Assignment Overview

- Mininet
- Controller (POX or Floodlight)
Things to Implement

- ARP responder
- Installing flow entries
- Handling link failures
Leaf Spine Topology

Spine Switches
s4
s5

Leaf Switches
l1
l2
l3

Hosts
h1
h2
h3
h4
h5
h6
Leaf Spine Topology

- Default Controller will not work
- Pingall will FAIL
- Forwarding Loops exist
Leaf Spine Topology

Spine Switches

Leaf Switches

Hosts
ARP Responder
ARP Responder

- Controller maintains a table for IP to MAC mapping
- MAC addresses serially assigned
- Controller listens to all the ARP requests and respond
  - Add flow entries in switches to forward ARP requests to the controller.
- Build the ARP responder as one component of your controller (do not simply use built-in modules).
ARP Responder

Central Controller
- h1 does ARP request for h5
- Switch l1 forwards the request to the controller
- The controller replies
- Switch l1 forwards the reply to h1
ARP Responder

- For checking the ARP responder
- Do pingall
- Each host will have the ARP entries for all other hosts
- Verify using the command “<host> arp -n” (e.g. h1 arp -n)
- You will still get 100 % packet loss
Installing Flow Entries
Installing Flow Entries

- Rules installed at switch setup
- No unneeded broadcast should happen
- Forwarding loops exist, be careful
- Rule details in instructions
Rules Installation

Central Controller
- Rule Installation on Setup
Rules Installation

- For verifying the traffic flows
- Pingall should work
- 0% packet drop
- For debugging try pinging individual host (e.g. h1 ping h2)
Link Failures
Link Failures

● Common place in real life

● Detection
  ○ Using built-in mechanisms

● Mitigating Effect
  ○ Install rules
  ○ Traffic should not be interrupted
Link Failures
Link Failures

- For failing links (for switch s4)
  - link s4 l1 down
  - link s4 l2 down
  - link s4 l3 down

- Controller should automatically detect

- Upon detection rules for mitigation should be installed
Link Failures

- Fail the links of only one switch
- After link failures pingall should still work
Questions