

FABRIC Educational Materials

Tutorial: Routing with IPv4

Introduction

The goal of this exercise is to understand how routing works in a network

Running the Tutorial

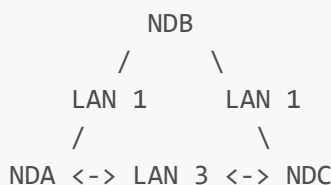
- The tutorial has three Jupyter notebooks and one folder:
 - **CreateSlice.ipynb**: Creates the FABRIC slice/topology needed for this tutorial
 - **Routing_with_IPv4.ipynb**: Configures the IPv4/IPv6 network address and then begins the Queues tutorial
- To run the tutorial:
 - Login to the FABRIC Portal 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 Routing with IPv4 tutorial
 - Open and execute the CreateSlice.ipynb notebook
 - Then open and execute the Routing_with_IPv4.ipynb

Create Slice Notebook

- In this notebook you will request a slice that contains three nodes (NDA, NDB, and a NDC) and three Layer-2 networks (LANs) with the following configurations:



- 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)

Routing with IPv4 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, To complete this section just follow the provided instructions to complete the exercise.
 - Assignment: This is the Experiment, To complete this section just follow the provided instructions to complete the exercise.
- **Notes:**
 - There is a link to the linux route command for reference, feel free to take a look at it if you are stuck and remember that the routes must be made both ways
 - 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/GENIEducation/SampleAssignments/IPRouting/Procedure>), but has been converted to run in FABRIC.