On-demand SDN Slices

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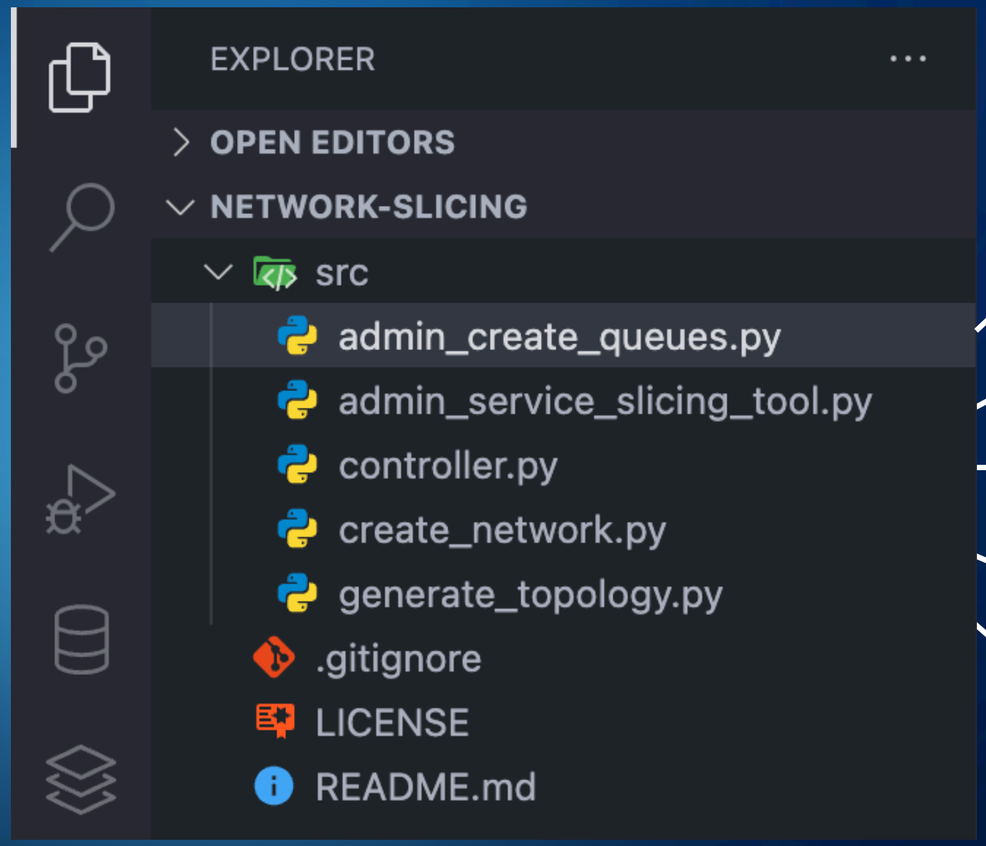


Given a topology and a slice definition as json, it generates ovs queues

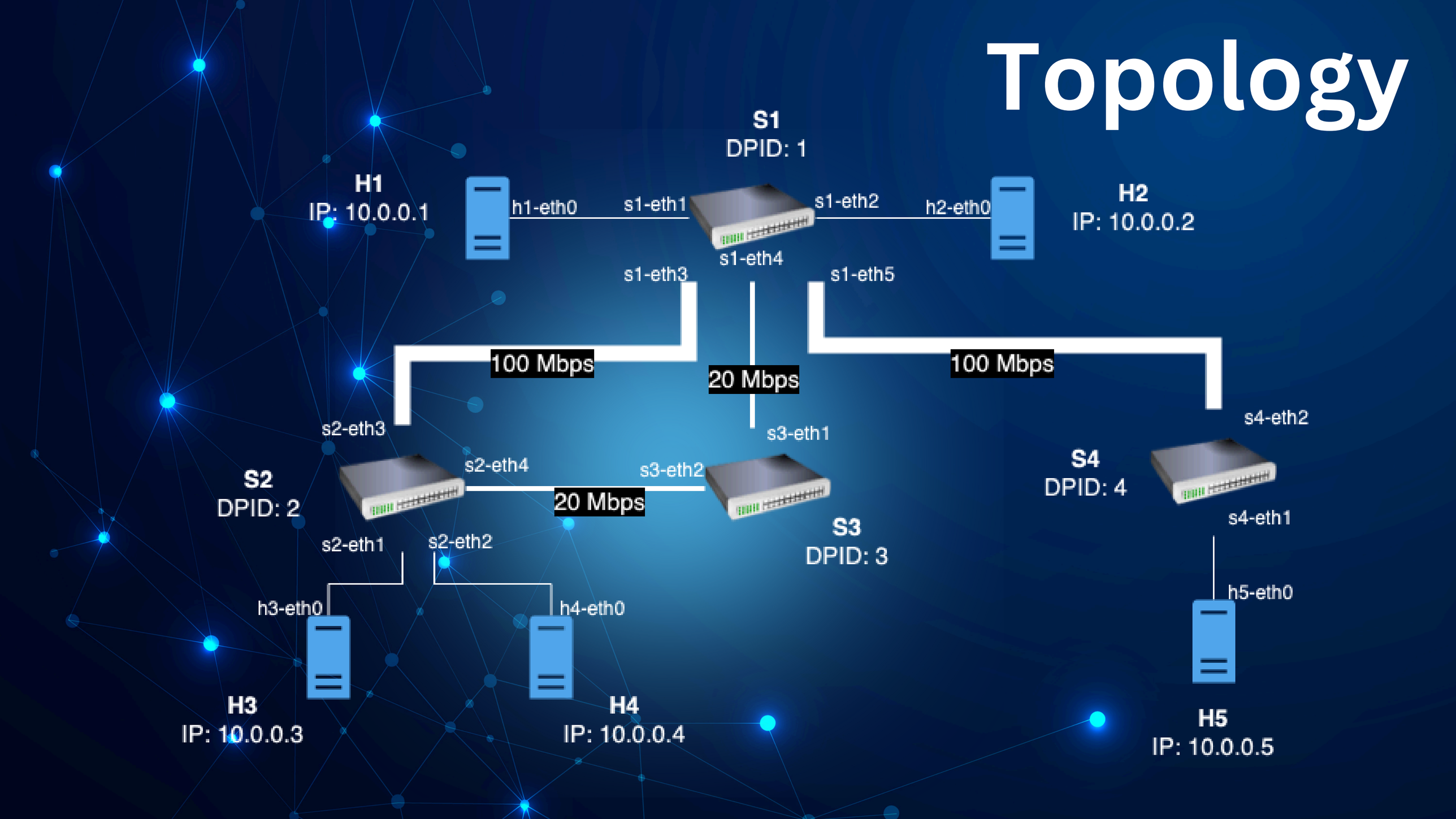
Used to define, view, activate and deactivate **slices**

The ryu controller defines forwarding rules by reading from the topology and slices json files

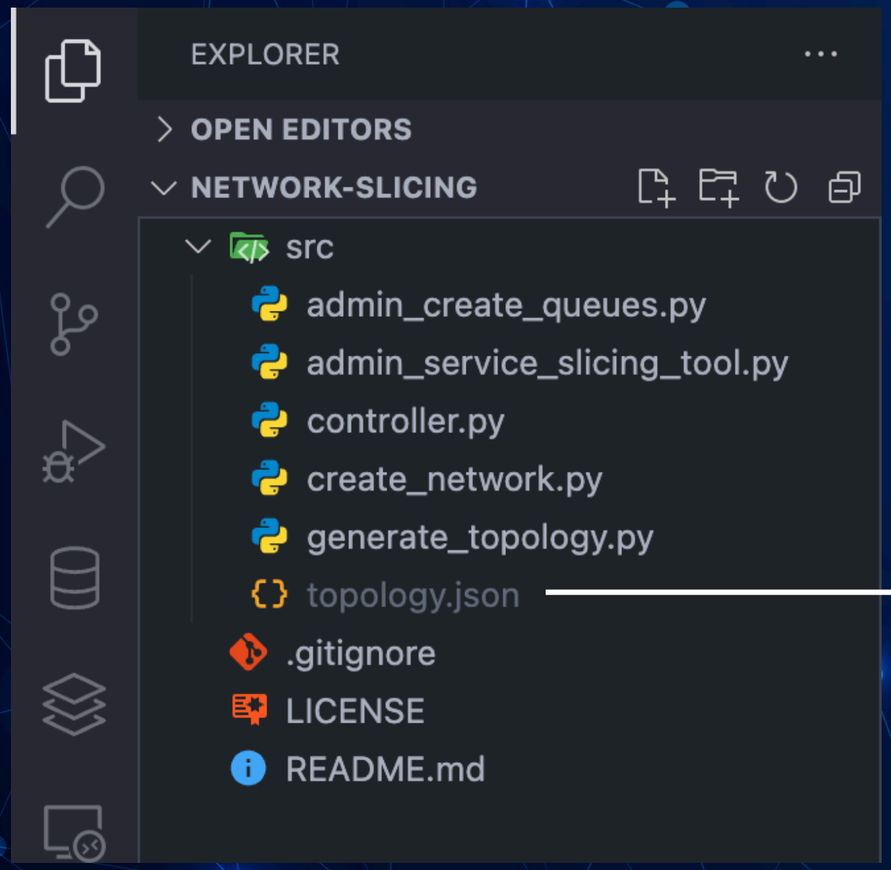
Runs a mininet network

Used to generate the **topology definition**

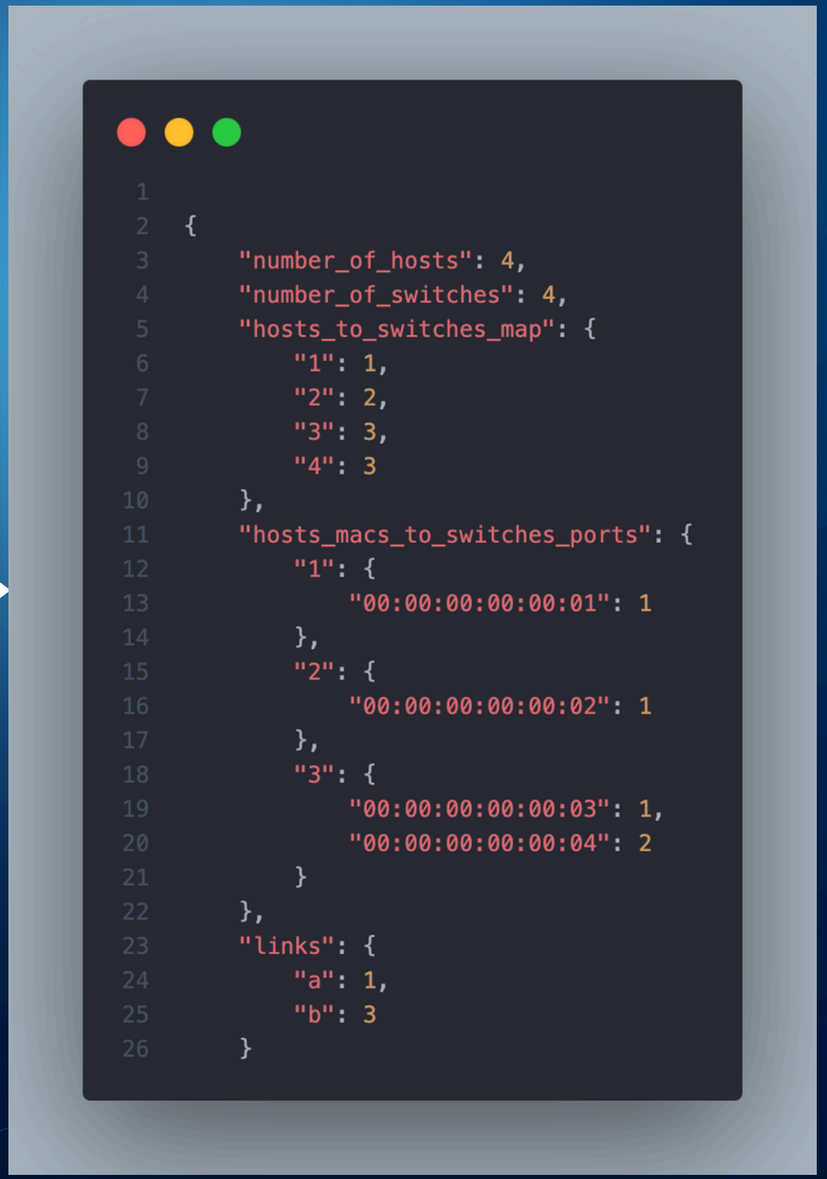
Topology


S1
DPID: 1
H1
IP: 10.0.0.1
h1-eth0
s1-eth1
s1-eth2
h2-eth0
H2
IP: 10.0.0.2
s1-eth4
s1-eth3
s1-eth5
100 Mbps
20 Mbps
100 Mbps
s2-eth3
s3-eth1
s4-eth2
S2
DPID: 2
s2-eth4
s3-eth2
S4
DPID: 4
20 Mbps
S3
DPID: 3
s4-eth1
s2-eth1
s2-eth2
h5-eth0
h3-eth0
h4-eth0
H3
IP: 10.0.0.3
H4
IP: 10.0.0.4
H5
IP: 10.0.0.5

Topology

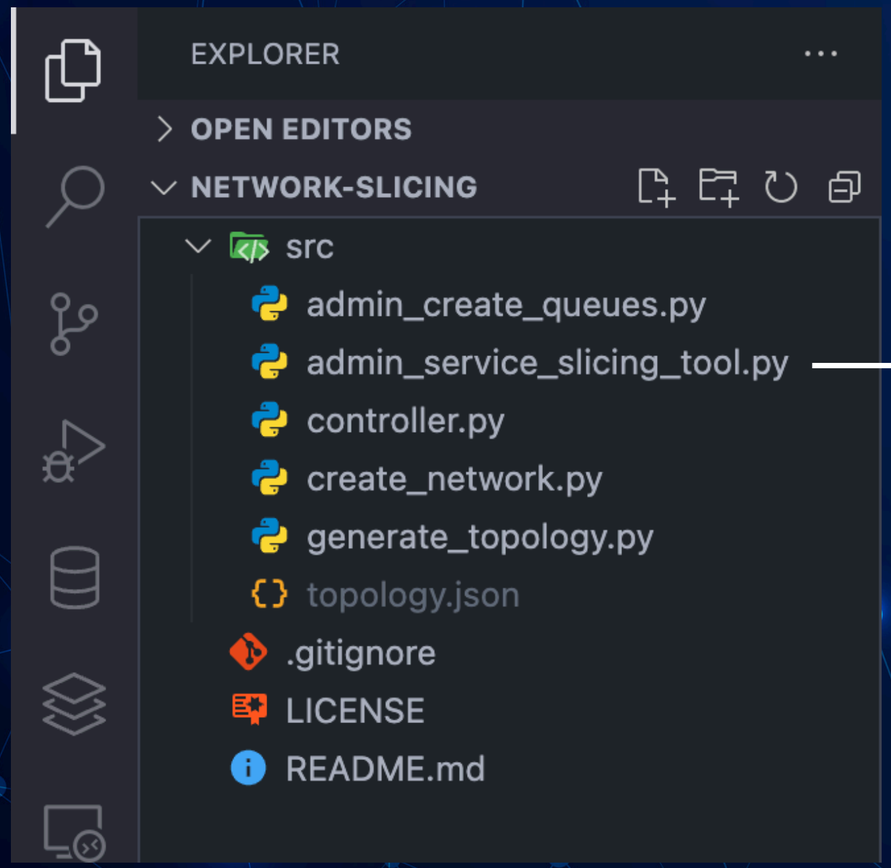



```
sudo python3 generate_topology.py
```



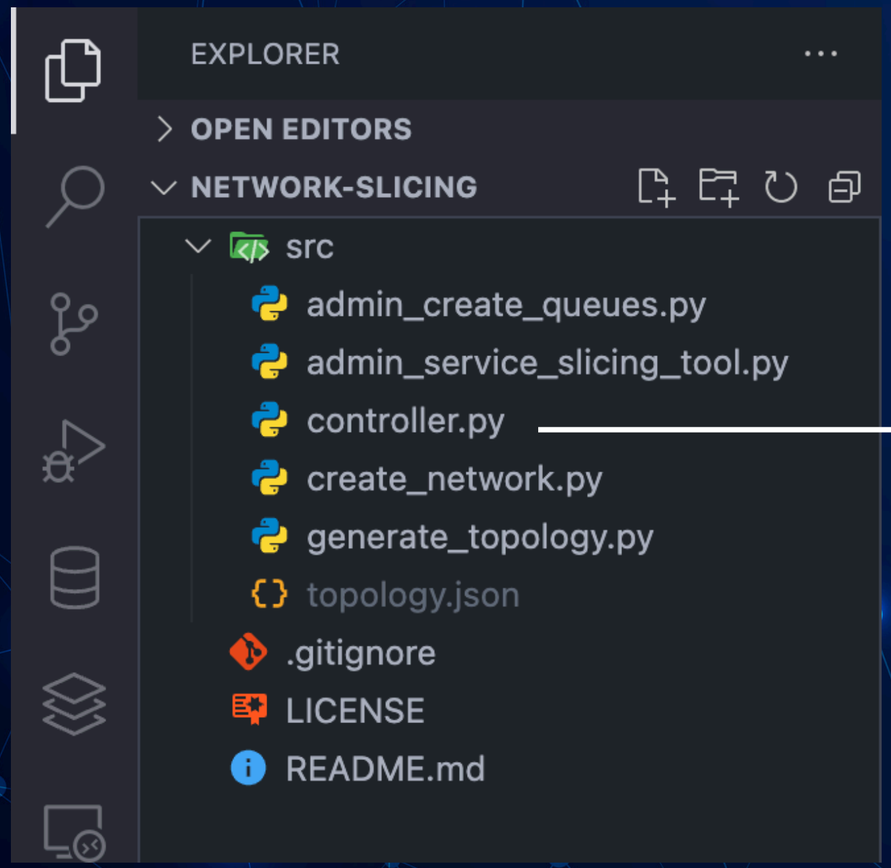
```
{
    "number_of_hosts": 4,
    "number_of_switches": 4,
    "hosts_to_switches_map": {
        "1": 1,
        "2": 2,
        "3": 3,
        "4": 3
    },
    "hosts_macs_to_switches_ports": {
        "1": {
            "00:00:00:00:00:01": 1
        },
        "2": {
            "00:00:00:00:00:02": 1
        },
        "3": {
            "00:00:00:00:00:03": 1,
            "00:00:00:00:00:04": 2
        }
    },
    "links": {
        "a": 1,
        "b": 3
    }
```

Slicing Tool



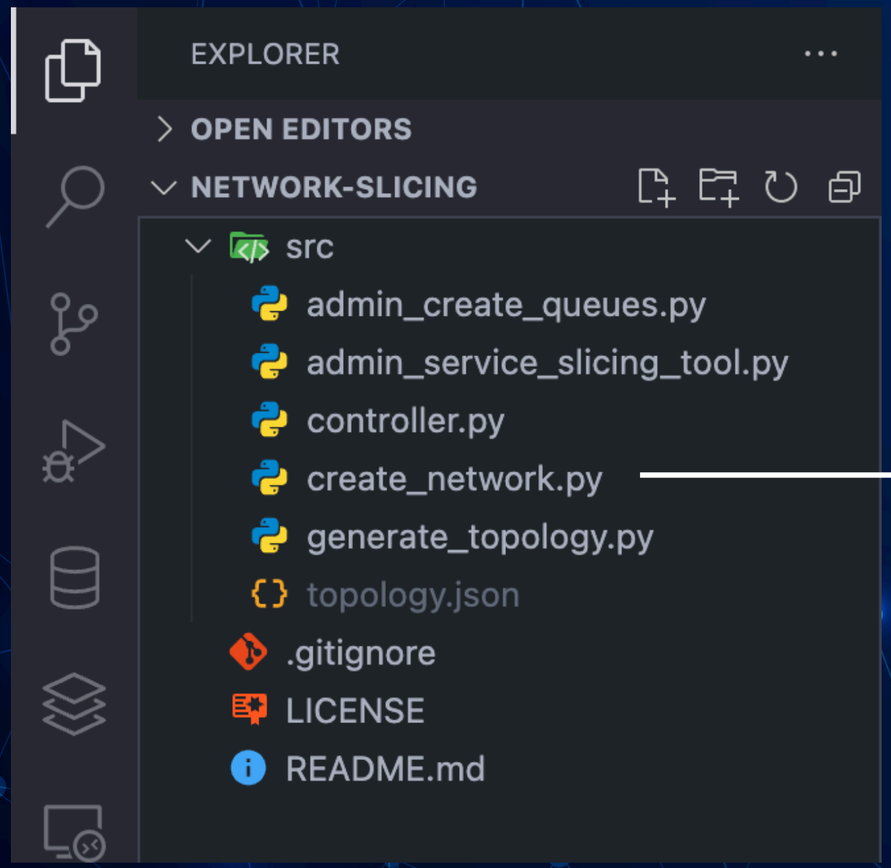

```
sudo python3 admin_service_slicing_tool.py
```

Controller



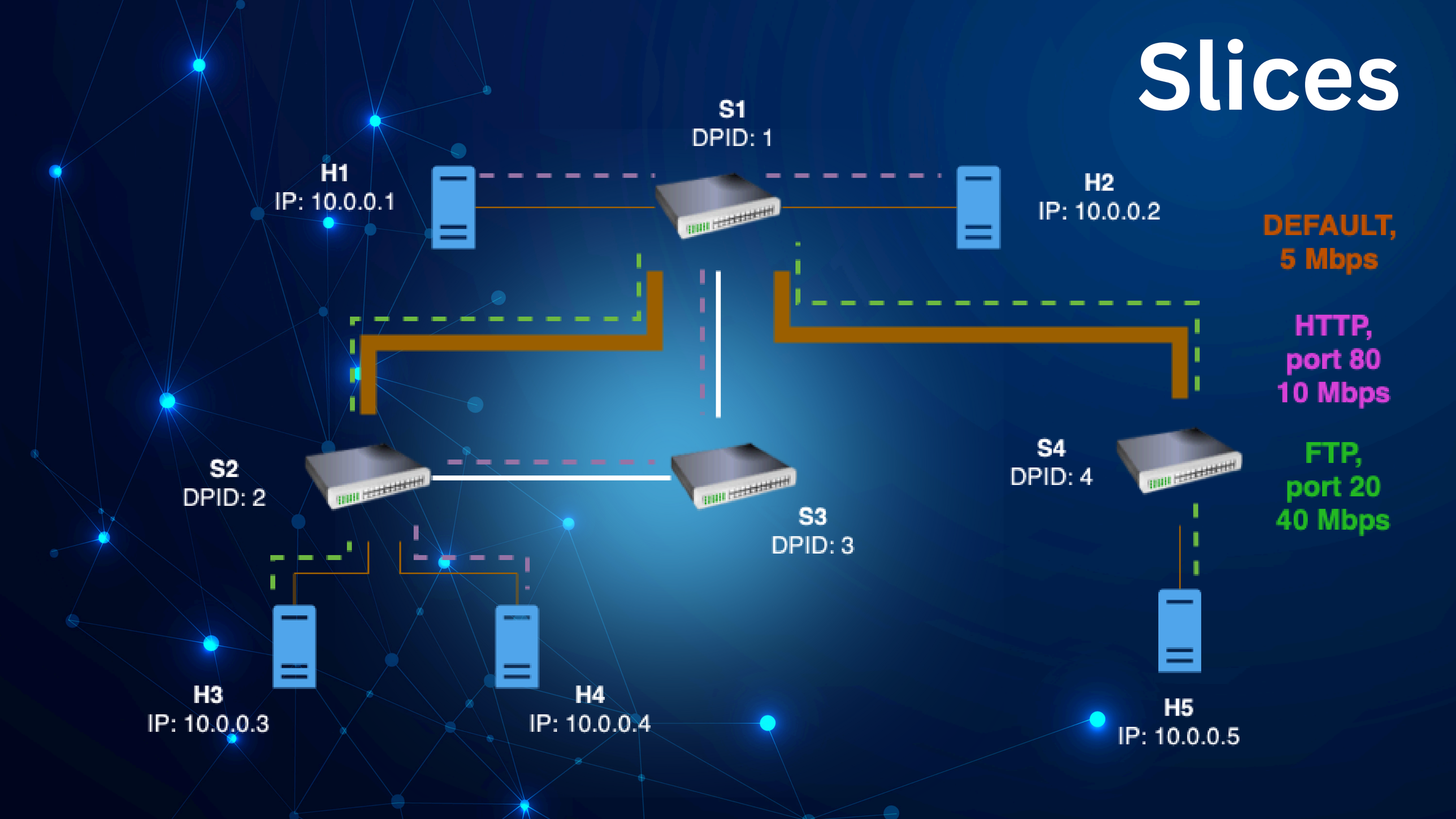

```
ryu-manager controller.py
```

Network

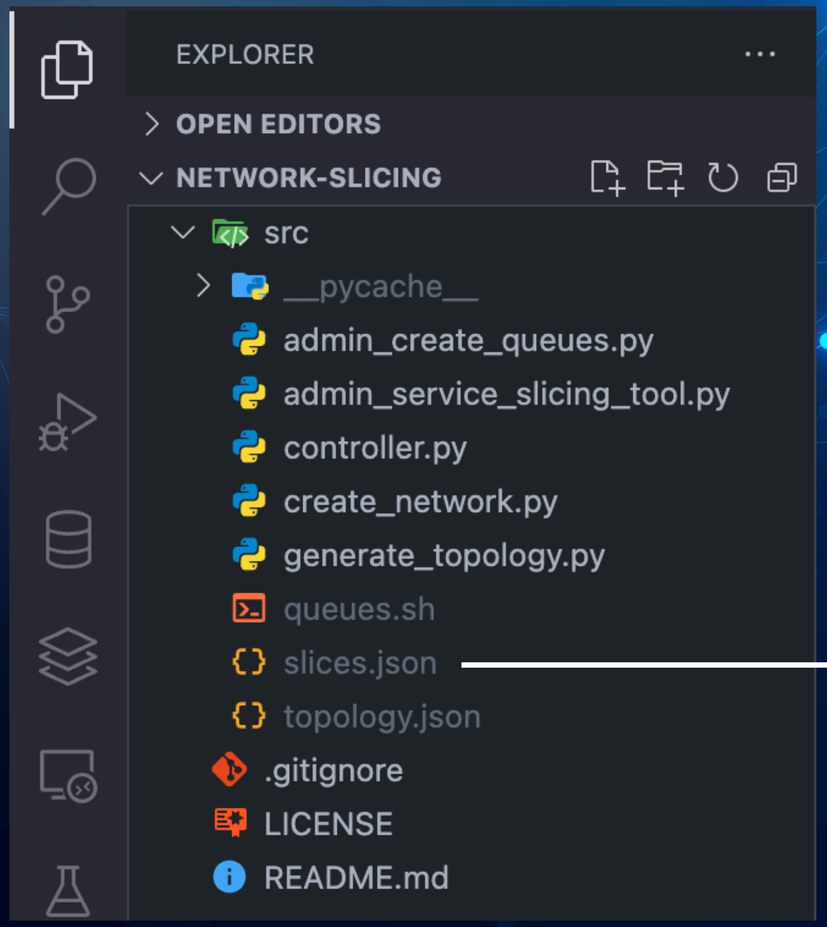


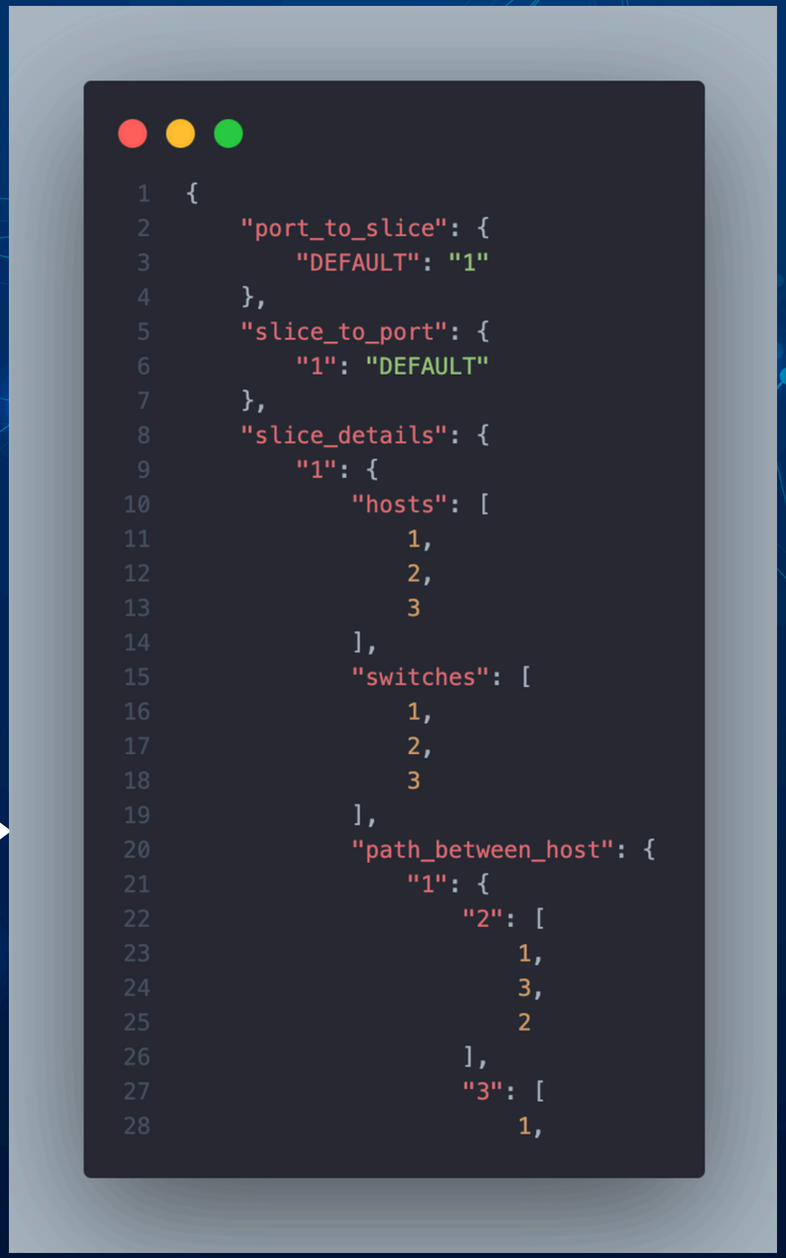

```
sudo python3 create_network.py
```

Slices


S1
DPID: 1
H1
IP: 10.0.0.1
H2
IP: 10.0.0.2
DEFAULT,
5 Mbps
HTTP,
port 80
10 Mbps
FTP,
port 20
40 Mbps
S2
DPID: 2
S3
DPID: 3
S4
DPID: 4
H3
IP: 10.0.0.3
H4
IP: 10.0.0.4
H5
IP: 10.0.0.5

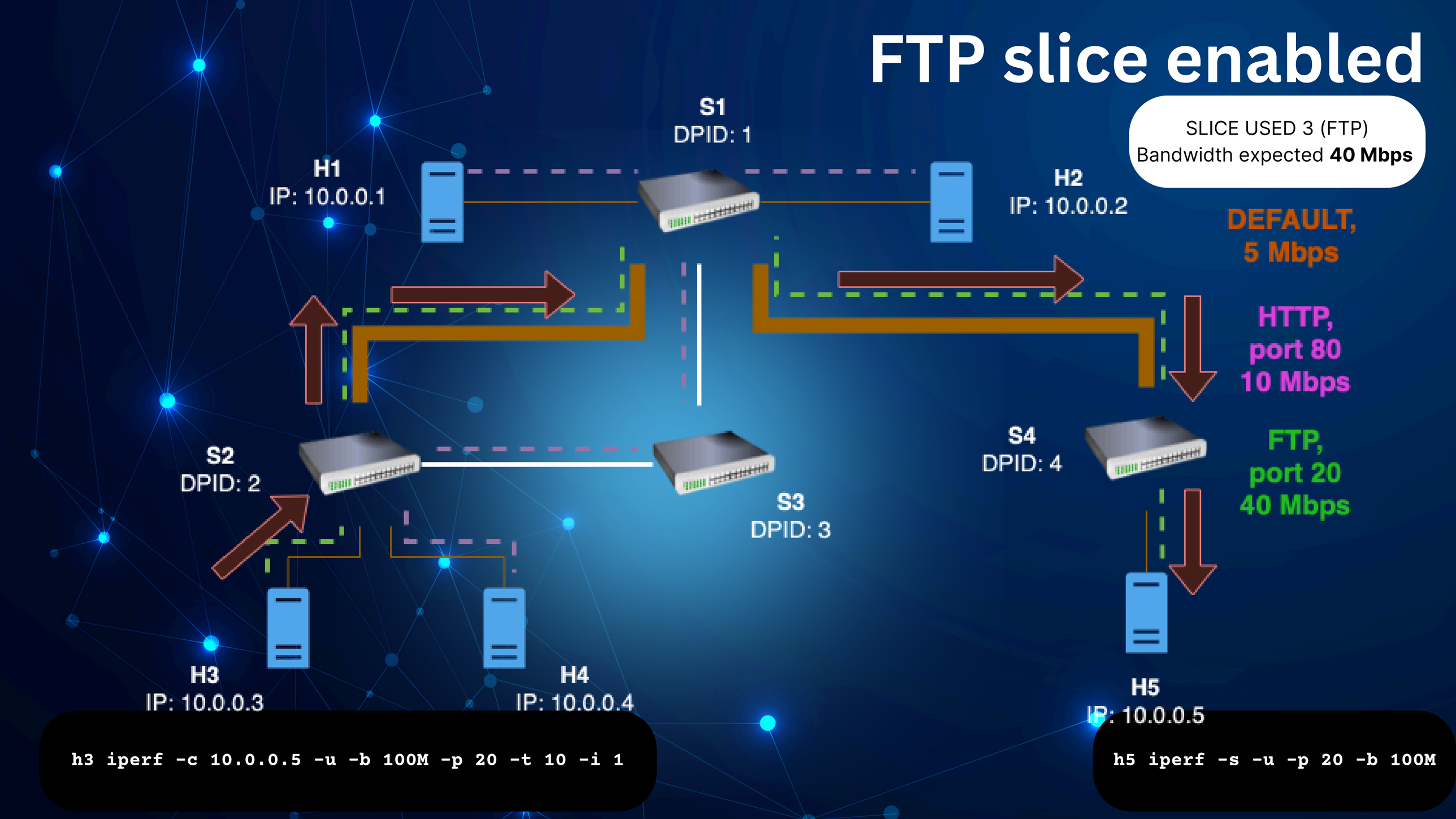
Slices





```
{
    "port_to_slice": {
        "DEFAULT": "1"
    },
    "slice_to_port": {
        "1": "DEFAULT"
    },
    "slice_details": {
        "1": {
            "hosts": [
                1,
                2,
                3
            ],
            "switches": [
                1,
                2,
                3
            ],
            "path_between_host": {
                "1": {
                    "2": [
                        1,
                        3,
                        2
                    ],
                    "3": [
                        1,
```

FTP slice enabled



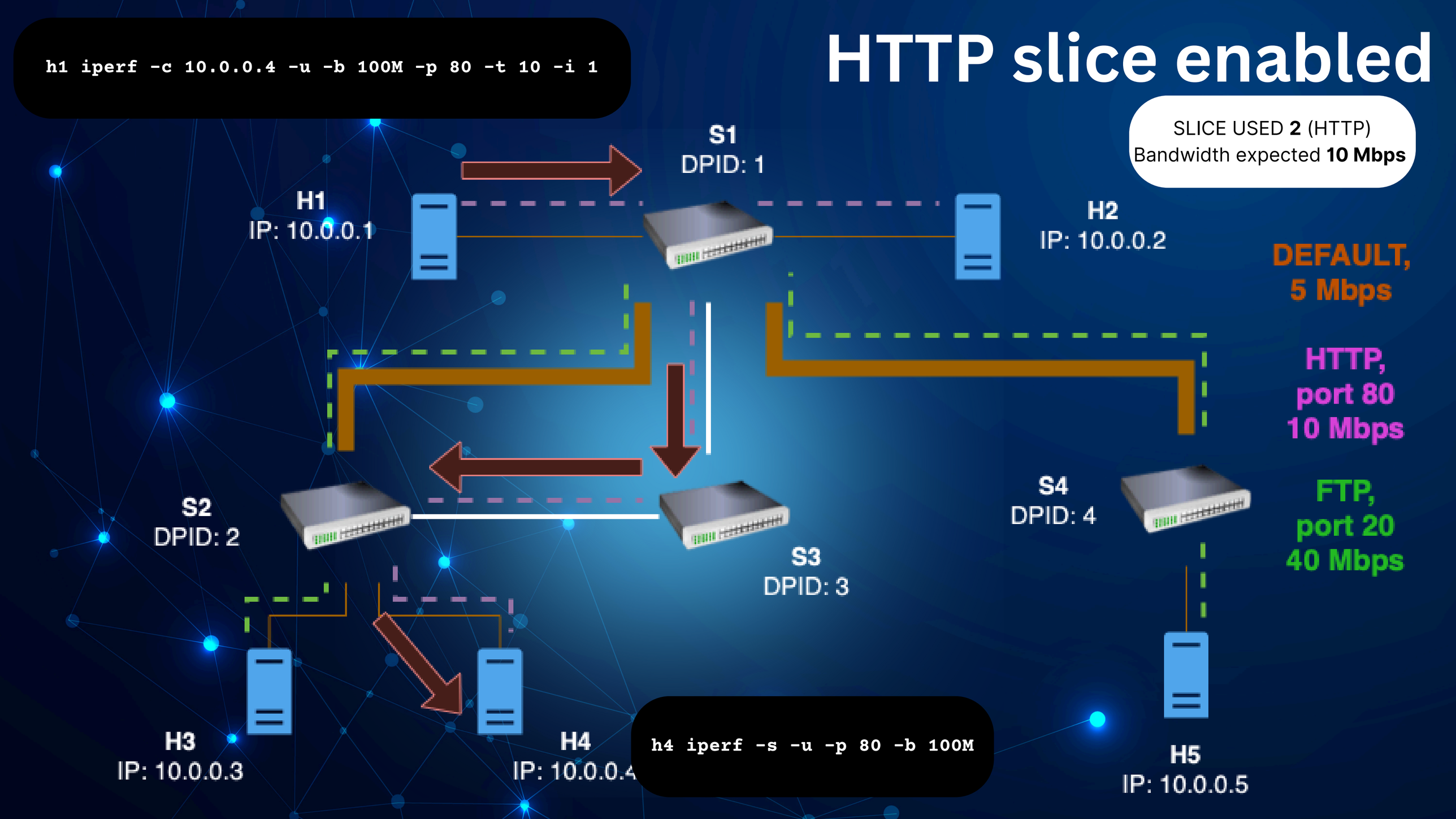

```
h3 iperf -c 10.0.0.5 -u -b 100M -p 20 -t 10 -i 1
```

```
h5 iperf -s -u -p 20 -b 100M
```

HTTP slice enabled

```
h1 iperf -c 10.0.0.4 -u -b 100M -p 80 -t 10 -i 1
```

SLICE USED **2** (HTTP)
Bandwidth expected **10 Mbps**

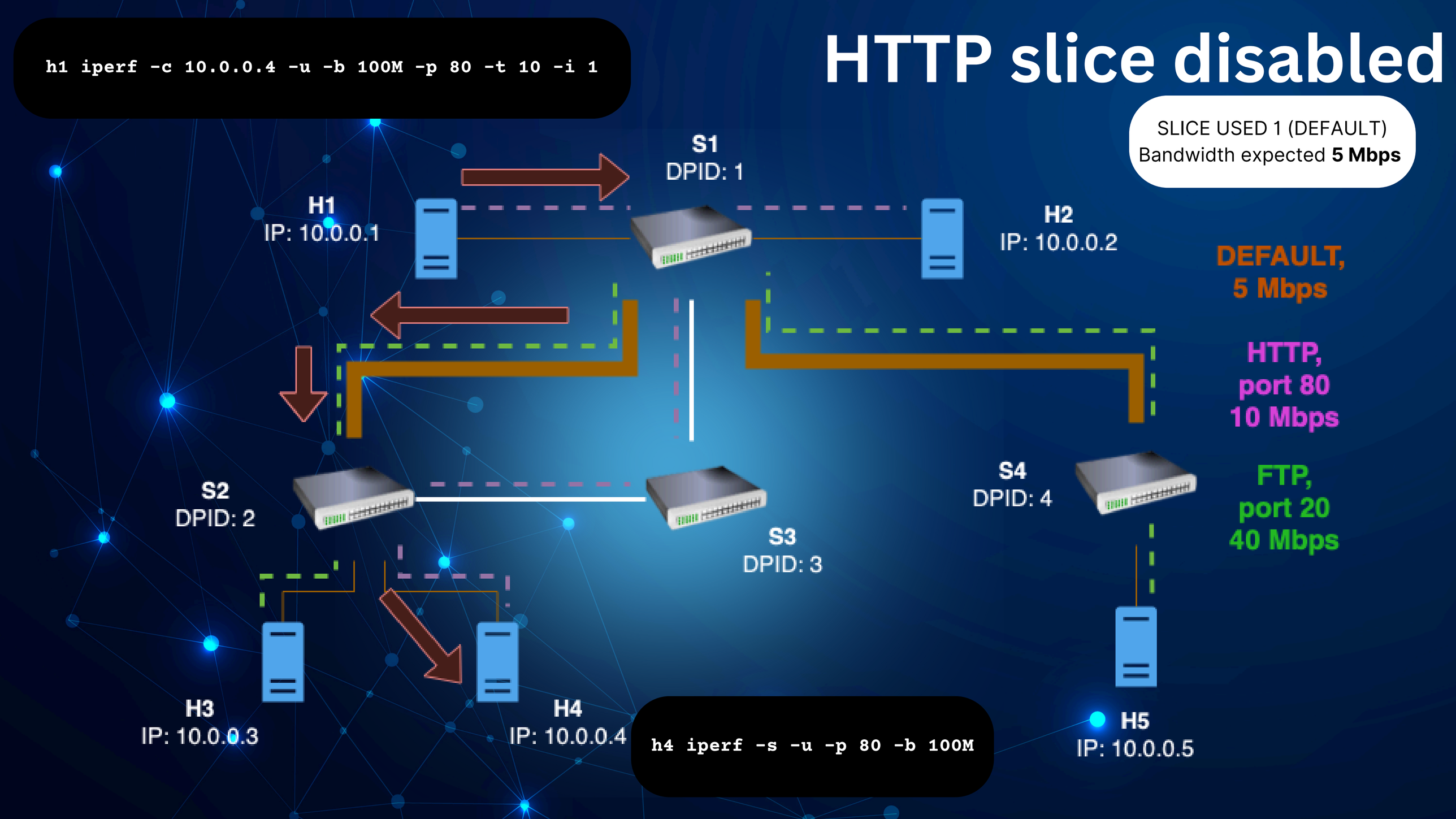



```
h4 iperf -s -u -p 80 -b 100M
```

HTTP slice disabled

```
h1 iperf -c 10.0.0.4 -u -b 100M -p 80 -t 10 -i 1
```

SLICE USED 1 (DEFAULT)
Bandwidth expected **5 Mbps**




```
h4 iperf -s -u -p 80 -b 100M
```


Thank You