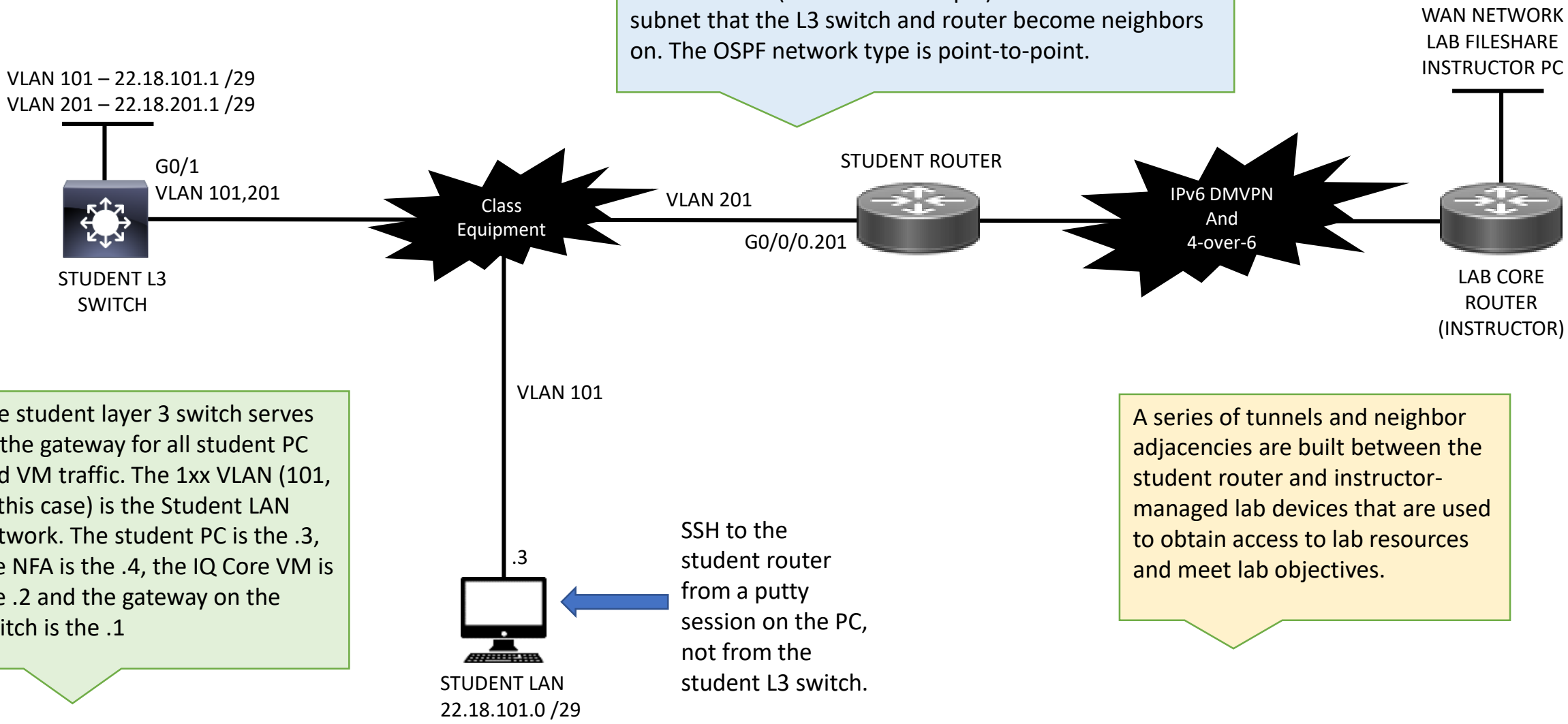
LAB CONNECTIVITY BASICS

PE 1

This example is using Student 1's IP scheme.

The student router is the uplink for all LAN traffic and establishes the connections/tunnels with all other lab devices. It is accessible via an OSPF link with the layer 3 switch. Before the router can be accessed via SSH, the student must configure their L3 switch for this adjacency. The 2xx VLAN (201 in this example) is the common subnet that the L3 switch and router become neighbors on. The OSPF network type is point-to-point.



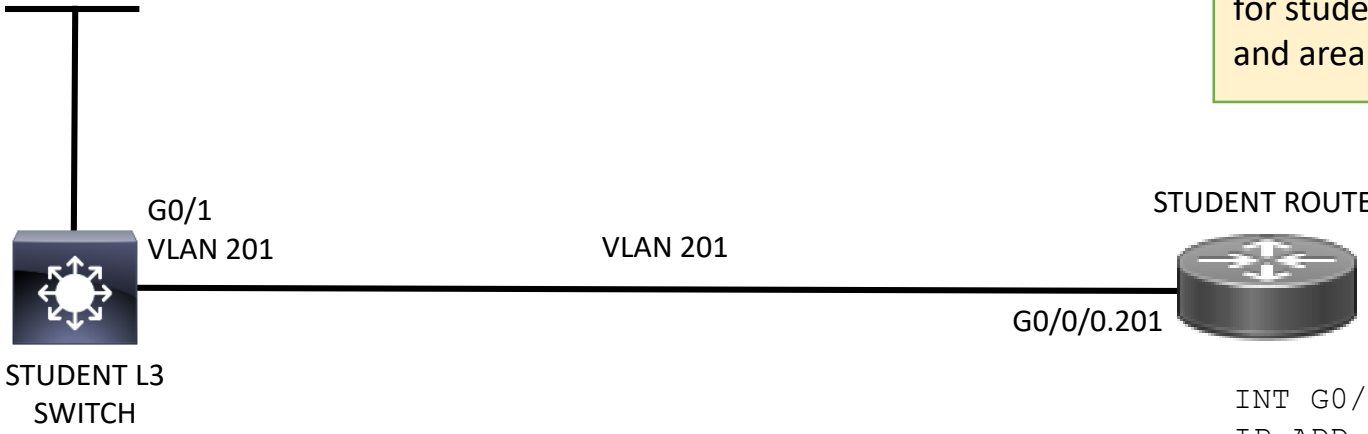
The student layer 3 switch serves as the gateway for all student PC and VM traffic. The 1xx VLAN (101, in this case) is the Student LAN network. The student PC is the .3, the NFA is the .4, the IQ Core VM is the .2 and the gateway on the switch is the .1

SSH to the student router from a putty session on the PC, not from the student L3 switch.

A series of tunnels and neighbor adjacencies are built between the student router and instructor-managed lab devices that are used to obtain access to lab resources and meet lab objectives.

This example is using Student 1's IP scheme.

```
INT VLAN 201
IP ADD 22.18.201.1 255.255.255.248
IP OSPF 1 AREA 1
IP OSPF NETWORK POINT-TO-POINT
```



There are two methods to effectively activate an interface for OSPF. The purple text below shows the two ways: an OSPF statement on the interface is the newer way, and a network statement under the OSPF process is the traditional method. Either will work, but only one is needed.

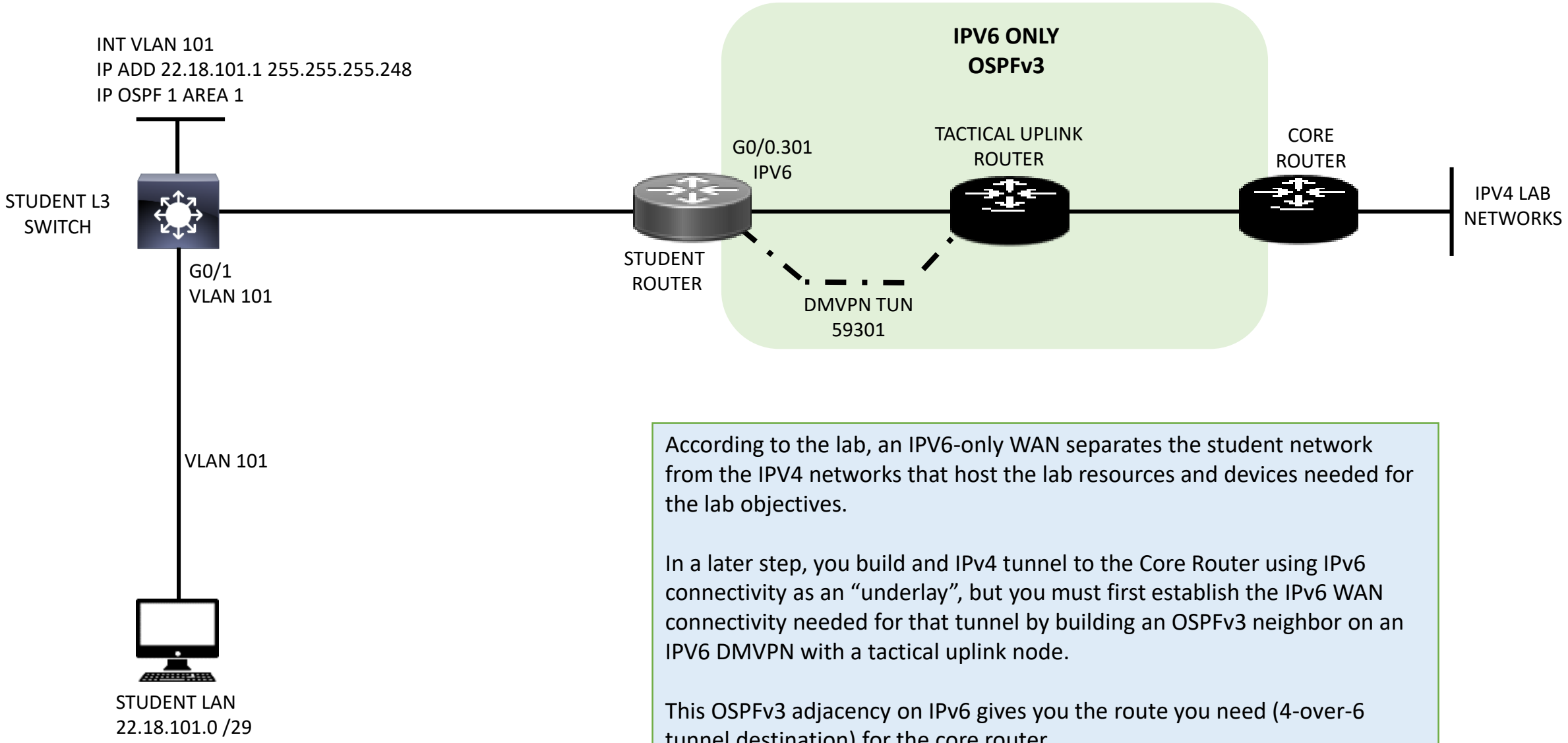
NOTE: The OSPF process number and area in this example are for student 1. The student PE document shows which process and area each student should use (it is the student number).

```
INT G0/0/0.201
IP ADD 22.18.201.2 255.255.255.248
IP OSPF 1 AREA 1
IP OSPF NETWORK POINT-TO-POINT


ROUTER OSPF 1
NETWORK 22.18.201.0 0.0.0.7 AREA 1
```

Students often believe there is something wrong with their equipment because they cannot access their student router, even though they see a neighbor adjacency with it on OSPF. If the network types do not match, the neighbor will form but routes will not be shared. Also, if the student LAN is not activated/advertised in that same OSPF process, the router will not have a path to return traffic to the student PC.

This example is using Student 1's IP scheme.

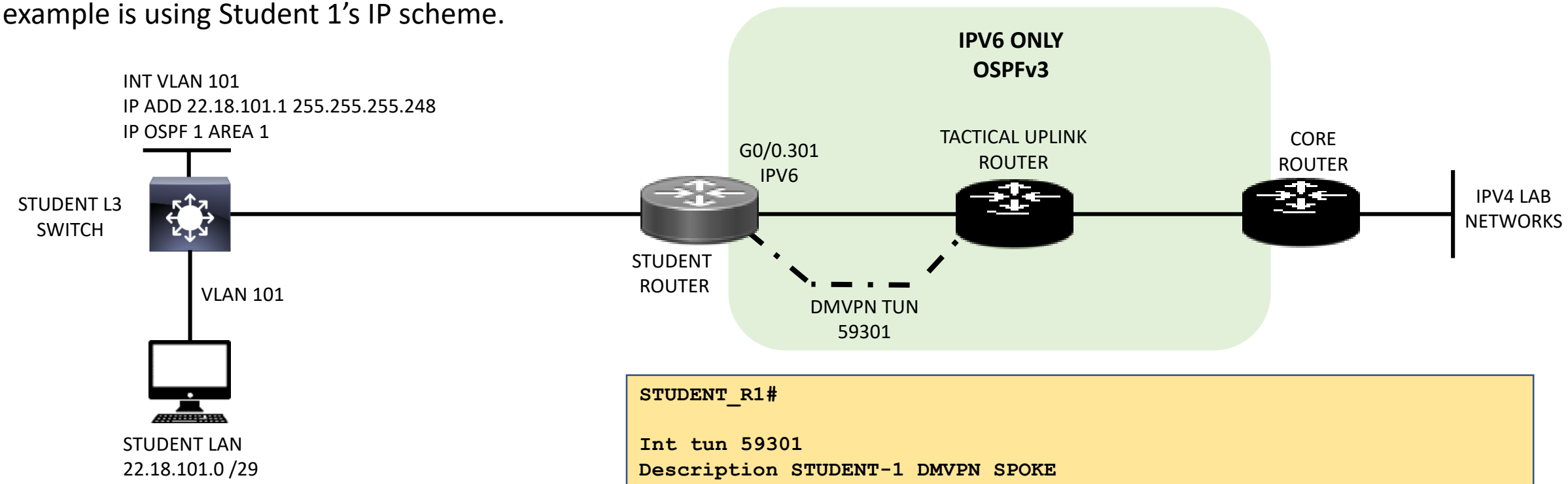


According to the lab, an IPV6-only WAN separates the student network from the IPV4 networks that host the lab resources and devices needed for the lab objectives.

In a later step, you build and IPv4 tunnel to the Core Router using IPv6 connectivity as an "underlay", but you must first establish the IPv6 WAN connectivity needed for that tunnel by building an OSPFv3 neighbor on an IPV6 DMVPN with a tactical uplink node.

This OSPFv3 adjacency on IPv6 gives you the route you need (4-over-6 tunnel destination) for the core router.

This example is using Student 1's IP scheme.



DMVPN configurations can be lengthy and complex. Most commands can apply to either IPv4 or IPv6 depending on the protocol that the tunnel is using. This example to the right shows a DMVPN spoke configuration for Student 1's OPSFv3 connection to the Tactical Uplink Node.

In DoD tactical networks (such as WIN-T, IAADS and 5GTI) DMVPNs are very commonly used to connect tactical nodes with Regional Hub Nodes or other uplink network elements.

```
STUDENT_R1#

Int tun 59301
Description STUDENT-1 DMVPN SPOKE
Ipv6 enable
Ipv6 add fc00::101:a002/122
Tunnel mode gre multipoint
Tunnel source 2001:aa01:ab02:ac02::1
Ipv6 nhrp nhs fc00::101:a001 nbma 2001:e42c:23ab:f00d::2019 multicast
Ipv6 nhrp network-id 11159301
Ipv6 nhrp authentication n3tm@n19
Ipv6 mtu 1392
Tunnel key 20191211
Ipv6 nhrp shortcut
Ipv6 pim
Ospfv3 301 ipv6 area 1
Ospfv3 network point-to-multipoint
Ospfv3 priority 0
Ospfv3 cost 2600
Ospfv3 hello-interval 10
Ospfv3 dead-interval 40
```