GENI Desktop Tutorial (Summer Camp 2015 UConn)

1. Introduction

This tutorial consists of three parts:

- Basic GENI Desktop Operations
- Brief Introduction to OpenFlow
- Flow Installation and Monitoring in the GENI Desktop

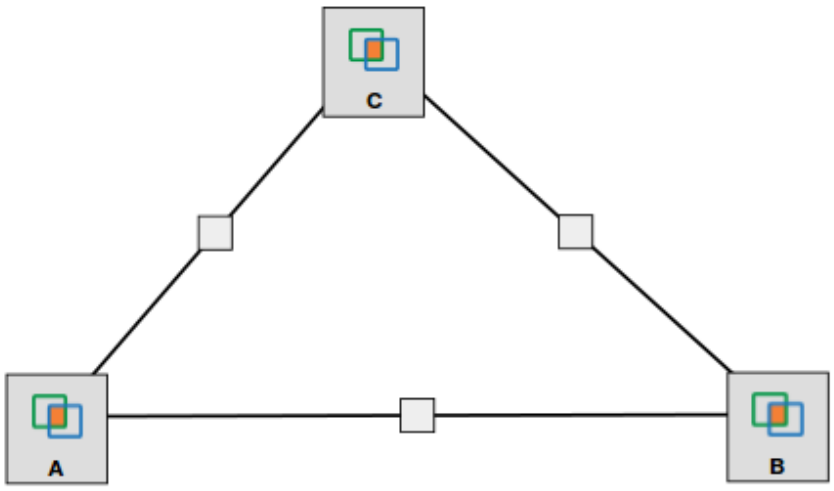
Important URLs

To use the GENI Desktop, go to	https://genidesktop.netlab.uky.edu
A general tutorial for the GENI Desktop	http://groups.geni.net/geni/wiki/GENIExperimenter/Tutorials/GENIDesktop
This page is located at	http://groups.geni.net/geni/wiki/GeniDesktop/Summer_Camp_2015

2. Basic GENI Desktop Operations

Part I: Setup

- Follow the instructions of the general tutorial for the GENI Desktop to create a topology with three Xen nodes as shown below.



Part II: Execute

- Step 1: Copy a file to selected nodes.
  - Download these two files (attachment:runs, attachment:runc) to a local directory.
  - Click on "File Upload" module
  - Click on "Browse" on the upright part of the window. Select both files you downloaded (runs, runc)
  - Click on "Upload Files to GENI Cloud"
  - Highlight two nodes (A and B) in the topology window (click, then shift-click)
  - Click on "Set Selected Nodes"
  - Click on "Distribute" (The process is done when two green bars show up and then disappear)
  - Close the window for file upload

- Step 2: Run a command on the selected nodes.
  - Click on "Command" module
  - Highlight all three nodes (A, B, and C)
  - Click on "Set Selection"
  - Type "sudo apt-get install iperf" in the text box.
  - Click on "Run Command" (The process is finished when green check marks appear)
  - Close the window for run command

- Step 3: Monitor the traffic of the selected interface.
  - Click on "Passive Graphs" module
  - From the drop-down menu for "Nodes", pick "B"
  - From the drop-down menu for "Graphs", pick "IP Traffic" and "TCP Graph"
  - Click on "LiveUpdate?" to make it "LiveUpdate?(On)"
  - Click on "ApplyConfig?"
  - Scroll to show the traffic figures (IP and/or TCP)
  - Leave the traffic window there (Do not close it)

- Step 4: Login by ssh to the selected nodes.
  - Highlight node B
  - Click on "SSH" module
  - Click on "Open Browser SSH"
  - Make sure file "runs" is there. Then type "sh runs".
  - Go back to GENI Desktop Tab/Window?
  - Make sure the information window is open.
  - Mouse over the link connecting nodes A and B, and write down the IP address of B.
  - Highlight node A
  - Click on "SSH" module
  - Click on "Open Browser SSH"
  - Edit file "runc" and replace "IPaddr" with the IP address of B.
  - Type "sh runc" to run the script
  - Go back to GENI Desktop Tab/Window?. Observe the traffic window.
  - You can go to the tab/window for A and type "sh runc" multiple times. See what happens in the traffic window.

Part III: Finish

- Tear down experiment

3. Introduction to OpenFlow

A brief introduction to OpenFlow can be found here.

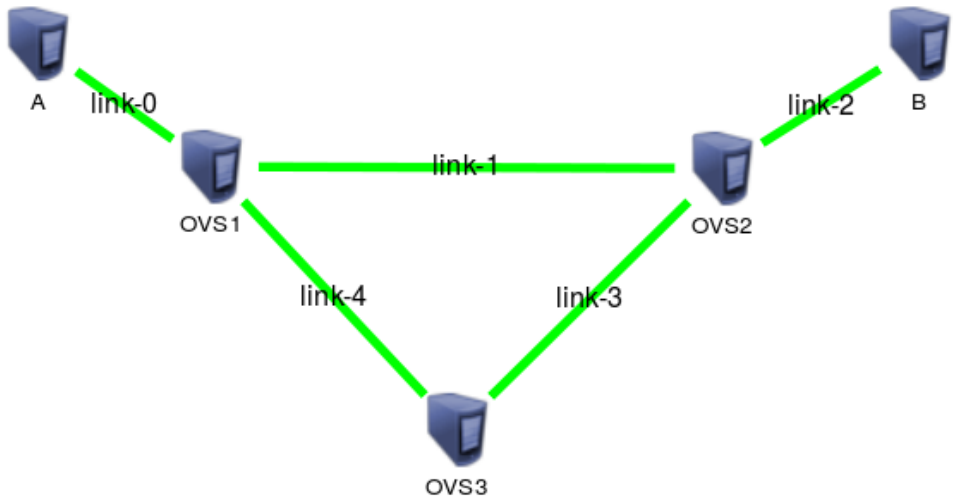
4. Flow Installation and Monitoring

To use these functions, go to the new URL at http://genidesktop.netlab.uky.edu/wild

Part I: Setup

Create two slices, one for the controller and one for an experiment using OVS nodes.

- Step 1: Create the controller slice
  - Drag one "AAG Ctrl" node to the canvas.
  - Click on the node
  - Check "Publicly Routable IP" box for the controller node.
  - You may change the name of the node.
  - Click on "Site X" where X is a number. Choose any InstaGENI rack from the drop-down menu for Aggregate.
  - Click on "Allocate resources using this RSPEC"
- Step 2: Create the experiment slice with a topology consisting of of three OVS nodes and two Xen nodes as shown below.
  - Drag "GD OVS" icon node to the canvas for the three OVS nodes.
  - Drag "Xen VM" node to the canvas for the two hosts.
  - Click on "Site X" to select an aggregate as above.
  - Allocate the resources.



Part II: Execute

- Step 1: Figure out the public IP address of the controller after the controller slice is

created. You can do "nslookup full_name_of_the_node" on a Linux terminal. Or you can follow these steps.
    - Highlight the controller node.
    - Click on "Command" module.
    - Click on "set selection"
    - Type "ifconfig eth0" in the text box and click on "Run Command"
    - Write down the IP address of the controller.
    - You may test the controller's web GUI by going to http://IP_address:8080/ (use admin and admin)

- Step 2: Run an initialization script on all OVS nodes in the experiment.
    - Open up the slice containing the topology.
    - Click on the "Command" module.
    - Highlight all OVS nodes and click on the "Set Selection" button.
    - Type the following command in the text box "sudo python /local/ovscmd.py -i IP_address", where IP_address is the controller's IP address you found in Step 1.
    - Login to the controller's web GUI by going to http://IP_address:8080/ and check all OVS nodes were added.

- Step 3: Install, list, and delete flows on the experiment
    - Click on "Flow Install" Module. Fill in the IP address of the controller.
    - Check "Add ARP processing", "Add Subnet Gateways", and "No routing rules", then click on "Initialize".
    - Select a path in the topology and highlight both nodes and links on the path.
    - Fill in the form to set the flow. You can choose between TCP and UDP, between one-way or two-way paths, and the port numbers at the nodes. The selection between "Src" and "Dst" is only effective for one-way path.
    - Click on "Install Flow".
    - You can also try "Refresh List" to list the current flows or "Delete Flow" to delete a flow from the list.

- Step 4: Monitor per-flow performance
    - Click on "Flow Monitor" module. Fill in the IP address of the controller.
    - Check "All Nodes" and click on "Query Statistics".
    - Choose a flow to monitor at a selected node by going to a node and finding the flow you want to monitor. Then click on "Packets" or "Bytes". A graph of live measurement will show.
    - Send traffic (ping, iperf, nc, etc) from end host A to end host B in the experiment.

Part III: Finish

- Tear down experiment

Attachments

- runs (32 bytes) - added by *fei@netlab.uky.edu* 42 hours ago. “run iperf server”
- runc (37 bytes) - added by *fei@netlab.uky.edu* 42 hours ago. “run iperf client”
- basic_topo3.png (8.7 KB) - added by *fei@netlab.uky.edu* 18 hours ago.
- aag_topo3.png (25.8 KB) - added by *fei@netlab.uky.edu* 18 hours ago.