

FABRIC Educational Materials

Tutorial: Exploring Queues

Introduction

The goal of this tutorial is to understand how queues function in networking and to experiment how queues react with restrictions.

Running the Tutorial

- The tutorial has three Jupyter notebooks and one folder:
 - **CreateSlice.ipynb**: Creates the FABRIC slice/topology needed for this tutorial including node specific configuration
 - **ExploringQueues.ipynb**: Configures the IPv4/IPv6 network address and then begins the Queues Assignment
- 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 Exploring Exploring Queues tutorial
 - Open and execute the CreateSlice.ipynb notebook
 - Then open and execute the steps on ExploringQueues.ipynb

Overview of the Notebooks in this Tutorial

Create Slice Notebook

- In this notebook you will request a slice that contains three nodes (Source, Destination, and a Router) and two Layer-2 networks (LANs) with the following configurations:

```
Source <-> LAN 1 <-> Router <-> LAN 2 <-> Destination
```

- 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)

Exploring Queues 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: you will make inferences based on the figures and then answer some questions, then you will re-try the experiment to see if your inferences were correct. Lastly you will delete the slice to clear resources you used.
 - **Notes:** 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://www.cs.unc.edu/Research/geni/geniEdu/09-queues.html>), but has been converted to run in FABRIC.