

Programming Project 4

CSci 4211 Computer Networks

Due Date: Sunday December 10, 2017 at 11:55 p.m

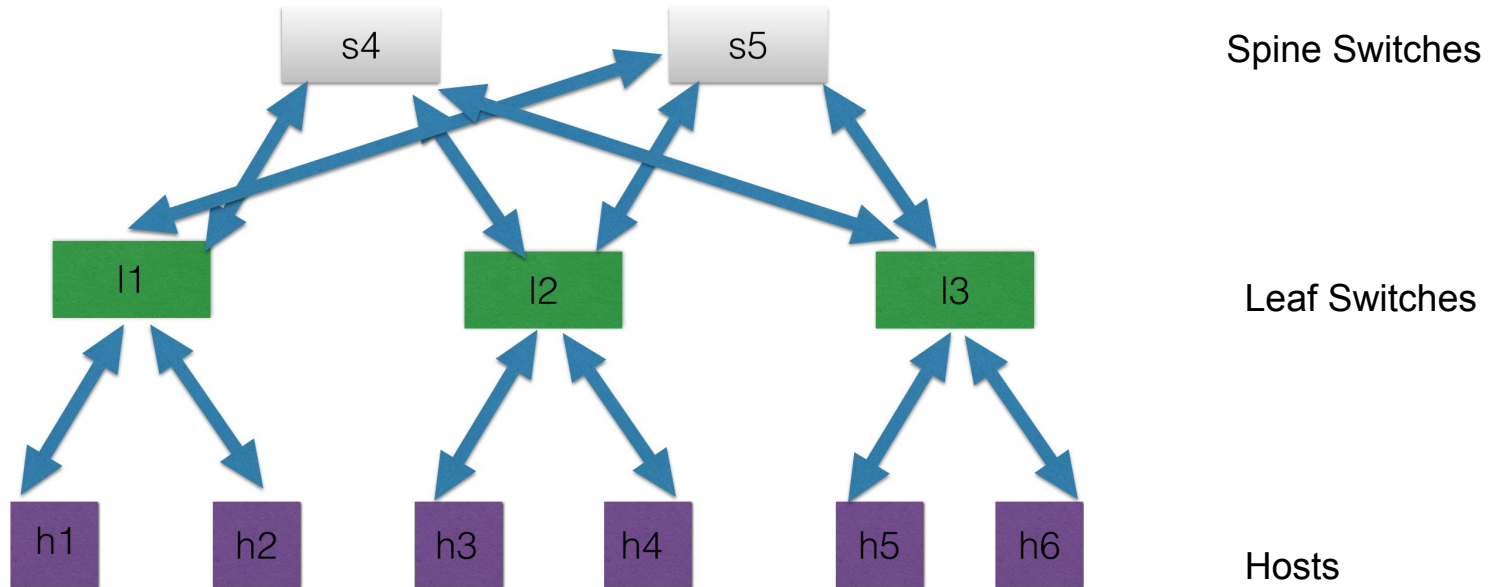
Assignment Overview

- Mininet
- Controller (POX or Floodlight)

Things to Implement

- ARP responder
- Installing flow entries
- Handling link failures

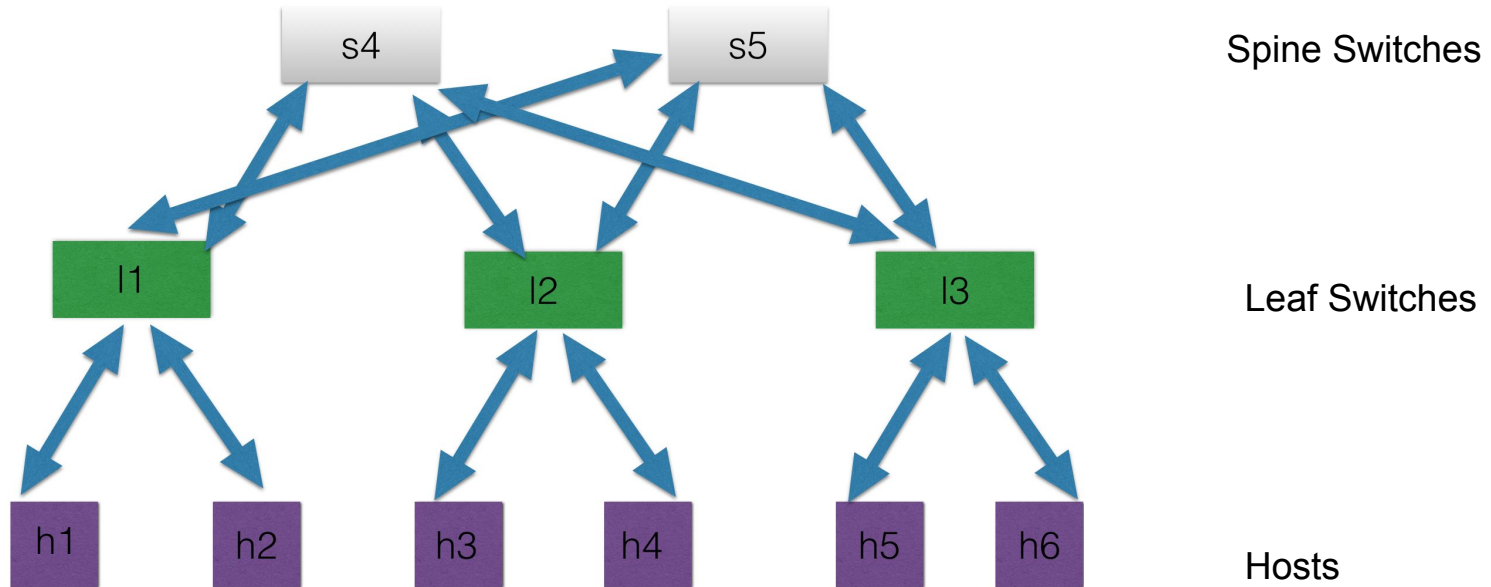
Leaf Spine Topology



Leaf Spine Topology

- Default Controller will not work
- Pingall will FAIL
- Forwarding Loops exist

Leaf Spine Topology

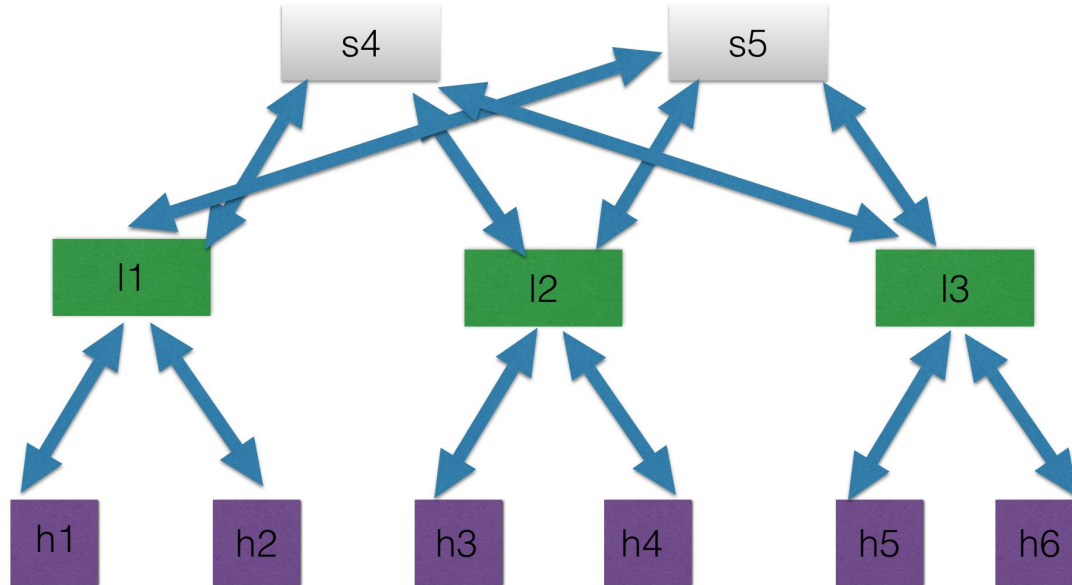


ARP Responder

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

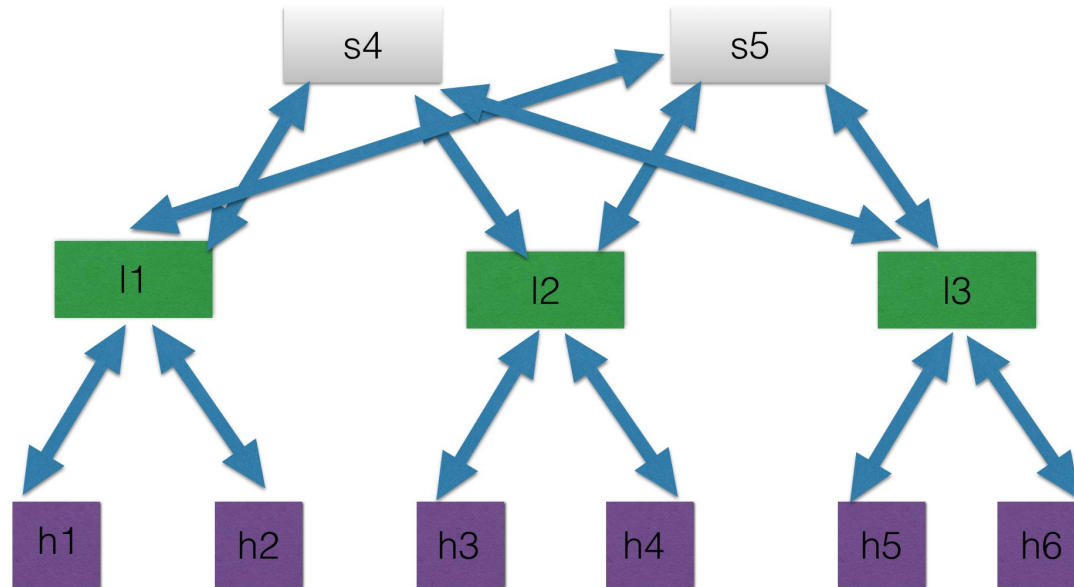
- For checking the ARP responder
- Do pingall
- Each host will have the ARP entries for all other hosts
- Verify using the command “<host> arp -n” (e.g h1 arp -n)
- You will still get 100 % packet loss

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

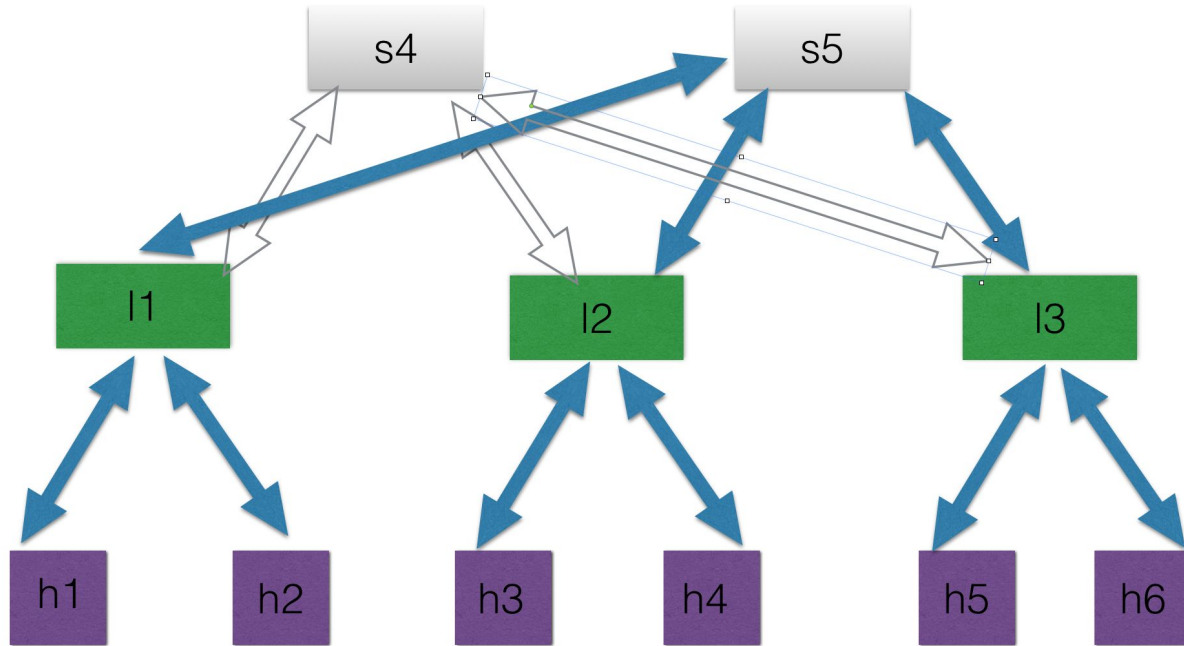
- For verifying the traffic flows
- Pingall should work
- 0% packet drop
- For debugging try pinging individual host (e.g h1 ping h2)

Link Failures

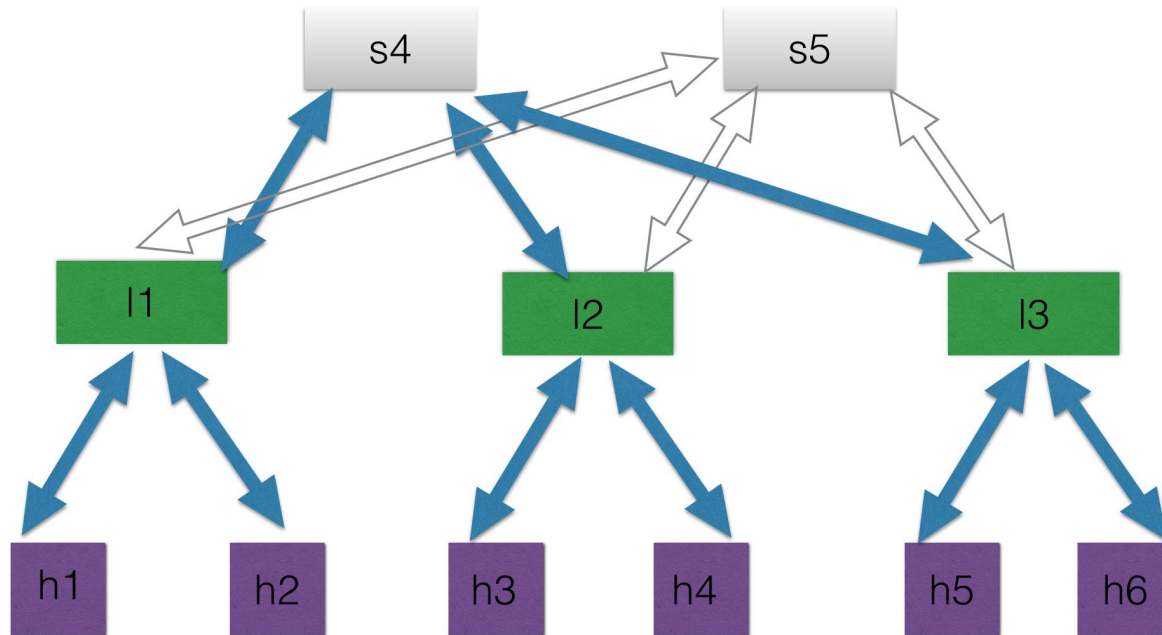
Link Failures

- Common place in real life
- Detection
 - Using built-in mechanisms
- Mitigating Effect
 - Install rules
 - Traffic should not be interrupted

Link Failures



Link Failures



Link Failures

- For failing links (for switch s4)
 - link s4 I1 down
 - link s4 I2 down
 - link s4 I3 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