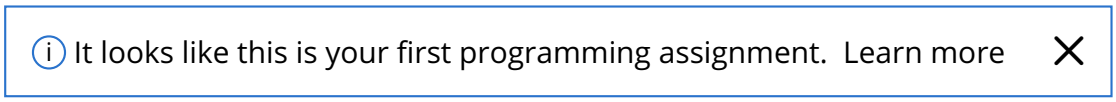
Programming Assignment: Programming Assignment 2 Submission

You have not submitted. You must earn 7/10 points to pass.



Deadline Pass this assignment by January 22, 11:59 PM PST

Instructions

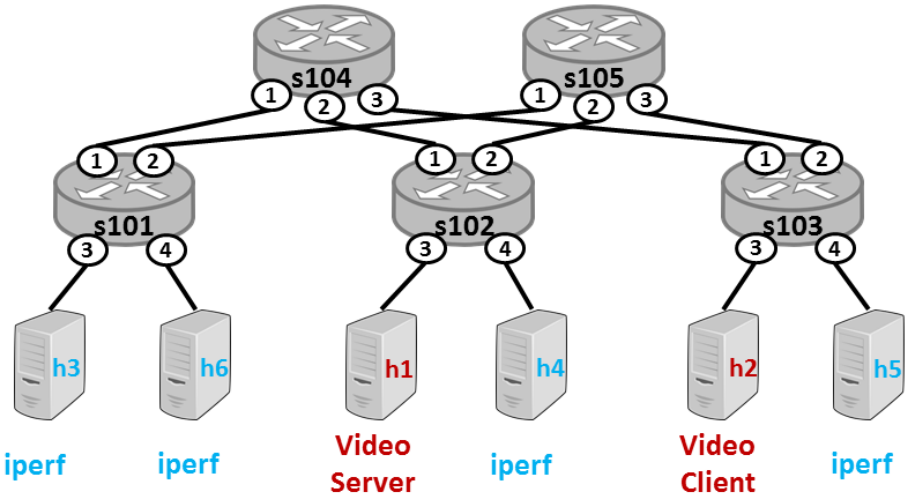
My submission

Discussions

Overview

Now that you have seen the impact of poor routing policies on application performance, your next step as network operator will be to quantify the problem by implementing a bandwidth monitor. To do this, you will extend our Ryu controller application to collect bandwidth information from the switches. Ryu and SDN switches support *port statistics requests*. This allows the controller application to query switches about the number of bytes, packets, and errors for each port (physical or virtual) on the switch.

We will be using the same topology and tenant placement as the previous assignment, shown below.



In this assignment, you will add code to the file *~/cloudnetmooc/minidc/controller/bwmon.py*. This file contains the code to issue a port statistics request to each switch in the network. Each switch responds asynchronously with a packet containing the statistics for each of its ports. Remember, each port is connected to a device on the network, such as a host or another network.

All the code for issuing port statistics requests is provided for you. You will add a small amount of code to handle the reply. In particular, you will extend the function *statsReplyHandler()* in the file *bwmon.py*. This function is invoked each time the controller receives a port statistics reply from a switch. The reply contains a list of statistics for each port. Your code should determine which host is associated with port in the reply and update the bandwidth usage for that host. Useful API functions are detailed in the source file and comments. Your solution should not require any code outside the function *statsReplyHandler()*. Hint: you only want to examine entries in the statistics list for physical ports, not virtual ports. You can filter out virtual ports by checking if the port has an entry in the list *self.topo.ports[switchName].keys()* for a switch *switchName*.

If coded correctly, you should see bandwidth statistics reported to the dashboard at *http://127.0.0.1*. (Note: this page is only accessible when the script *mdc* is running.) You will also see bandwidth usage statistics (grouped by tenant) printed to the terminal executing Ryu.

Instructions

To validate your code, open two terminals in the VM and perform the following steps:

1. In terminal 1, cd to *~/cloudnetmooc* and run: *sudo ./mdc --vid*

2. In terminal 2, cd to *~/cloudnetmooc/minidc/controller*

- Start Ryu: *ryu-manager controller.py.*
- The default (naive) routing policy will be loaded automatically.

3. Now that Ryu has started, press <enter> in **terminal 1.**

- A Chrome window will pop up, press play to start the video.
- Observe the video quality is poor and plays only in low quality. The video may even pause to buffer.

4. Open a new, different instance of Chrome from the menu bar or Desktop.

- Load the dashboard by navigating to http://127.0.0.1.
- Observe that the graphs now report data, including bandwidth usage for each host and tenant. **Note:** opening a new window from the video player using Ctrl-N will open a sandboxed instance that does not have access to the dashboard.

5. End the experiment:

- In terminal 1, type *exit<enter>* (**do not** Ctrl-c to exit, this will interrupt the teardown process. If you accidentally Ctrl-c and interrupt the process, run *sudo mn -c*).
- In terminal 2, Ctrl-c to stop Ryu.

Expected Result

If your code is working properly, you should see bandwidth data for each host and tenant in the dashboard at http://127.0.0.1.

What to Submit

Submit the file *bwmon.py* containing your changes. Remember: your solution should be contained within the function *statsReplyHandler()*.

How to submit

When you're ready to submit, you can upload files for each part of the assignment on the "My submission" tab.