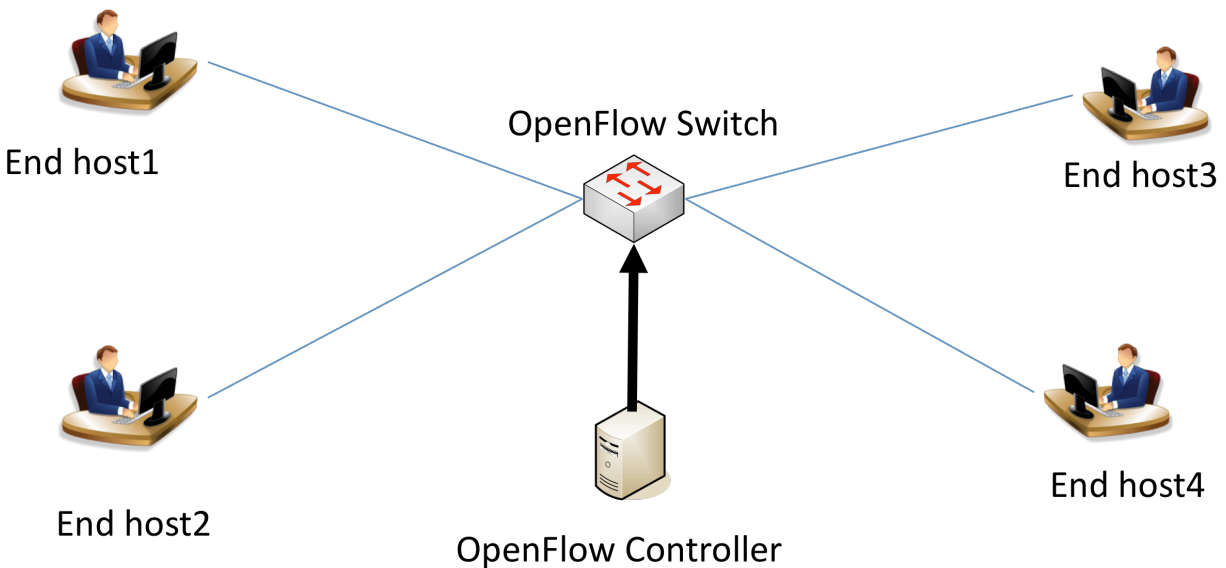


CS 838: Rethinking the Internet Architecture
Assignment 1: Introduction to OpenFlow

GOAL: In this assignment, students will familiarize themselves with the basic concepts of OpenFlow. Students will learn to set up controllers, associate switches, use components, as well as develop components. The assignment is composed of two parts, the first part is due Friday September 18 and the second part is due Friday September 24.

PART 1 [DUE September 18, 2009]

The first part of this assignment involves setting up a simple topology with 4 end hosts, 1 OpenFlow switch and 1 controller. Below in the FAQ there are links to instructions for setting up Nox and for configuring a virtual test bed.



Once the topology is setup, the student will modify the switch or the pyswitch component and enhance it to filter/restrict communication between two end hosts – the specific end hosts to filter will be provided via an input file.

Each line in the input file will have one of the two formats:

IP1 IP2

Or

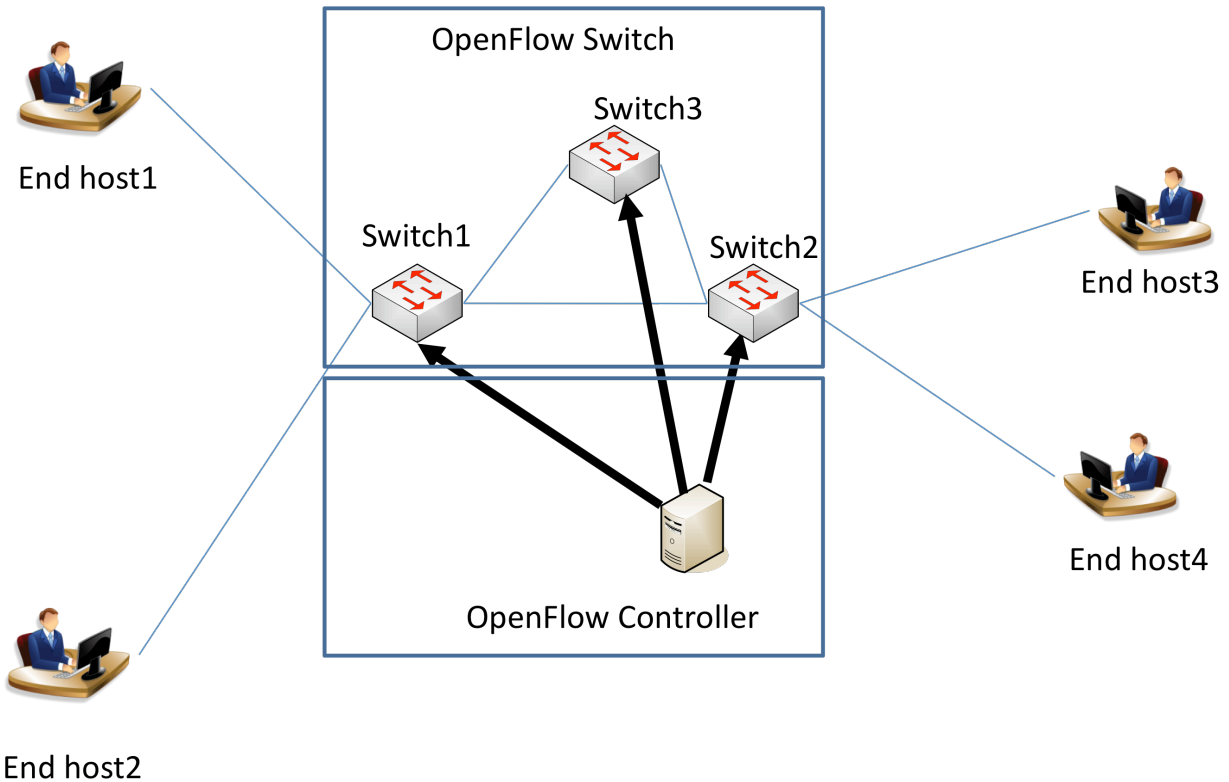
IP3

Where IP1 is the IP address for endhost1, IP2 is the IP address for end host 2 and finally IP3 is the IP address for endhost3.

Each line will contain either two IP addresses or one IP address, in host address format. If the line has two IP addresses, then the user's controller should restrict communication between the pair, however, if only one IP address then all communications to and from that address should be

dropped. When a line has only one IP address, the controller should (at startup), preload the switch with the appropriate flow entries to deny traffic to and from that address.

PART 2 [DUE September 25, 2009]



In the next portion of this assignment, students will implement more complex policies. The policy implemented in this section requires that traffic to or from certain end hosts need to go through a particular switch. For example traffic from Endhost1 to Endhost4 may be required to traverse switch3 despite the fact that this would result in a longer path. The default paths for all flows will be the shortest path unless otherwise specified. The user will be provided an input file, specifying which flows need to traverse a particular switch. Each line in the input file will have the following format:

```
IP1 SWITCH1
```

Where IP1 is the address for Endhost1 and SWITCH1 is the identifier for switch 1. This line states that all traffic from IP1 must go through switch1. Note, traffic to IP1 still uses the default path.

Frequently Asked Questions.

How do I test my controller?

To test your controller, you can send ping message between the end host. This will force the switch to request flow entries from the controller.

How do I view the flow table for my switch?

To look at the flow entries in the switch, in the OpenFlow terminal you can enter the following command:

```
./dpctl dump-flows nl:<datapath>
```

For example:

```
./dpctl dump-flows nl:0
```

How do I find out the name of the input files?

The names of the input files will be provided to your component through the configuration file for the component. You merely need to iterate and search the configuration for the argument called "topologyfile.txt".

How do I turn in my assignment?

To turn in your assignments copy your files into your handin directory using the commands below.

```
cp <FILE_NAME> /p/course/cs838-2/handin/<THEIR_CS_ACCOUNT_NAME>/In
```

Any other questions?

Questions should be posted as comments to the wiki. We will post replies to the wiki in a timely fashion. Please check the contents of the wiki before posting new questions.

Are there any helpful Links?

Nox Home Page [<http://noxrepo.org/wp/>]

Nox Installation [<http://noxrepo.org/manual/installation.html>]

VM Environment Setup[<http://pages.cs.wisc.edu/~akella/CS838/F09/ExperimentSetup.pdf>]

Editing Topology File [<http://pages.cs.wisc.edu/~akella/CS838/F09/EditTopology.pdf>]