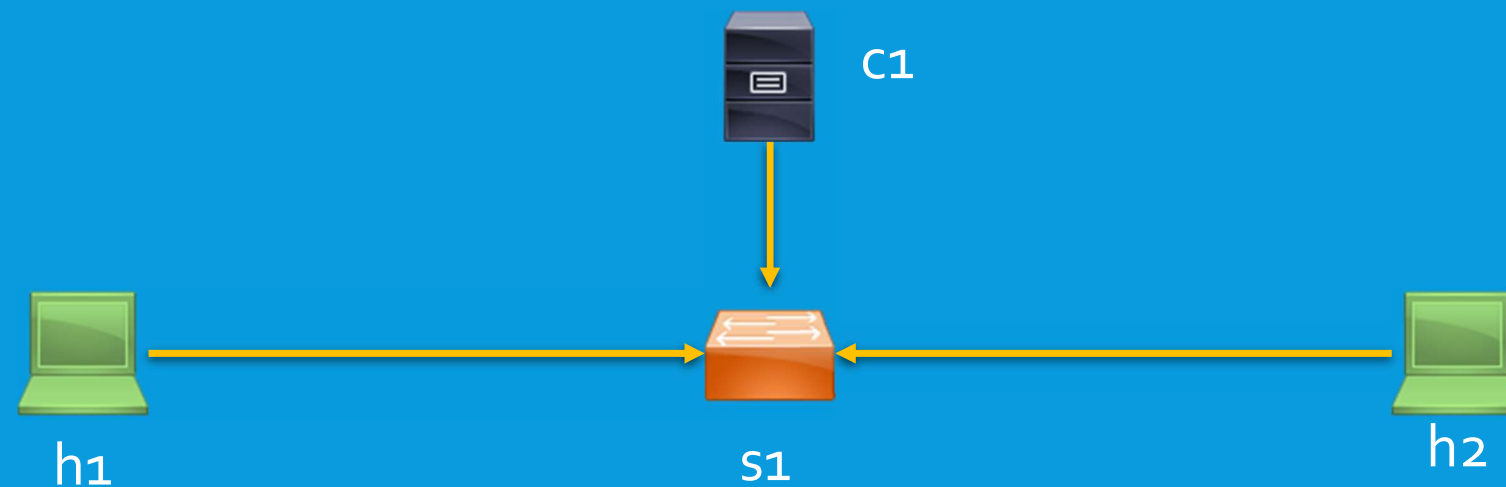
- By convention host names start with 'h' and switch names begin with 's'; numbering begins with 1.

- Start a minimal topology and enter the CLI:

```
~$ sudo mn
```

- Display Mininet CLI commands:

```
mininet> help
```

- Display nodes:

```
mininet> nodes
```

- Display links:

```
mininet> net
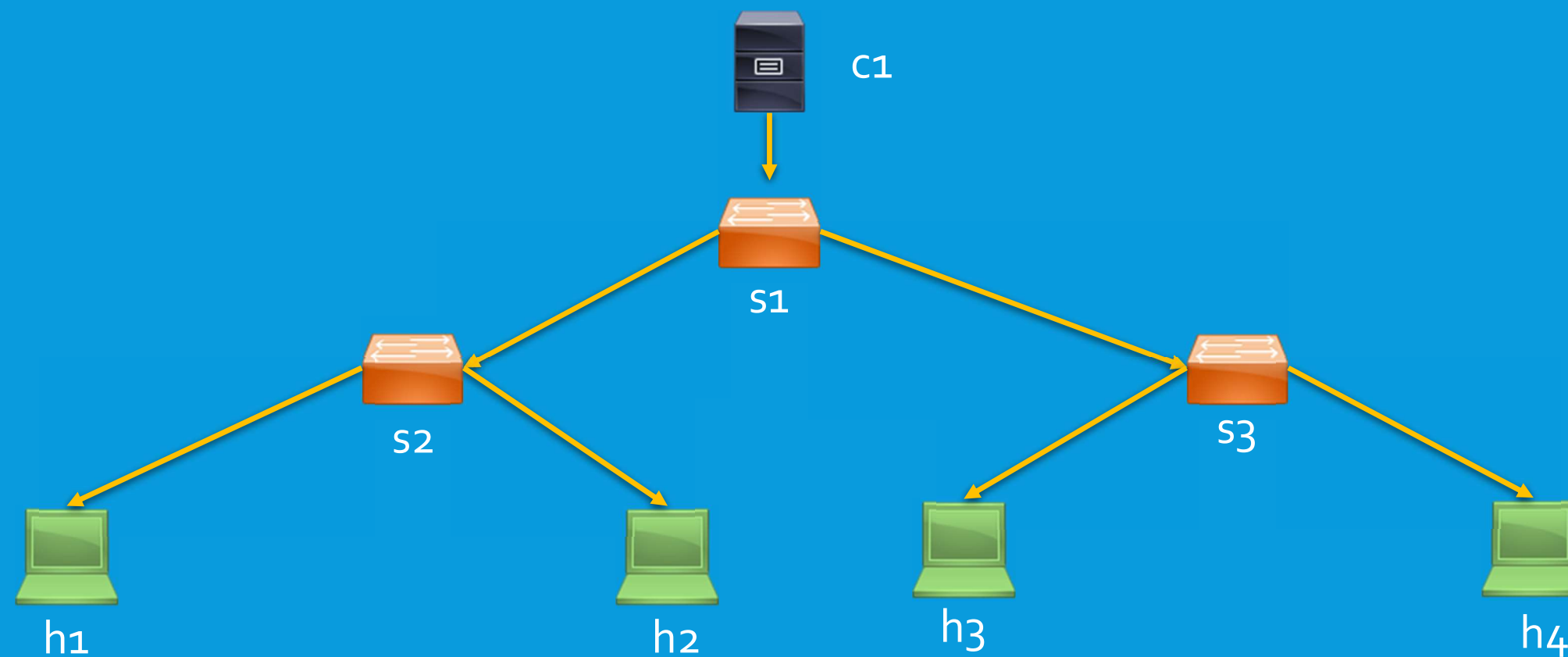```

- Dump all information about all nodes:

```
mininet> dump
```

- Check connectivity between hosts:

```
mininet> h1 ping -c 1 h2
```

EXPERIMENT II : CREATE TREE TOPOLOGY

- Now, we will create a tree topology with defined depth and fan-out.

- It includes three switches, four hosts and one controller.

- Start a tree topology with depth = 2 and fan-out = 2

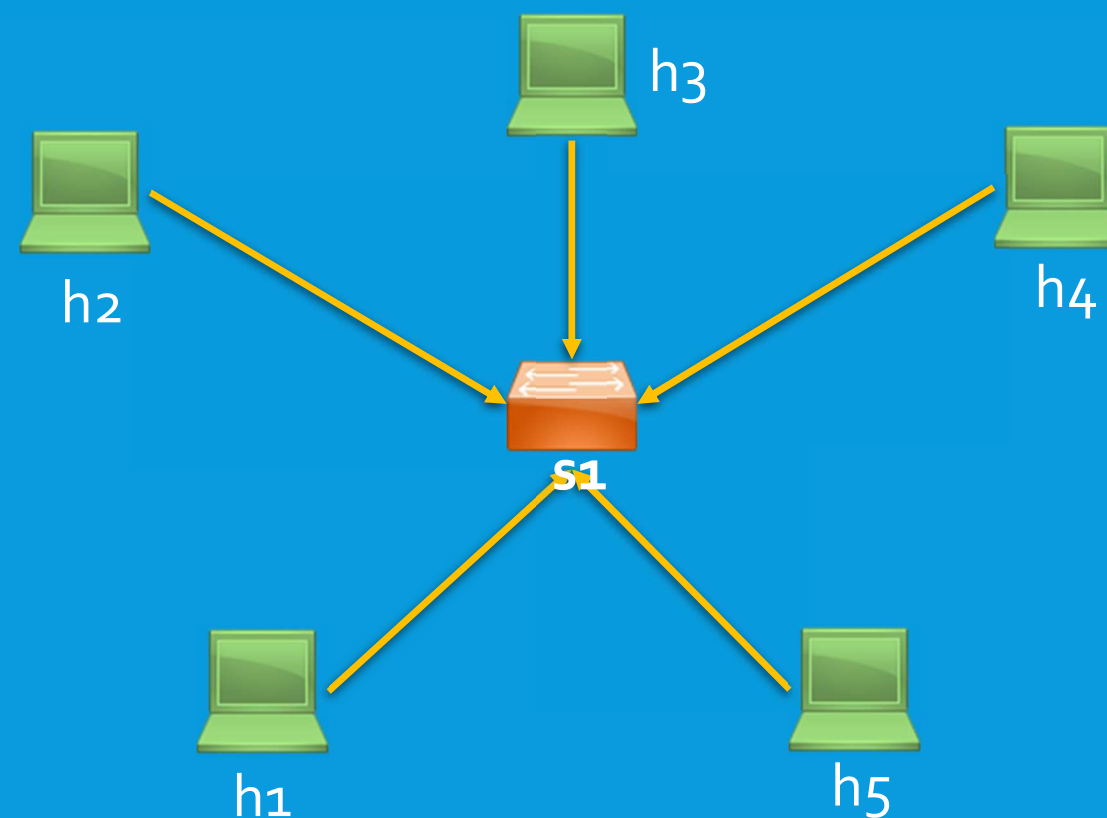```
~$ sudo mn --topo=tree,depth=2,fanout=2
```

- Check connectivity of all hosts in single command:

```
mininet> pingall
```

EXPERIMENT III : CREATE STAR TOPOLOGY USING PYTHON SCRIPT

- In this topology, there are five hosts which are connected to a single switch.

- Command to add topology to Mininet from the python script is :

```
~$ sudo mn --custom /home/username/Desktop/star_topo.py --topo star_topo
```

LIMITATION OF MININET

- Mininet-based networks cannot (currently) exceed the CPU or bandwidth available on a single server.

- Mininet cannot (currently) run non-Linux-compatible OpenFlow switches or applications; this has not been a major issue in practice.

- Mininet won't write your OpenFlow controller for you; if you need custom routing or switching behavior, you will need to find or develop a controller with the features you require.

- By default all Mininet hosts share the host file system and PID space; this means that you may have to be careful if you are running daemons that require configuration in /etc, and you need to be careful that you don't kill the wrong processes by mistake.

REFERENCES

1) mininet. (n.d.). *mininet/mininet*. GitHub. Retrieved June 1, 2021, from https://github.com/mininet/mininet/wiki/Documentation

2) *SDN Narmox Spear*. (n.d.). Retrieved June 1, 2021, from http://demo.spear.narmox.com/app/?apiurl=demo#!/mininet

3) Mininet Project Contributors. (n.d.). *Mininet: An instant virtual network on your laptop (or other PC) - Mininet*. Retrieved June 1, 2021, from http://mininet.org/

4) *30   Mininet — An Introduction to Computer Networks, desktop edition 2.0.4*. (n.d.). Retrieved June 1, 2021, from https://intronetworks.cs.luc.edu/current/html/mininet.html