

# Using Flash Interface to Allocate BGP-Mux Resources

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## 1 Introduction

This note documents the use of Flash Interface to Allocate BGP-Mux resources to experiments running in Emulab and ProtoGENI facilities. BGP-Mux [2] is a device which allows researchers to connect transparently to Internet using BGP protocol. Researchers can then participate in the Internet routing and conduct routing experiments, without affecting the Internet's stability. BGP-Mux devices are deployed in Atlanta, Madison, and Princeton.

Emulab and ProtoGENI [1] are public network experimentation facilities, which allow researchers to instantiate virtual network topologies over a physical infrastructure. Researchers define the virtual network topologies using a Flash Interface, implemented by ProtoGENI developers. Today, it is also possible to use Flash Interface to define inter-domain routing connection through BGP-Mux.

## 2 Prerequisites

Before a researcher can use Flash Interface to allocate Emulab, ProtoGENI, and BGP-Mux resources, she must obtain access to Emulab facility at <http://www.emulab.net>. Using the web interface the researcher must generate SSL keys and load them into their preferred Web browser as described in <http://www.protogeni.net/trac/protogeni/wiki/FlashClientSetup>.

## 3 Allocating BGP-Mux Resources

**High level overview.** Allocating BGP-Mux resources consists of two major steps: 1) specifying a topology in Flash Interface, and 2) sending the topology information to BGP-Mux aggregate administrator. During the first step, when the topology is specified, Flash Interface contacts Emulab/ProtoGENI aggregate manager and instantiates topology nodes and links. Each node in the topology automatically downloads BGP-Mux client software from BGP-Mux



Figure 1: Login screen.

aggregate manager. BGP-Mux client software periodically contacts BGP-Mux aggregate manager to try to retrieve inter-domain routing configuration. After the second step, when topology information reaches BGP-Mux aggregate administrator, BGP-Mux devices configure necessary links to Emulab nodes and supply configuration to them.

### 3.1 Specifying a topology

1. Log into the customized Flash Interface using the following URL: <https://boss.emulab.net/protogeni-demo-valas.swf>. The Flash Interface will be shown as in Figure 1. For login to be successful you must have your SSL keys installed as described in Section 2.
2. Wait until Emulab and ProtoGENI resources are discovered. From a drop down menu on the upper left, select “Emulab”, as shown in Figure 2. From the list on the left, select the nodes in the topology (*e.g.*, “pc1”, “pc2”). Place the nodes in the center area and connect them in the topology you prefer.
3. From a drop down menu on the upper left, select “GaTech”, as shown

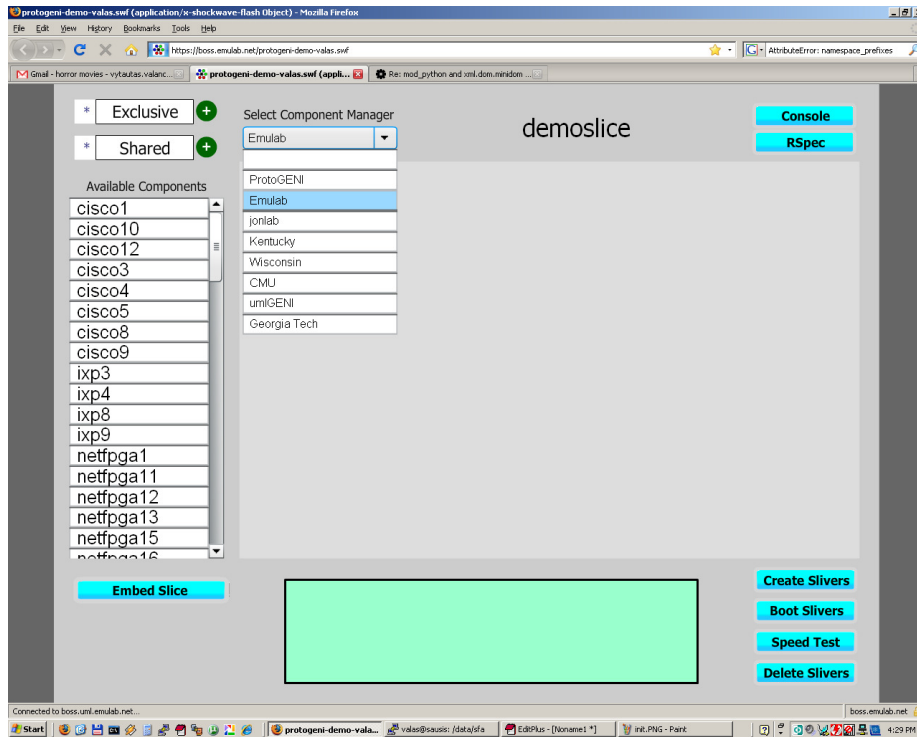


Figure 2: Selecting Emulab resources.

in Figure 3. Pick Atlanta\_Mux and/or Madison\_Mux nodes and place them in the center area. Connect the BGP-Mux nodes to the Emulab/ProtoGENI nodes in your topology using links.

4. Instantiate the topology: First, press “Create Slivers” button, then, after slivers are created, press “Boot Slivers” button. The Emulab/ProtoGENI nodes should become green and you should be able to login to your nodes.
5. Click “RSpec” button on upper right corner and save the contents of the resulting window (Figure 4). The XML-formatted topology is used in the next subsection.

### 3.2 Sending topology information to BGP-Mux aggregate administrator.

BGP-Mux aggregate does not implement ProtoGENI API yet, therefore the topology has to be sent to the BGP-Mux aggregate manager manually. Send the XML text from “RSpec” window, described in the subsection before, to email: [valas@gatech.edu](mailto:valas@gatech.edu).

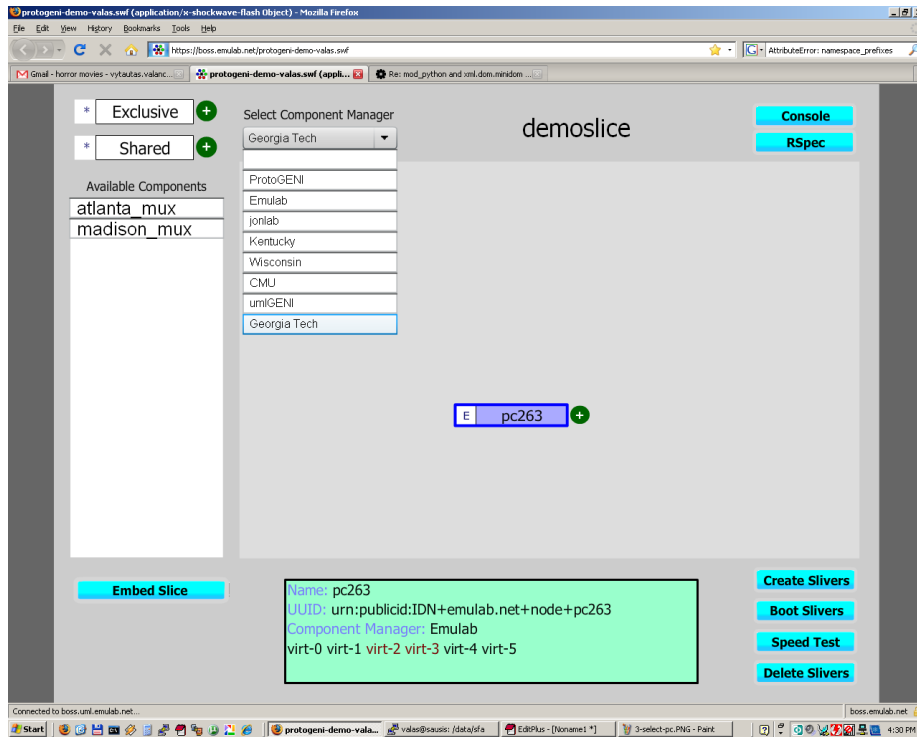


Figure 3: Selecting BGP-Mux resources.

The BGP-Mux aggregate administrator will configure the BGP-Mux Aggregate Manager to bring up links to the Emulab/ProtoGENI nodes. By this time the experiment should be able to use newly acquired BGP-Mux resources.

## References

- [1] ProtoGENI. <http://www.protogeni.net/>, 2009.
- [2] V. Valancius and N. Feamster. Multiplexing BGP Sessions with BGP-Mux. Technical Report number forthcoming, Georgia Tech, Atlanta, GA, Jan. 2008. <http://www.cc.gatech.edu/~feamster/papers/bgpmux-tr.pdf>.

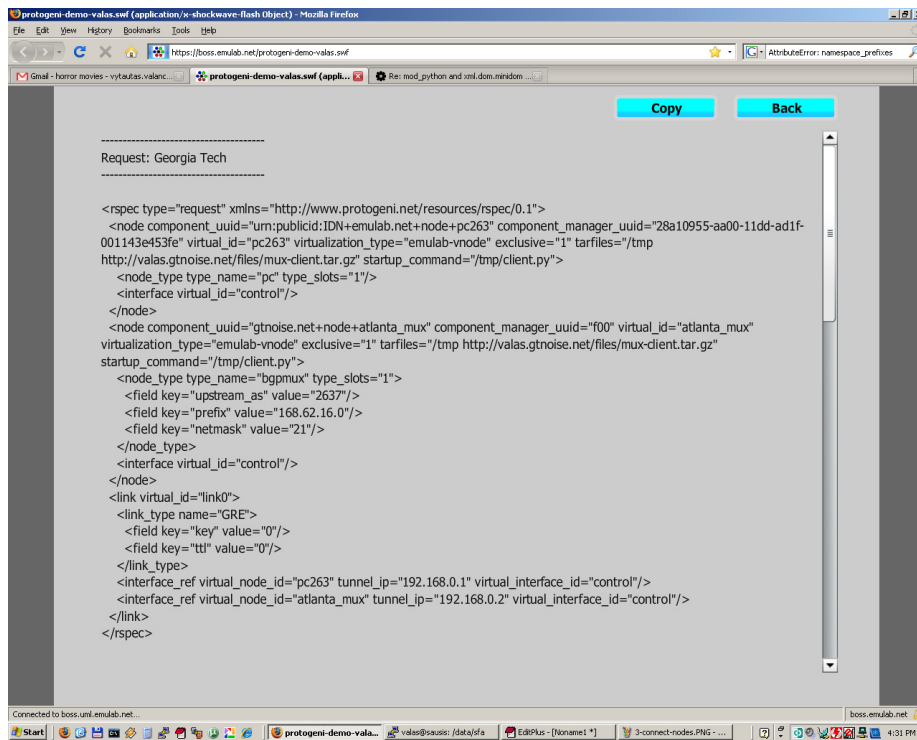


Figure 4: XML-formatted resource specification.