# CLab 5

CSCI 4406 – Computer Networks
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# Hello_Fabric_2024.ipynb

- **Creating the node**

```
[1]: from fabrictestbed_extensions.fablib.fablib import FablibManager as fablib_manager

fablib = fablib_manager()

fablib.show_config();
```

FABlib Config

| | |
|---|---|
| Credential Manager | cm.fabric-testbed.net |
| Orchestrator | orchestrator.fabric-testbed.net |
| Project ID | a70de2f5-9e12-4b6b-b412-0ae1a2c553b0 |
| Token File | /home/fabric/.tokens.json |
| Bastion Host | bastion.fabric-testbed.net |
| Bastion Username | jludo01_0000228382 |
| Bastion Private Key File | /home/fabric/work/fabric_config/fabric_bastion_key |
| Slice Private Key File | /home/fabric/work/fabric_config/slice_key |
| Slice Public Key File | /home/fabric/work/fabric_config/slice_key.pub |
| Log File | /tmp/fablib/fablib.log |
| Log Level | INFO |
| Sites to avoid | |
| SSH Command Line | ssh -i {{ _self_.private_ssh_key_file }} -F /home/fabric/work/fabric_config/ssh_config {{ _self_.username }}@{{ _self_.management_ip }} |
| Version | 1.7.3 |
| Data directory | /tmp/fablib |
| Core API | uis.fabric-testbed.net |
| Bastion SSH Config File | /home/fabric/work/fabric_config/ssh_config |

[3]:
```
try:
    # Create a slice
    slice = fablib.new_slice(name="MySlice")

    # Add a node at the EDUKY site
    slice.add_node(name="Node1", site="EDUKY")

    # Submit the slice
    slice.submit()
except Exception as e:
    print(f"Exception: {e}")
```

```
Retry: 11, Time: 245 sec
```

Slice

| | |
|---|---|
| ID | ac072bec-2b3d-4566-a895-deba541c167c |
| Name | MySlice |
| Lease Expiration (UTC) | 2024-10-04 22:59:03 +0000 |
| Lease Start (UTC) | 2024-10-03 22:59:03 +0000 |
| Project ID | a70de2f5-9e12-4b6b-b412-0ae1a2c553b0 |
| State | StableOK |

Nodes

| ID | Name | Cores | RAM | Disk | Image | Image Type | Host | Site | Username | Management IP | State | Error | SSH Command | Public SSH Key File | Private SSH Key File |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d6197c23-38f7-4b63-b23f-98bb61cb3b5c | Node1 | 2 | 8 | 10 | default_rocky_8 | qcow2 | eduky-w10.fabric-testbed.net | EDUKY | rocky | 2610:1e0:1700:206:f816:3eff:fe24:8015 | Active | | ssh -i /home/fabric/work/fabric_config/slice_key -F /home/fabric/work/fabric_config/ssh_config rocky@2610:1e0:1700:206:f816:3eff:fe24:8015 | /home/fabric/work/fabric_config/slice_key.pub | /home/fabric/work/fabric_confi |

### Show the slice attributes

4]:
```
slice.show();
```

Slice

| | |
|---|---|
| ID | ac072bec-2b3d-4566-a895-deba541c167c |
| Name | MySlice |
| Lease Expiration (UTC) | 2024-10-04 22:59:03 +0000 |
| Lease Start (UTC) | 2024-10-03 22:59:03 +0000 |
| Project ID | a70de2f5-9e12-4b6b-b412-0ae1a2c553b0 |
| State | StableOK |

### List the nodes

5]:
```
slice.list_nodes();
```

Nodes

| ID | Name | Cores | RAM | Disk | Image | Image Type | Host | Site | Username | Management IP | State | Error | SSH Command | Public SSH Key File | Private SSH Key File |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d6197c23-38f7-4b63-b23f-98bb61cb3b5c | Node1 | 2 | 8 | 10 | default_rocky_8 | qcow2 | eduky-w10.fabric-testbed.net | EDUKY | rocky | 2610:1e0:1700:206:f816:3eff:fe24:8015 | Active | | ssh -i /home/fabric/work/fabric_config/slice_key -F /home/fabric/work/fabric_config/ssh_config rocky@2610:1e0:1700:206:f816:3eff:fe24:8015 | /home/fabric/work/fabric_config/slice_key.pub | /home/fabric/work/fabric_confi |

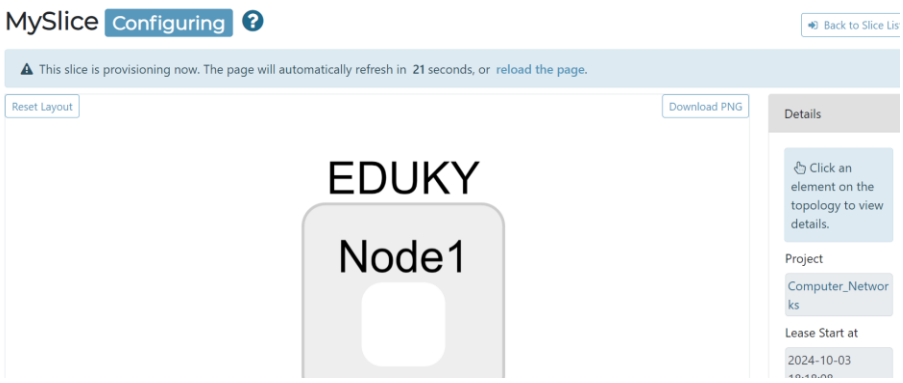
## Step 6: Run the Experiment

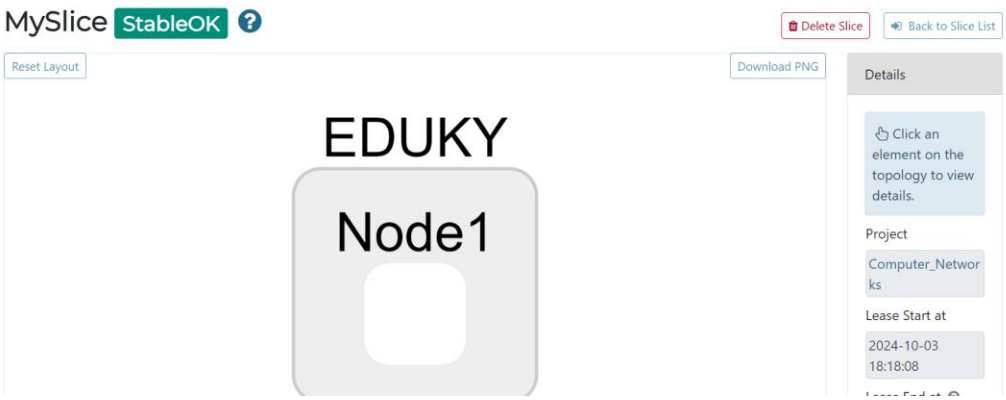
Most experiments will require automated configuration and execution. You can use the fablib library to execute arbitrary commands on your node.

The following code demonstrates how to use fablib to execute a "Hello, FABRIC" bash script. The library uses the bastion and VM keys defined at the top of this notebook to jump through the bastion host and execute the script.

[6]:
```
#node = slice.get_node('Node1')

for node in slice.get_nodes():
    stdout, stderr = node.execute('echo Hello, FABRIC from node `hostname -s`')
```

```
Hello, FABRIC from node Node1
```






- **After creating the node, I logged into the node**

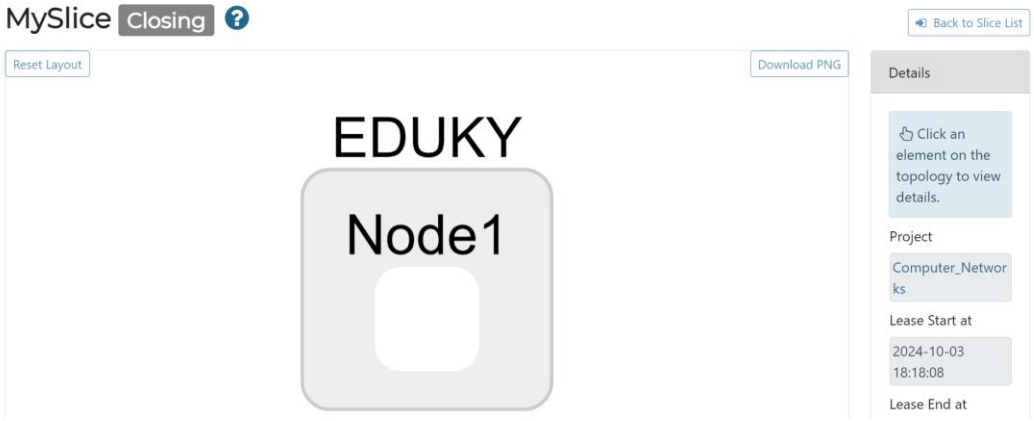
```
fabric@spring:jupyter-examples-rel1.7.0-16%$ ssh -i /home/fabric/work/fabric_config/slice_key -F /home/fabric/work/fabr
ic_config/ssh_config rocky@2610:1e0:1700:206:f816:3eff:fe24:8015
Warning: Permanently added 'bastion.fabric-testbed.net' (ED25519) to the list of known hosts.
Warning: Permanently added '2610:1e0:1700:206:f816:3eff:fe24:8015' (ED25519) to the list of known hosts.
Activate the web console with: systemctl enable --now cockpit.socket

[rocky@Node1 ~]$
```

- **Then I deleted the node:**

Step 7: Delete the Slice

Please delete your slice when you are done with your experiment.

```
[7]: slice.delete()
```



**Summary:**

From this lab, I gained valuable experience in working with Fabric for designing and managing network topologies. I learned how to create and configure slices, which are isolated sets of resources that can be used to build and test network scenarios. This involved adding nodes to the slices and specifying their configurations. Additionally, I learned how to generate and use SSH keys to securely connect to the nodes within the slices. This process included creating SSH key pairs, adding the public keys to the nodes, and using the private keys to establish secure connections. This skill is crucial for managing and interacting with remote servers and devices in a secure manner. Overall, this lab provided me with hands-on experience in setting up and managing network environments using Fabric, as well as enhancing my understanding of secure communication practices with SSH keys.