

# FABRIC Educational Materials

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## Tutorial: Ping Layer

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### Introduction

The goal of this exercise is to understand how the ping layer works in a network and an introduction of the ping command in linux along with iperf

### Running the Tutorial

- The tutorial has three Jupyter notebooks and one folder:
  - **CreateSlice.ipynb**: Creates the FABRIC slice/topology needed for this tutorial
  - **ping.ipynb**: Configures the IPv4/IPv6 network address and then begins the Ping tutorial
- To run the tutorial:
  - Login to the FABRIC Portal and JupyterHub
    - Login to the [FABRIC Portal](#)
    - Login/connect to the [FABRIC JupyterHub](#)
  - Download the latest copy of the tutorials from GitHub
    - Open a terminal in JupyterHub by clicking the "Terminal" tile under "Other" in the Launcher tab
    - In the terminal window, type the following commands to download (pull) the latest version of the set of tutorials from Github

```
mkdir teaching-materials
cd teaching-materials
git clone https://github.com/fabric-testbed/teaching-materials.git
```

- Run the Tutorial Notebooks
  - In the left-hand column of JupyterHub, navigate to the Ping tutorial
  - Open and execute the CreateSlice.ipynb notebook
  - Then open and execute the ping.ipynb

### Create Slice Notebook

- In this notebook you will request a slice that contains two nodes (client, and server) and one Layer-2 networks (LAN) with the following configurations:

```
client <-> LAN 1 <-> Server
```

- Each node should have the following requirements:
  - NIC\_Basic model
  - "default\_ubuntu\_20" image

- 1 cores
  - 2 ram
  - 10 disk space
- To successfully run this notebook you should only need to run the code blocks in order from top to bottom
- **Notes:** If your slice creation fails you can just try to specify a site in the second code block run them again. (you can get a site from "https://portal.fabric-testbed.net/" by looking at the map, use the name **outside** of the parenthesis and make sure the site chosen is up)

## Ping Notebook

- To successfully run this notebook you need to run the code blocks first (*Retrieve Slice*) and then follow the steps in (*Guided Experiment*):
  - Retrieve Slice: This step is not required but it will allow you to easily access the nodes in the slice you will use for the experiment.
  - Guided Experiment: This is the Experiment, This contains two sub sections, ping & pingPlus.
    - ping (2.1 - 2.4) focuses on the introductions of the linux command
    - pingPlus (2.5 - 2.12) is focused on teaching the user about how the command functions with a special program.
- **Notes:**
  - Step 2.6 Uses the Controll interface device, this route is not routed by default on the client, if you encounter a problem where "connect failed: Operation now in progress" the route is defaulting back to ssh terminal, please add the route to the ip interface manually using the device connected to the server node, and the server's control interface caution, use the following command "ip route add {ip adress} dev {device name}"
  - The last cell is to delete the slice and free resources, make sure you set "Check" to "True" to delete the slice
  - In the case the slice fails to delete please examine the experiment tab on the fabric portal and delete the corresponding slice if it was not already deleted

## Additional Information

- FABRIC Learn Website: If you encounter problems, questions, or suggestions, please navigate to the FABRIC Knowledge Base at <https://learn.fabric-testbed.net/>
- FABRIC Teaching Material Github: <https://github.com/fabric-testbed/teaching-materials>
- This assignment was originally written for the GENI network (<https://groups.geni.net/geni/wiki/Tutorials/Layer2Ping/Procedure> and [https://groups.geni.net/geni/wiki/GENIExperimenter/Tutorials/jacks/GettingStarted\\_PartI/Procedure](https://groups.geni.net/geni/wiki/GENIExperimenter/Tutorials/jacks/GettingStarted_PartI/Procedure)), but has been converted to run in FABRIC.