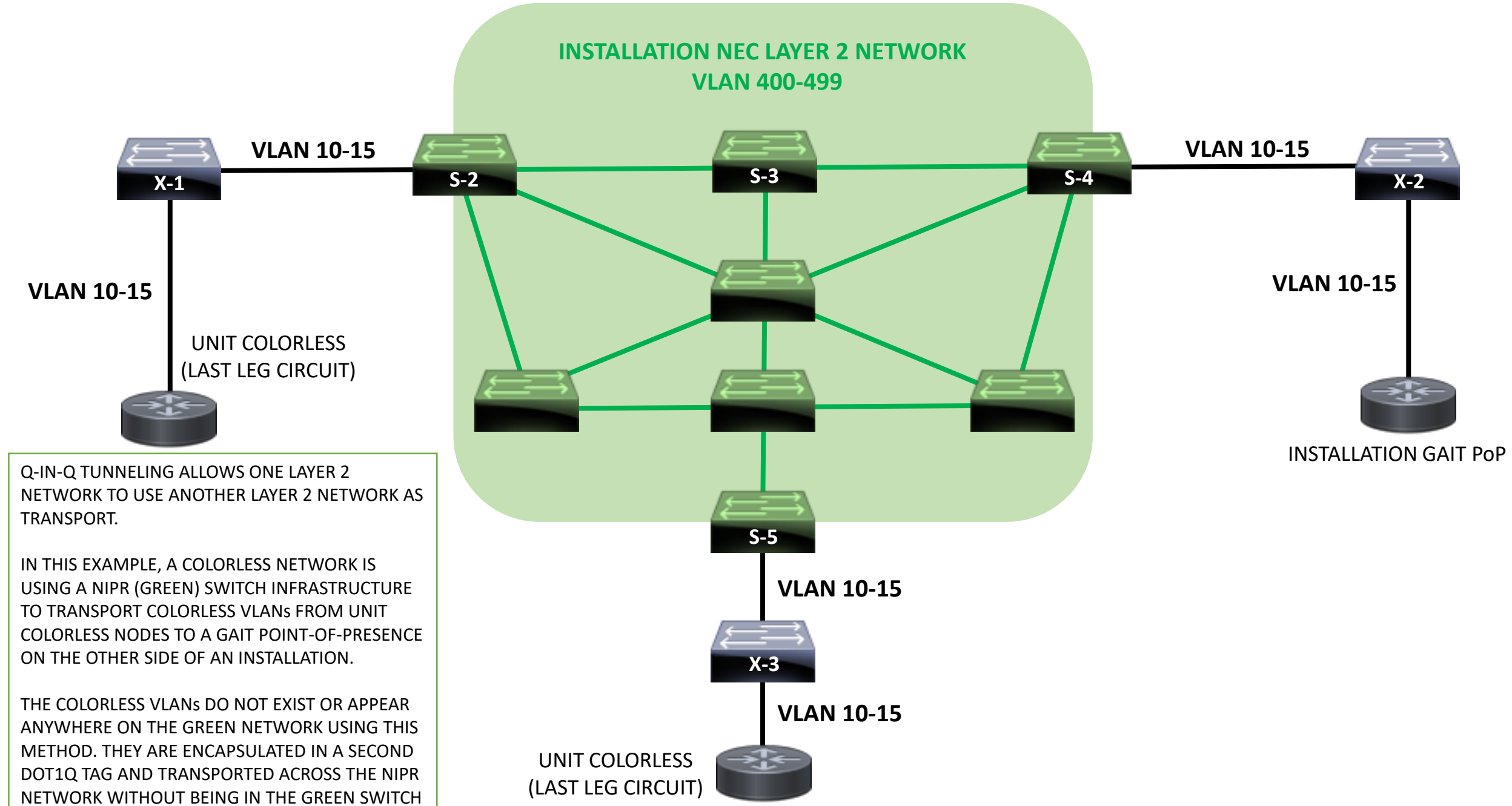
“Q-IN-Q TUNNELING”



Q-IN-Q TUNNELING ALLOWS ONE LAYER 2 NETWORK TO USE ANOTHER LAYER 2 NETWORK AS TRANSPORT.

IN THIS EXAMPLE, A COLORLESS NETWORK IS USING A NIPR (GREEN) SWITCH INFRASTRUCTURE TO TRANSPORT COLORLESS VLANs FROM UNIT COLORLESS NODES TO A GAIT POINT-OF-PRESENCE ON THE OTHER SIDE OF AN INSTALLATION.

THE COLORLESS VLANs DO NOT EXIST OR APPEAR ANYWHERE ON THE GREEN NETWORK USING THIS METHOD. THEY ARE ENCAPSULATED IN A SECOND DOT1Q TAG AND TRANSPORTED ACROSS THE NIPR NETWORK WITHOUT BEING IN THE GREEN SWITCH VLAN DATABASE(S).

THE COLORLESS NETWORK IN THIS EXAMPLE IS THE “EXTERNAL” NETWORK

```
X1#
!
Int g1/0/4
Sw mode trunk
Sw trunk allow vlan 10-15
```

```
X2#
!
Int g1/0/4
Sw mode trunk
Sw trunk allow vlan 10-15
```

INSTALLATION NEC LAYER 2 NETWORK

VLAN 400-499

X-1

VLAN 10-15

G1/0/4

S-2

S-3

S-4

VLAN 10-15

G1/0/4

X-2

VLAN 10-15

UNIT COLORLESS
(LAST LEG CIRCUIT)

VLAN 10-15

INSTALLATION GAIT PoP

CONFIGURATION ON THE COLORLESS SWITCHES LOOKS LIKE A STANDARD TRUNK PORT. THE VLANs TO BE TRANSPORTED MUST EXIST ON THE COLORLESS SWITCHES. THE GREEN NETWORK WILL BE TRANSPARENT TO THEM AND THE TRUNKED TRAFFIC PASSED BETWEEN THE COLORLESS SWITCHES WILL BEHAVE LIKE ANY STANDARD LAYER 2 NETWORK.

S-5

VLAN 10-15

G1/0/4

X-3

```
X3#
!
Int g1/0/4
Sw mode trunk
Sw trunk allow vlan 10-15
```

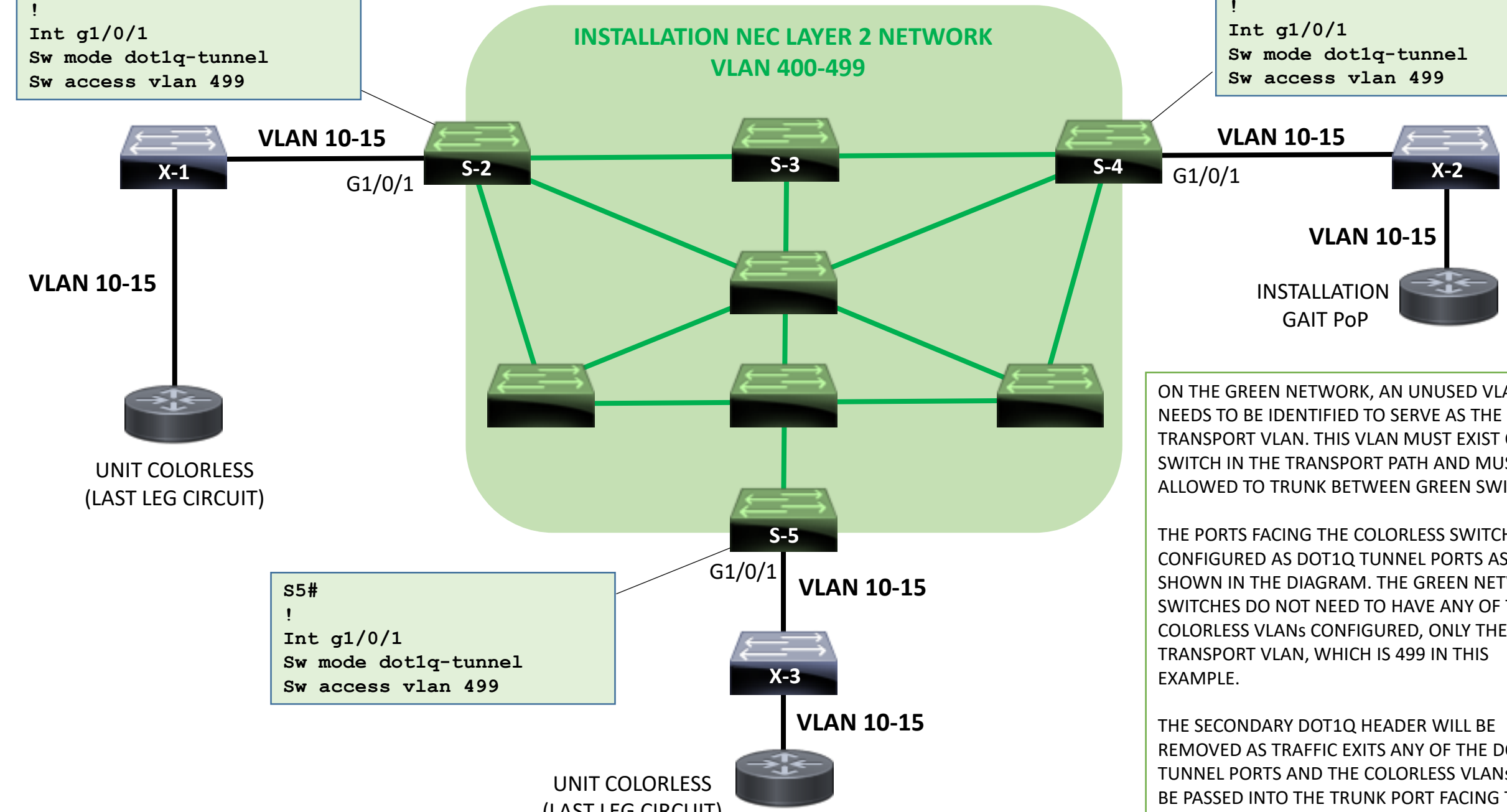
VLAN 10-15

UNIT COLORLESS
(LAST LEG CIRCUIT)

THE GREEN NETWORK IN THIS EXAMPLE IS THE “INTERNAL” NETWORK

```
S2#
!
Int g1/0/1
Sw mode dot1q-tunnel
Sw access vlan 499
```

```
S4#
!
Int g1/0/1
Sw mode dot1q-tunnel
Sw access vlan 499
```




```
S5#
!
Int g1/0/1
Sw mode dot1q-tunnel
Sw access vlan 499
```

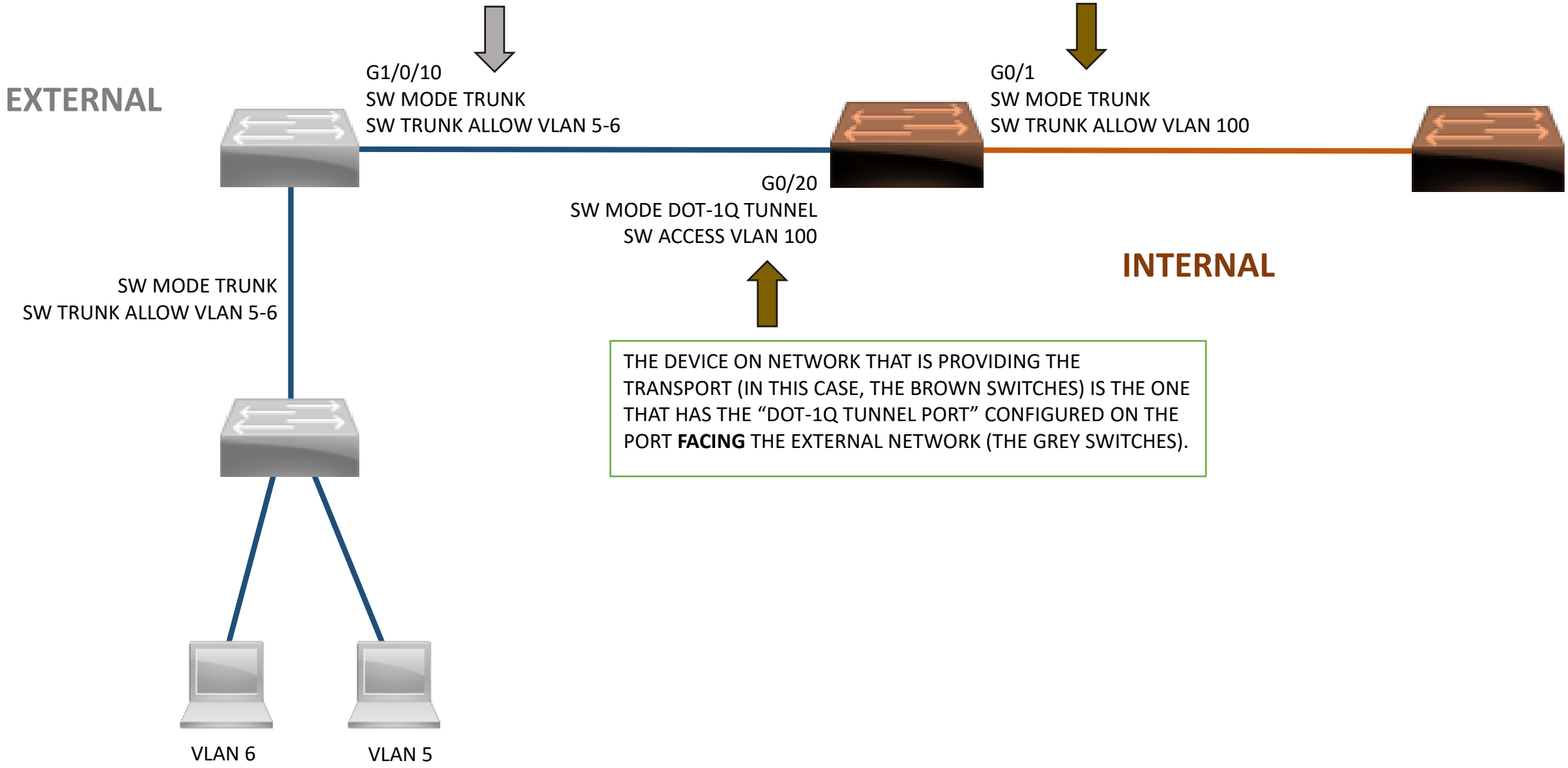
ON THE GREEN NETWORK, AN UNUSED VLAN NEEDS TO BE IDENTIFIED TO SERVE AS THE TRANSPORT VLAN. THIS VLAN MUST EXIST ON ANY SWITCH IN THE TRANSPORT PATH AND MUST BE ALLOWED TO TRUNK BETWEEN GREEN SWITCHES.

THE PORTS FACING THE COLORLESS SWITCHES ARE CONFIGURED AS DOT1Q TUNNEL PORTS AS SHOWN IN THE DIAGRAM. THE GREEN NETWORK SWITCHES DO NOT NEED TO HAVE ANY OF THE COLORLESS VLANs CONFIGURED, ONLY THE TRANSPORT VLAN, WHICH IS 499 IN THIS EXAMPLE.

THE SECONDARY DOT1Q HEADER WILL BE REMOVED AS TRAFFIC EXITS ANY OF THE DOT1Q TUNNEL PORTS AND THE COLORLESS VLANs WILL BE PASSED INTO THE TRUNK PORT FACING THE DOT1Q TUNNEL.

THE DEVICE ON THE EXTERNAL NETWORK THAT IS BEING TRANSPORTED HAS A STANDARD TRUNK PORT WITH THE EXTERNAL VLANS ALLOWED, **FACING** THE DOT-1Q TUNNEL PORT ON THE INTERNAL NETWORK SWITCH.

THE DEVICE ON THE INTERNAL NETWORK THAT IS PROVIDING THE TRANSPORT (IN THIS CASE, THE BROWN SWITCHES) HAS A STANDARD TRUNK PORT CARRYING THE TRANSPORT VLAN (100) FACING THE OTHER DEVICES IN ITS OWN NETWORK.



THE DEVICE ON NETWORK THAT IS PROVIDING THE TRANSPORT (IN THIS CASE, THE BROWN SWITCHES) IS THE ONE THAT HAS THE “DOT-1Q TUNNEL PORT” CONFIGURED ON THE PORT **FACING** THE EXTERNAL NETWORK (THE GREY SWITCHES).