

# FABRIC Educational Materials

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## Tutorial: Exploring IPv6

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### Introduction

The goal of this tutorial is to learn about IPv6 and to experiment with the IPv6 protocol and examine differences between IPv6 and IPv4.

### Running the Tutorial

- The tutorial has three Jupyter notebooks:
  - **CreateSlice.ipynb**: Creates the FABRIC slice/topology needed for this tutorial
  - **ExploringIPV6.ipynb**: begins the IPv6 Experiment
- 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 IPv6 tutorial
  - Then open and execute the CreateSlice.ipynb
  - Then open and execute the steps on ExploringIPV6.ipynb

### Overview of the Notebooks in this Tutorial

#### Create Slice Notebook

- In this notebook you will request a slice that contains three nodes (Host 1, Host2, and a Router) and two Layer-2 networks (LANs) with the following configurations:

```
Host 1 <-> LAN 1 <-> Router <-> LAN 2 <-> Host 2
```

- Each node should have the following requirements:
  - NIC\_Basic model
  - "default\_ubuntu\_20" image
  - 1 cores
  - 2 ram
  - 10 disk space
- Additionally each node will need:
  - The net-tools package from linux
- 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 IPV6 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 analyze the headers once again and then delete the slice after answering the questions to clean the resources 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- Guided Experiment: This is the Experiment, To complete this section just follow the provided instructions to understand the 3 sections: Basic Connection, Header Comparison and Global Address.

## 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 (<http://www.cs.unc.edu/Research/geni/geniEdu/10-IPv6.html>), but has been converted to run in FABRIC.