CS 640 Introduction to Computer Networks
Lab 4 Overview

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Due: Tuesday Nov 30 2021 11:59PM

Course Instructor

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WF 1:00PM - 2:00PM
or by appointment

Agenda

1. Objectives
2. Implementation
3. Grading Rubrics

Objectives

1. Contrast SDN applications and traditional network control planes

2. Create SDN applications that use proactive or reactive flow installation

   1. Layer-3 Routing Application

   2. Distributed Load Balancer Application

Implementation

1. ## Setup
   1. Install the required packages.
   2. Download, Install and Patch floodlight-plus package.
   3. Build and run FloodlightWithApps.jar with provided prop file as args.
   4. Start mininet for a specific topology
   5. Test the setup on a provided topology by pinging two hosts.

2. ## Code
   1. In Part 2 – Modify `L3Routing.java` in `` `edu.wisc.cs.sdn.apps.l3routing` ``
   2. In Part 3 – Modify `LoadBalancer.java` in 'edu.wisc.cs.sdn.apps.loadbalancer'

3. ## Test
   1. Use the provided topologies to test your implementation (See Rubric)
   2. Test L3 Routing after implementing Load Balancer
      - Due to some unknown issues in floodlight-plus, Hosts in L3 Routing do not get added without the Load Balancer.

Grading Rubrics (Layer 3 Routing)

SI No	Test case	Points	Topo
1	Flow entries for each host matches host's IP	3	single,3
2	Flow entries have correct timeout	3	single,3
3	Packets are forwarded between hosts on the same switch	3	single,3
4	Flow entries are sent to other switch to reach host on other switch	3	linear,2
5	Packets are forwarded between hosts on two different switches	3	linear,2
6	Packets are forwarded between hosts on many different switches	3	linear,5
7	Shortest-paths are computed correctly in a network with loops	3	someloops
8	Paths are recomputed when link goes down	3	someloops
9	Paths are recomputed when link comes up	3	someloops
10	Paths are recomputed correctly when link goes up and/or down	3	someloops
11	Shortest-paths are computed correctly in a mesh	3	mesh,5

Grading Rubrics (Load Balancing)

SI No	Test case	Points	Topo
12	Every switch has rules to send all other packets to next table	3	triangle
13	Every switch has rules to send TCP packets for virtual IP to controller	3	triangle
14	Every switch has rules to send ARP requests for virtual IP to controller	3	triangle
15	Pingall success for load balancer	3	triangle
16	Rules have idle timeout = 20s	3	single,6
17	SYN for virtual IP results in correct rule for packets from client	3	single,6
18	SYN for virtual IP results in correct rule for packets from server	3	single,6
19	Connections are round-robined between hosts to test load balancing	6	single,6

Keep the Rubric handy during implementation.

Thank You

Use Piazza or Office Hours for any doubts