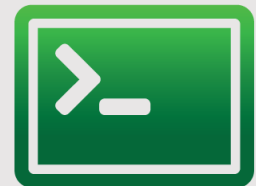


Lab Zero: A First Experiment using GENI and Fed4FIRE



Design/Setup



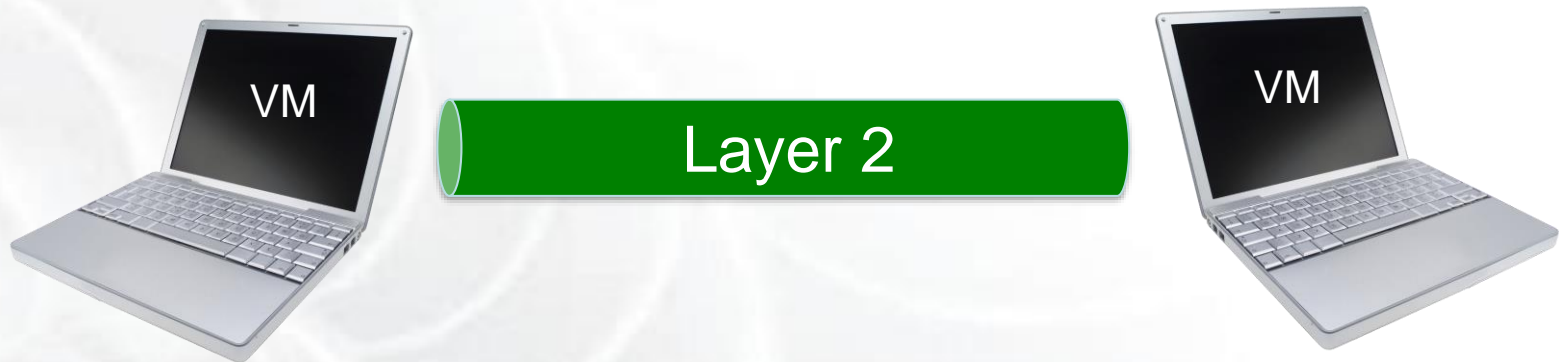
Execute



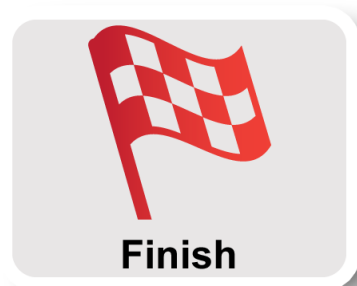
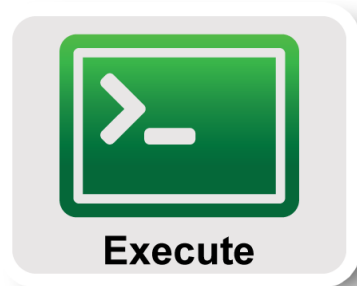
Finish

Do a Simple Experiment

Reserve two VMs/raw PCs connected at Layer 2



Experiment Workflow

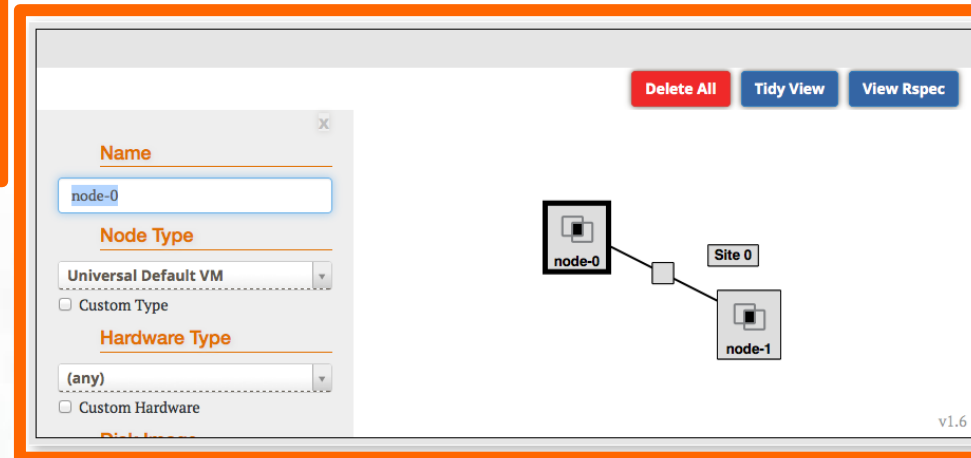
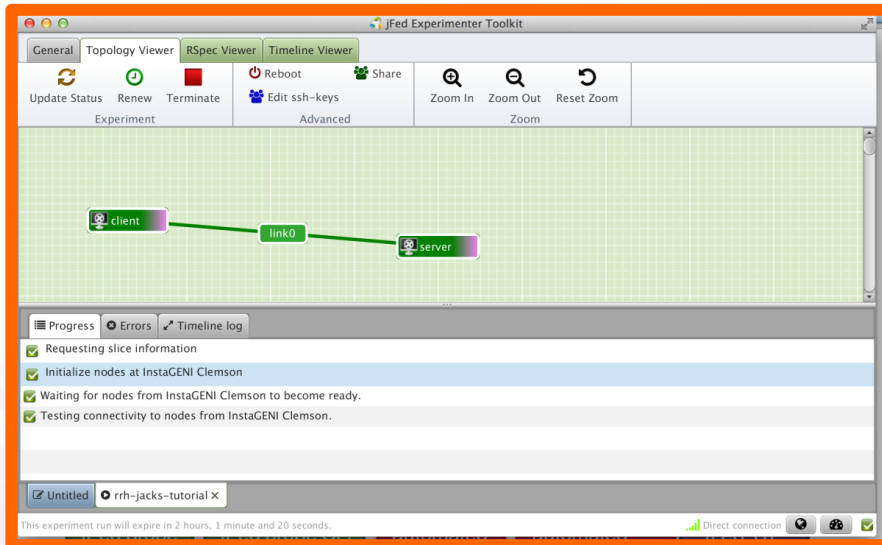


- Part I: Design/Setup

- Part II: Execute

- Part III: Finish

Jacks and jFed are ...



Graphical user interfaces (GUIs) for:

- **designing topologies** in GENI
- **reserving resources** in GENI

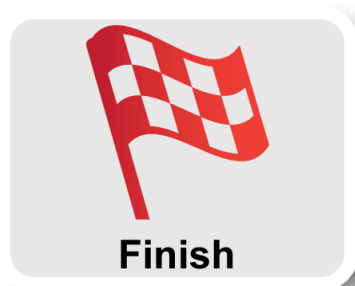
Experiment Workflow



- **Part I: Design/Setup**



- **Part II: Execute**



- **Part III: Finish**

Establish Management Environment

Use GENI

1 Pre-work: Design your experiment

2.1 Pre-work: Create a GENI or Fed4FIRE account

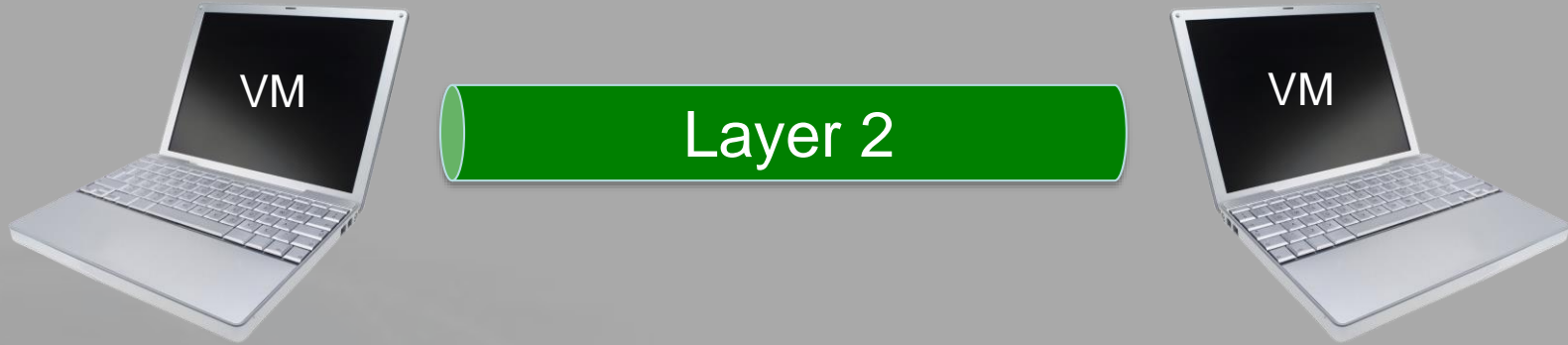
<https://portal.geni.net>

<https://authority.ilabt.iminds.be>

2.2 Pre-work: Join the following projects

Project Name: FGRE16 + ipv6proxy for US FGRE for others

slice



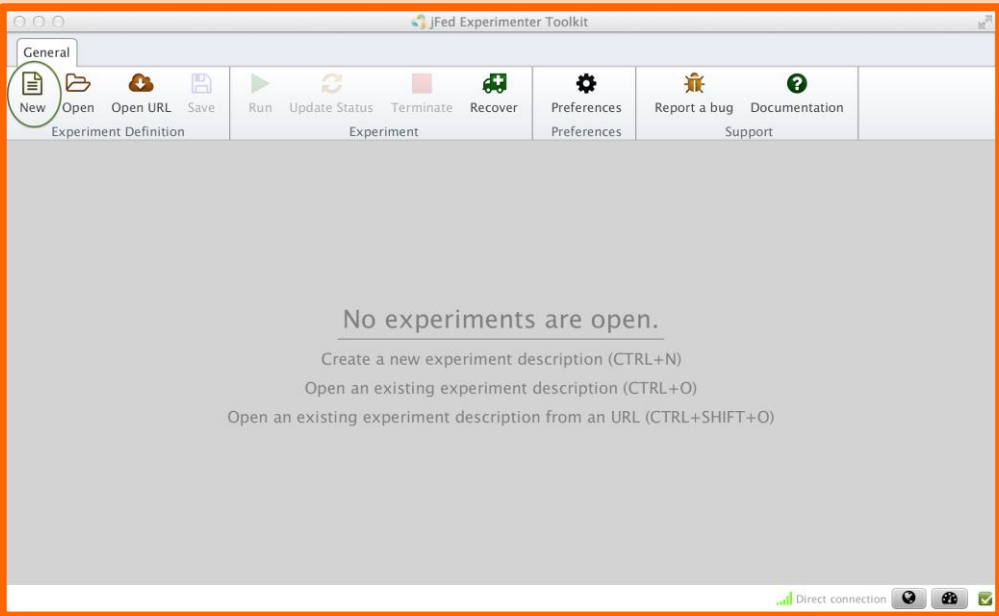
3.1 Create a slice

3.2 (optional) Renew your slice

3.3 Reserve two VMs at one aggregate

3.4 Check Whether VMs are Ready to be Used

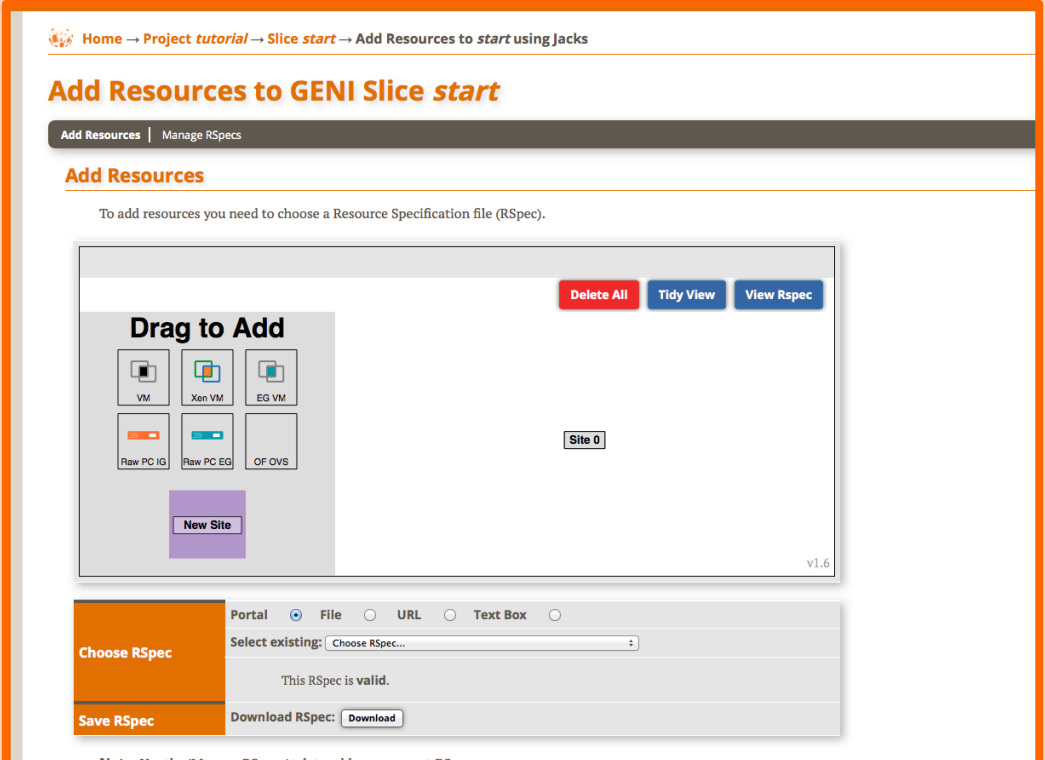
3.3

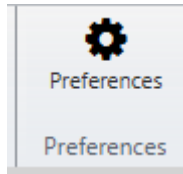


<http://jfed.iminds.be>
5.6.0 release

Launch
Tool

Jacks in
geni portal





Preferences

- General
- PuTTY
- SSH Authentication
- Proxy**
- SCS
- Additional Accounts
- User Details
- Testbed Settings
- Logging

Proxy settings

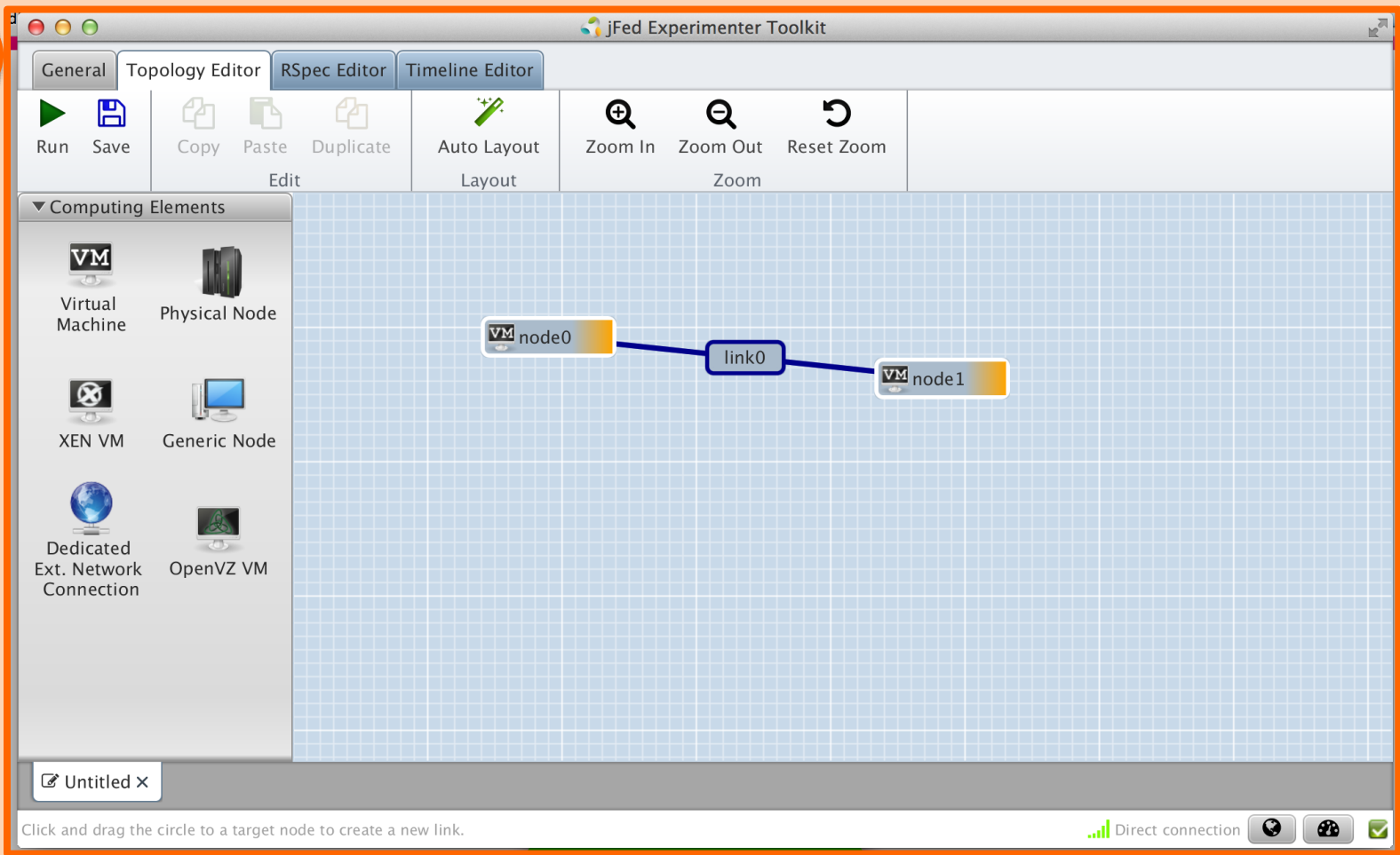
Proxy for jFed: Never Always

Proxy for SSH connections: Never Always

Start the proxy connectivity test to enable proxy support Run Proxy Test

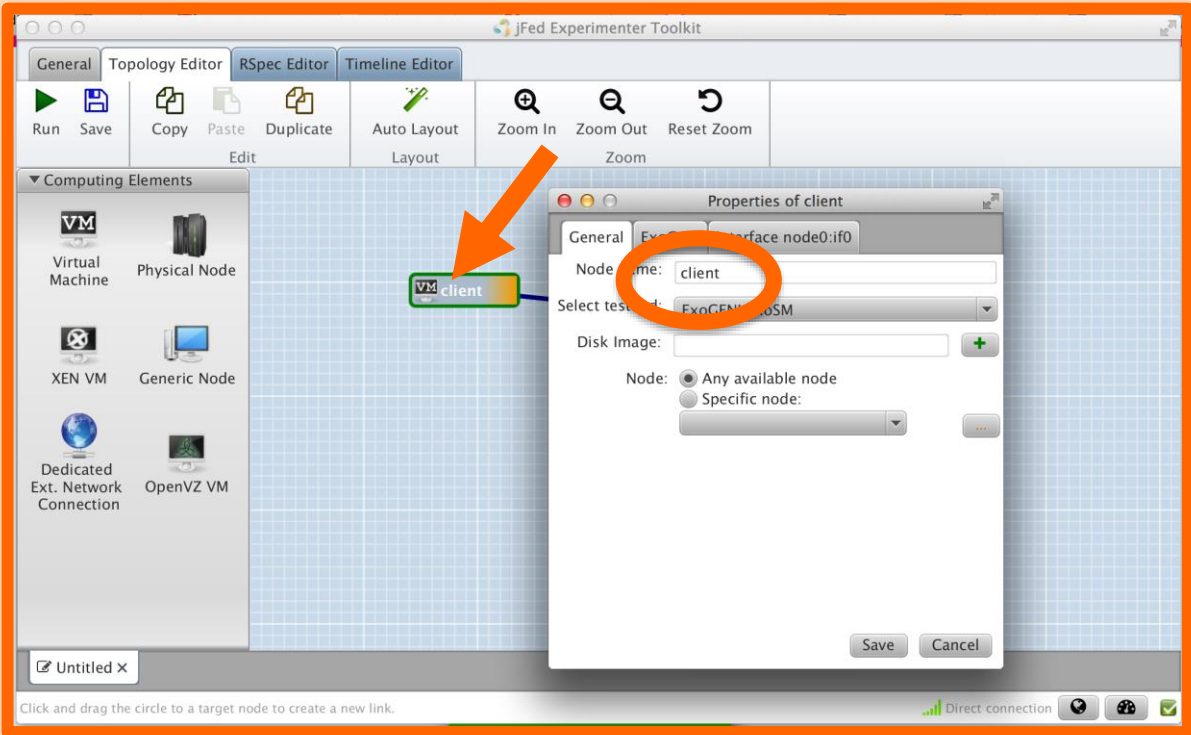
- First click 'Run proxy test', then turn on proxy for SSH connections (to log in with IPv6 from a non IPv6 network)

3.3



Draw two Physical nodes connected by a link

3.3



**Change names
of VMs**

3.3

The screenshot shows a window titled "Properties of link0" with three tabs: "General", "Impairment", and "Link Type". The "General" tab is active. It contains a "Link name:" field with the value "link0". Below it, "Configuration t..." is followed by radio buttons for "Automatic", "IPv4" (which is selected), and "IPv6". A table lists interface configurations:

Interface ID	IP Address	Netmask
node0:if0	10.1.1.1	255.255.255.0
node1:if0	10.1.1.2	255.255.255.0

Below the table is an "IP addresses:" label and a "Save" button next to a "Cancel" button.

Set IP and mask of interfaces

3.3

Reserve resources

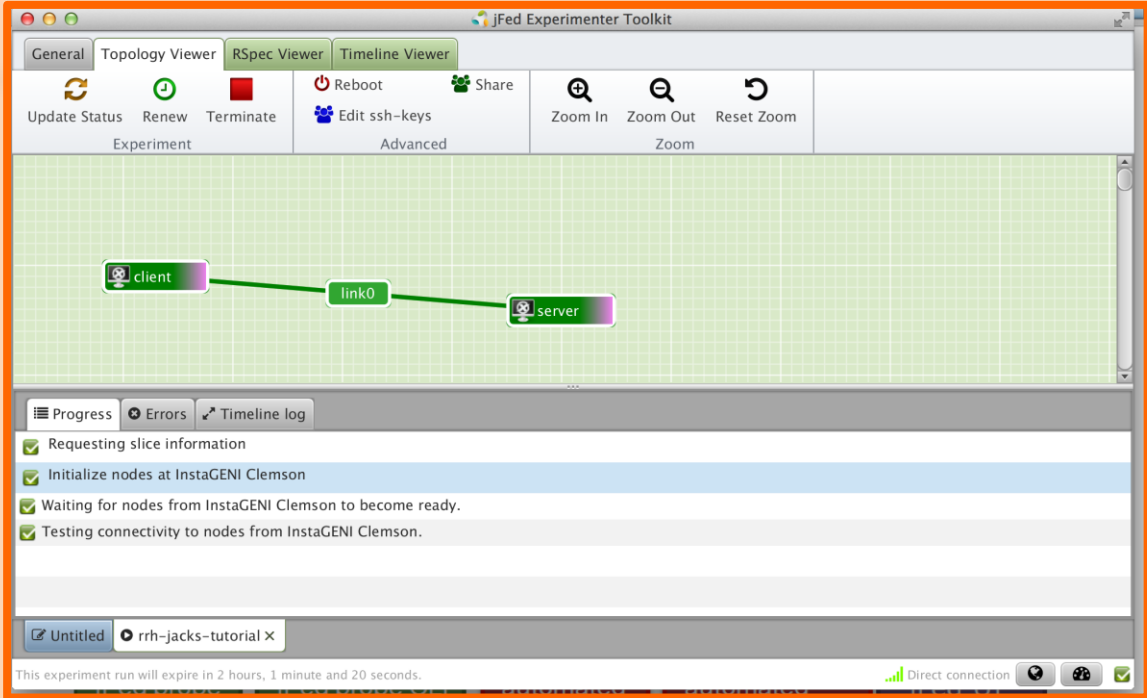
The screenshot shows the software interface with the 'Reserve resources' step. The 'link0' component is highlighted with a blue circle, and an arrow points to the 'link0' component in the diagram. The interface includes a menu bar with 'General', 'Topology Editor', and 'RSpec Editor'. The toolbar contains icons for Run, Save, Copy, Paste, Duplicate, Auto Layout, Zoom In, Zoom Out, and Reset Zoom. The 'Computing Elements' panel on the left lists Virtual Machine, Physical Node, XEN VM, Generic Node, Dedicated Ext. Network Connection, and OpenVZ VM. The main workspace shows a diagram with a 'VM client' node connected to a 'link0' component, which is connected to a 'VM server' node. A status bar at the bottom indicates 'Untitled x' and provides the instruction: 'Click and drag the circle to a target node to create a new link.'



Select a Slice

The screenshot shows the software interface with the 'Select a Slice' step. A dialog box titled 'Start an experiment run' is open, displaying a dropdown menu for 'Slice name' with 'gec21-tools' selected. The dialog box also shows 'Project: CHOCULA' and 'Duration: gec21-tools'. The interface includes a menu bar with 'General', 'Topology Editor', 'RSpec Editor', and 'Topology Editor'. The toolbar contains icons for Run, Save, Copy, Paste, Duplicate, Auto Layout, Zoom In, Zoom Out, and Reset Zoom. The 'Computing Elements' panel on the left lists Virtual Machine, Physical Node, XEN VM, Generic Node, Dedicated Ext. Network Connection, and OpenVZ VM. The main workspace shows the same diagram as the previous step. A status bar at the bottom indicates 'Untitled x' and provides the instruction: 'Click and drag the circle to a target node to create a new link.'

3.4



Resources are READY!!!
Double click a node to open an ssh terminal

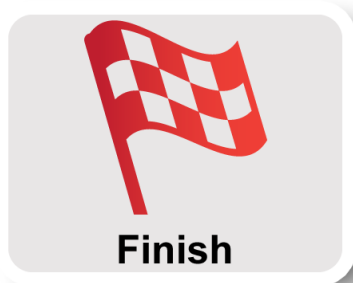
Experiment Workflow



- Part I: Design/Setup



- **Part II: Execute**

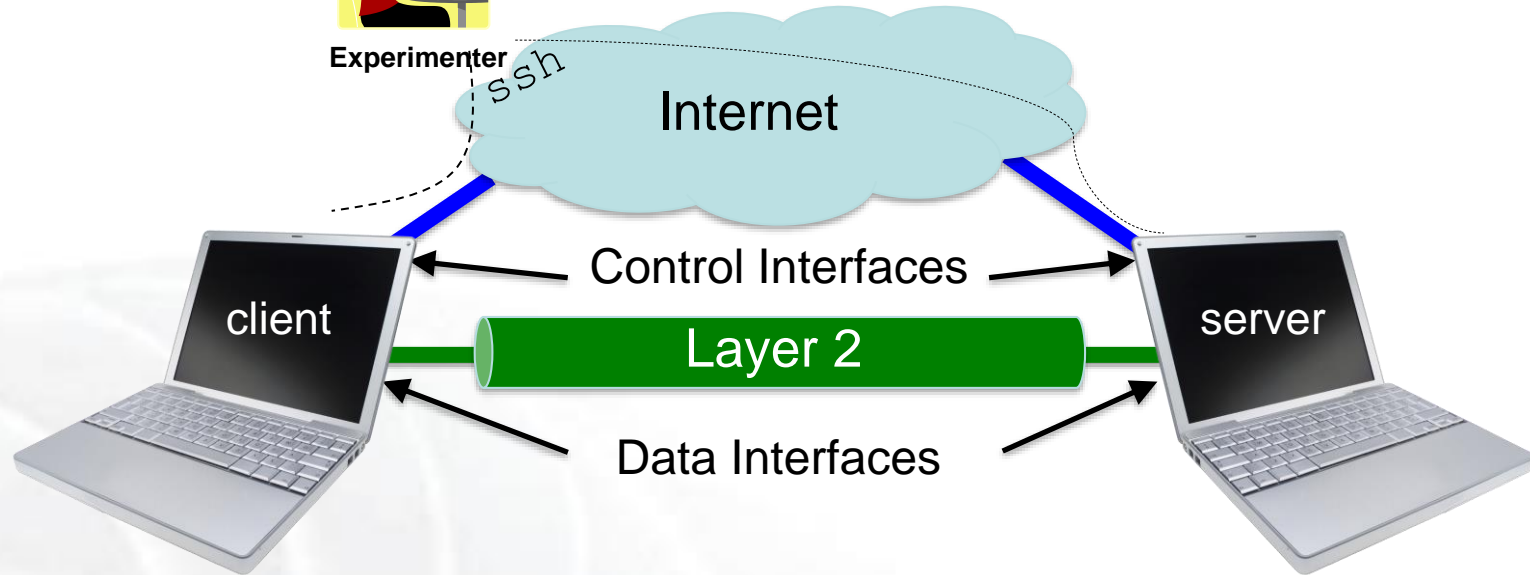


- Part III: Finish

Execute Experiment



Experimenter



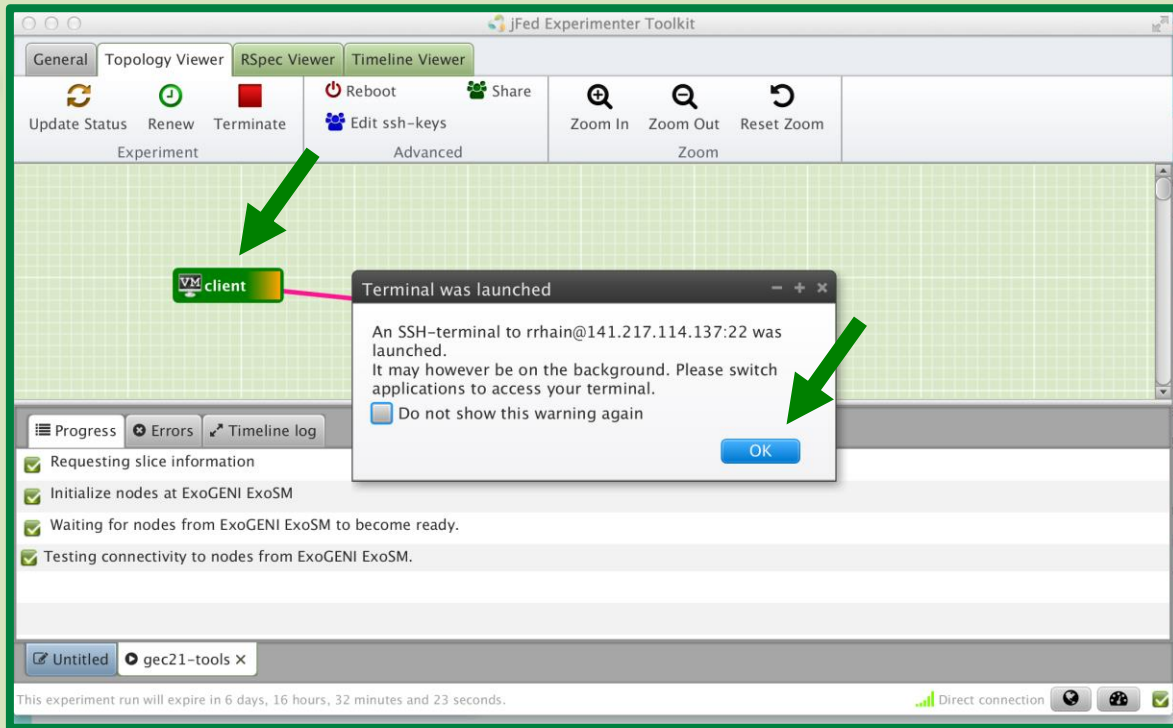
4.1 Login to both nodes (ssh)

5.1 Test Connectivity (ping)

5.2 Explore the Data and Control Planes

6.1 Logout of nodes

4.1



Login by double clicking node

5.1

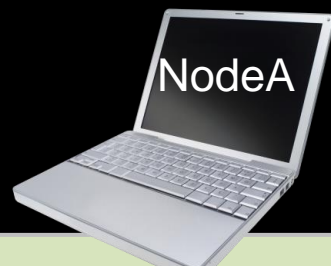
```
$ sudo apt-get install iperf
$ hash
```

```
# server data i/f
$ iperf -c 192.168.1.11
```

...

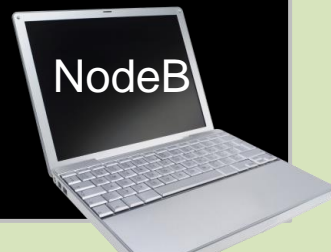
```
# server ctrl i/f
$ iperf -c 172.17.2.4
```

...



```
$ sudo apt-get install iperf
$ hash
```

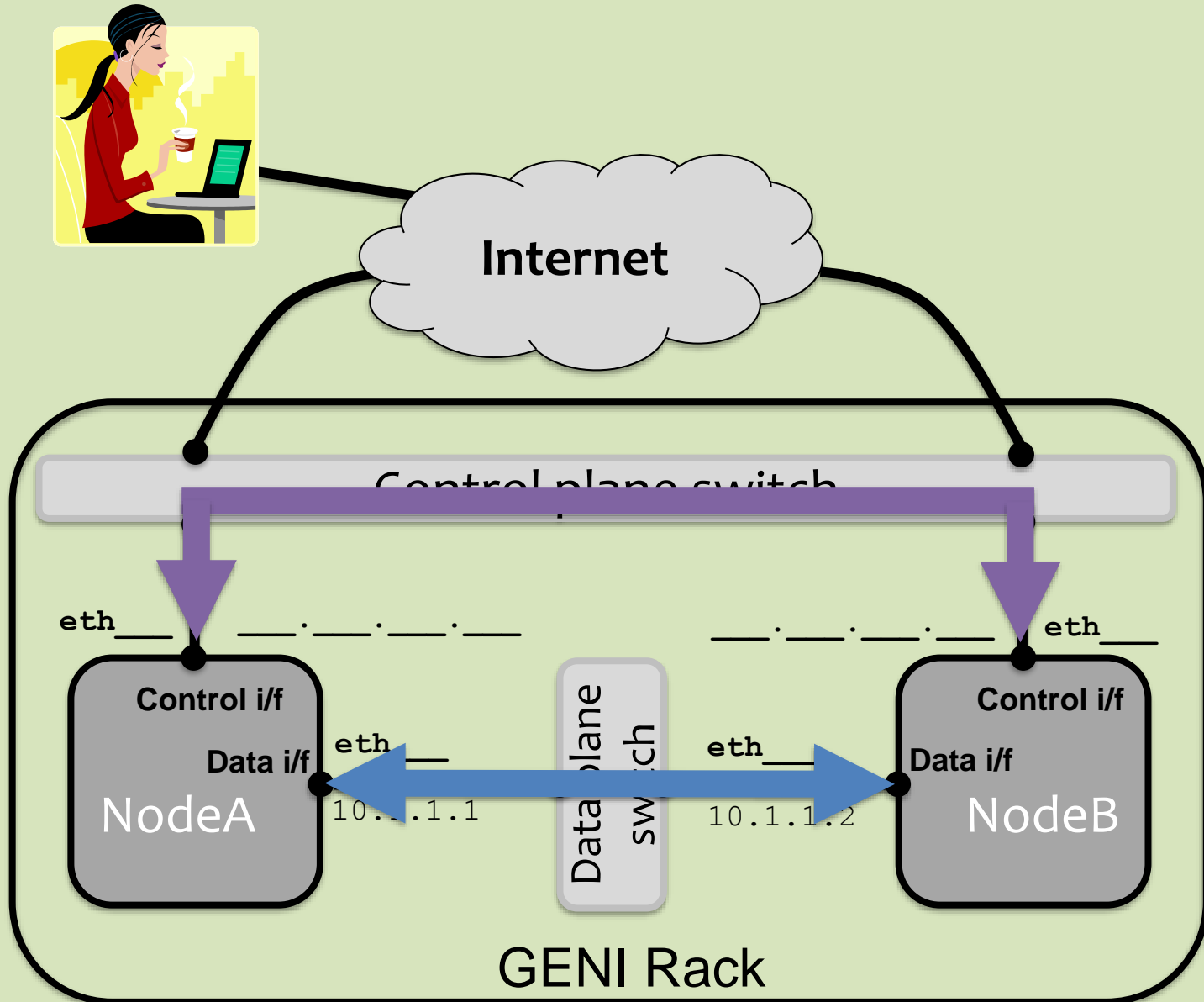
```
# start an iperf server
$ iperf -s
```



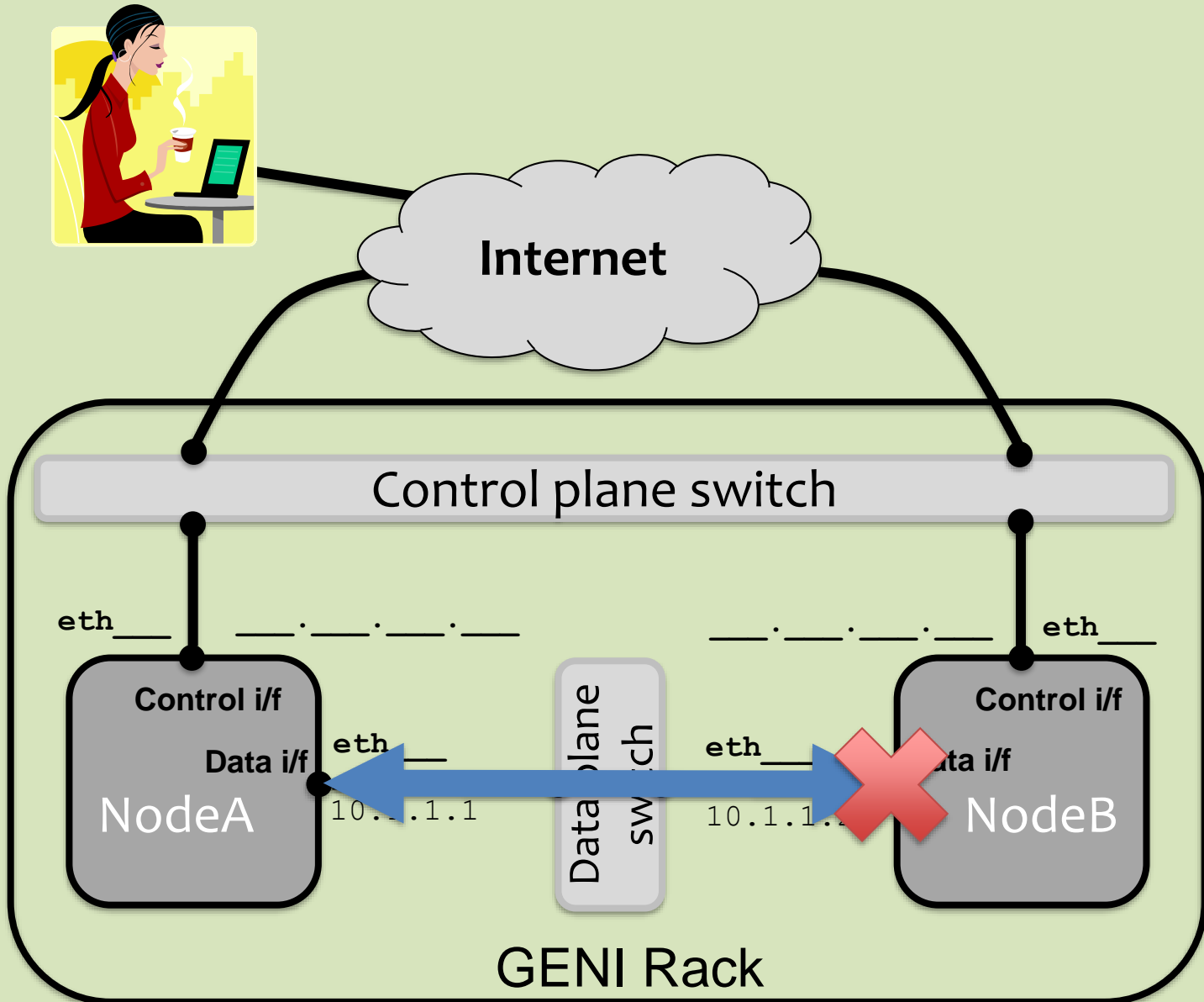
What is the bandwidth of the **data** link? Why?

5.1

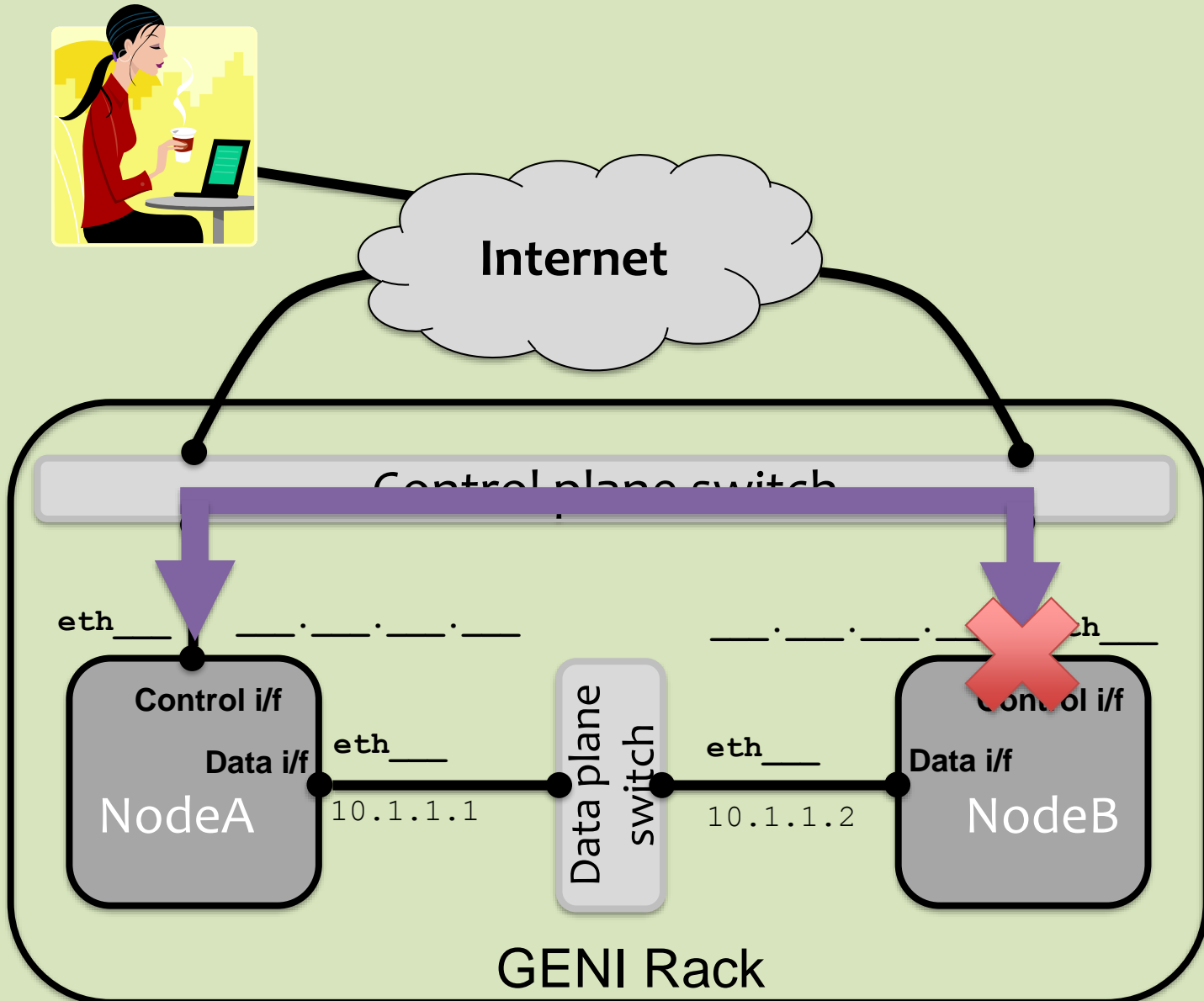
What is the bandwidth of the **control** link? Why?



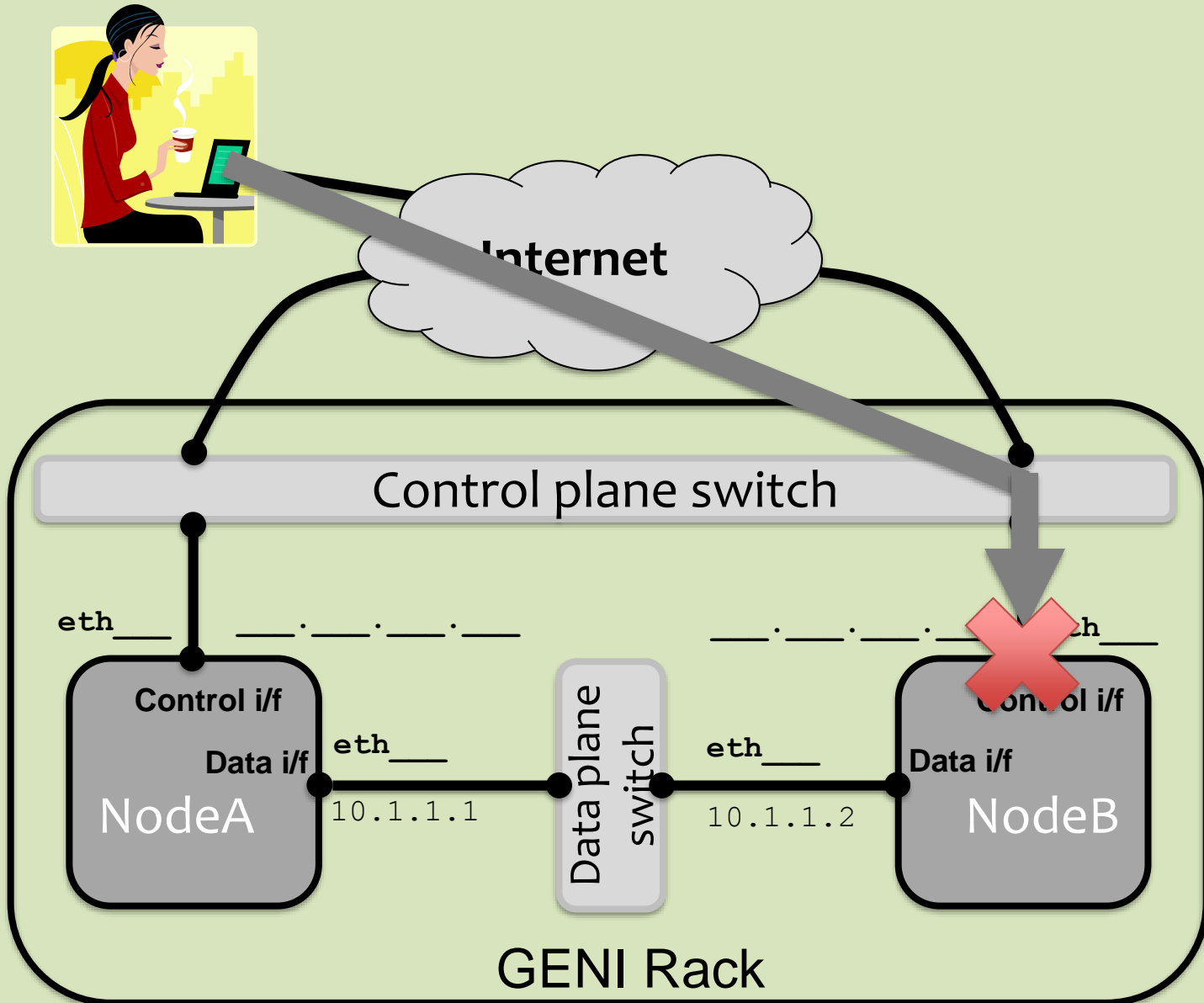
5.3 When you bring down the **data** interface, the destination should become unreachable. Why?



5.3 After you bring down the **control** interface, the destination becomes unreachable. Why?



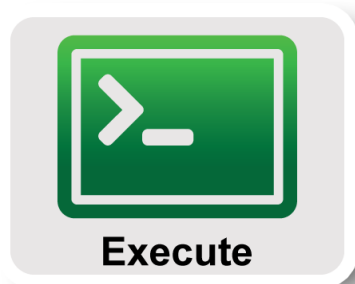
5.3 After you bring down the **control** interface, your ssh session should immediately hang. Why?



Experiment Workflow



- Part I: Design/Setup



- Part II: Execute



- Part III: Finish

7

The screenshot displays the jFed Experimenter Toolkit interface. At the top, there are tabs for 'General', 'Topology Viewer', 'RSpec Viewer', and 'Timeline Viewer'. Below these are several groups of icons: 'Experiment Definition' (New, Open, Open URL, Save), 'Experiment' (Run, Update Status, Terminate, Recover), 'Preferences' (Preferences), and 'Support' (Report a bug, Documentation). A red arrow points to the 'Terminate' icon (a red square). The main area shows a network diagram with three nodes: 'client', 'link0', and 'server', connected by green lines. Below the diagram is a 'Progress' section with a list of tasks, all marked with green checkmarks: 'Requesting slice information', 'Initialize nodes at InstaGENI Clemson', 'Waiting for nodes from InstaGENI Clemson to become ready.', and 'Testing connectivity to nodes from InstaGENI Clemson.'. At the bottom, there are tabs for 'Untitled' and 'rrh-jacks-tutorial x'. A status bar at the very bottom indicates 'This experiment run will expire in 1 hour, 58 minutes and 45 seconds.' and shows a 'Direct connection' status with a signal strength indicator and a green checkmark.

Delete Resources

project resource
aggregate experimenter

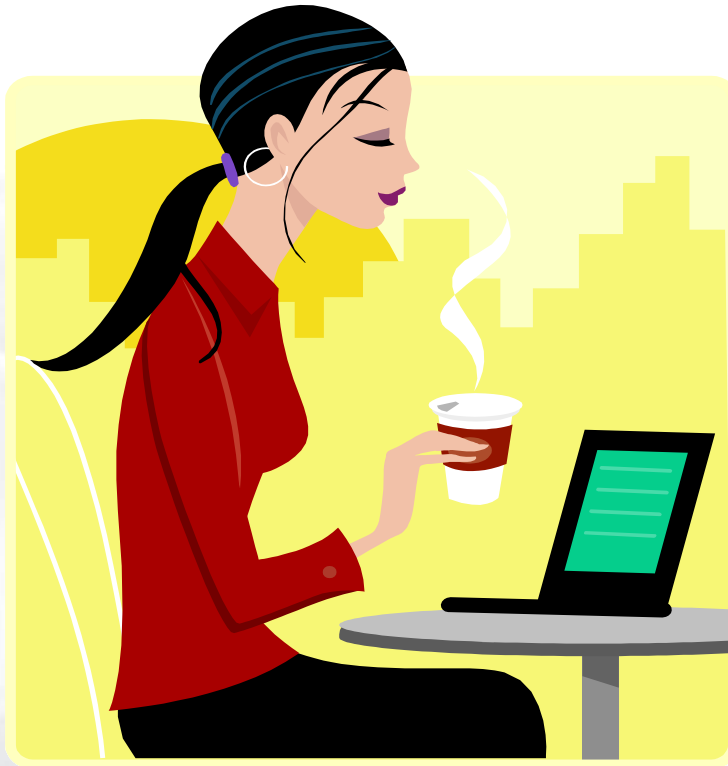


When your experiment is done, you should always release your resources.

- Normally this is when you would archive your data
- Delete your resources at **each** aggregate

You have...

–Run your first GENI Experiment!



Welcome to GENI!