

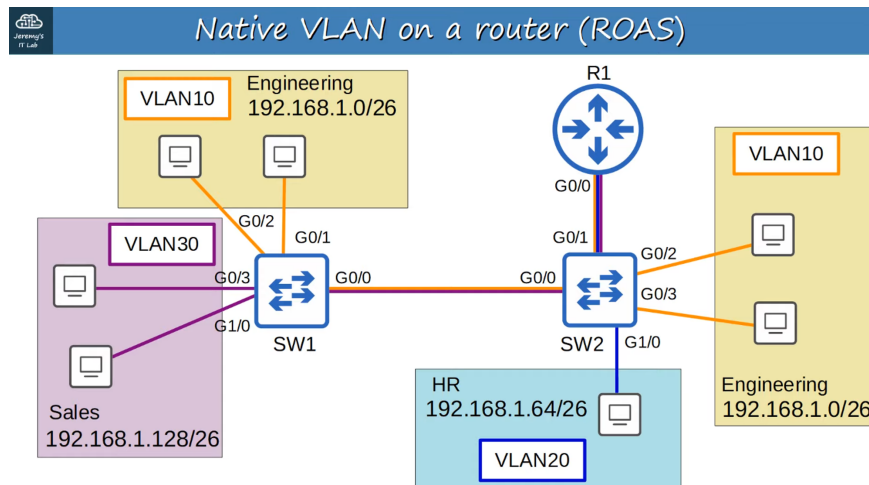
Day 18 - (VLANs pt 3)

Wednesday, August 26, 2026

5:05 PM

18. VLANS : PART 3

NATIVE VLAN ON A ROUTER (ROAS)



Native VLAN untagged frames are faster and more efficient (smaller) than tagged ones.

Let's reset all SWITCHES (SW1 and SW2) to native vlan 10

```
SW1(config)#int g0/0
SW1(config-if)#switchport trunk native vlan 10
SW1(config-if)#
```

```
SW2(config)#int g0/0
SW2(config-if)#switchport trunk native vlan 10
SW2(config-if)#int g0/1
SW2(config-if)#switchport trunk native vlan 10
SW2(config-if)#
```

There are TWO methods of configuring the native VLAN on a router:

- Use the command "encapsulation dot1q " on a Sub-Interface

```
R1(config)#int g0/0.10
R1(config-subif)#encapsulation dot1q 10 native
R1(config-subif)#
```

OR

- Configure the IP address for the native VLAN on the router's physical interface (the "encapsulation dot1q command is not necessary")

```
R1(config)#no interface g0/0.10
R1(config)#interface g0/0
R1(config-if)#ip address 192.168.1.62 255.255.255.192
R1(config-if)#
```

RI(config)#

Output of "show running-config" of G0/0 Interface

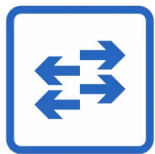
```
!  
interface GigabitEthernet0/0  
 ip address 192.168.1.62 255.255.255.192  
 duplex auto  
 speed auto  
 media-type rj45  
!  
interface GigabitEthernet0/0.20  
 encapsulation dot1Q 20  
 ip address 192.168.1.126 255.255.255.192  
!  
interface GigabitEthernet0/0.30  
 encapsulation dot1Q 30  
 ip address 192.168.1.190 255.255.255.192  
!
```

LAYER 3 (MULTILAYER) SWITCHES

ICON APPEARANCE



Layer 3 (Multilayer) Switches



Layer 2 switch



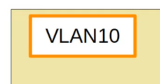
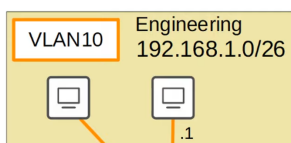
Layer 3 switch

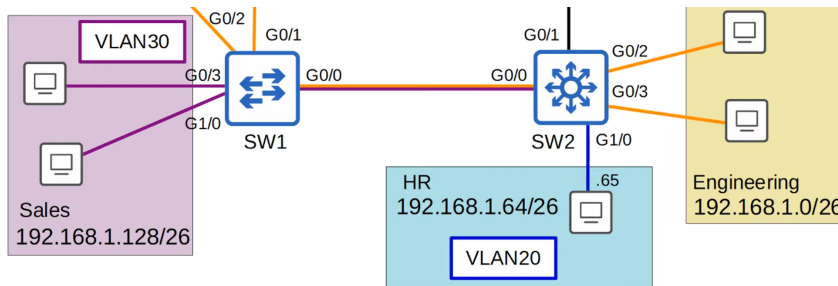


- A MULTILAYER SWITCH is capable of both SWITCHING and ROUTING
- It is LAYER 3 AWARE
- You can assign IP Addresses to its L3 Virtual Interface, like a router
- You can create Virtual Interfaces for each VLAN, and assign IP addresses to those interfaces
- You can configure routes on it, just like a ROUTER
- It can be used for inter-VLAN routing



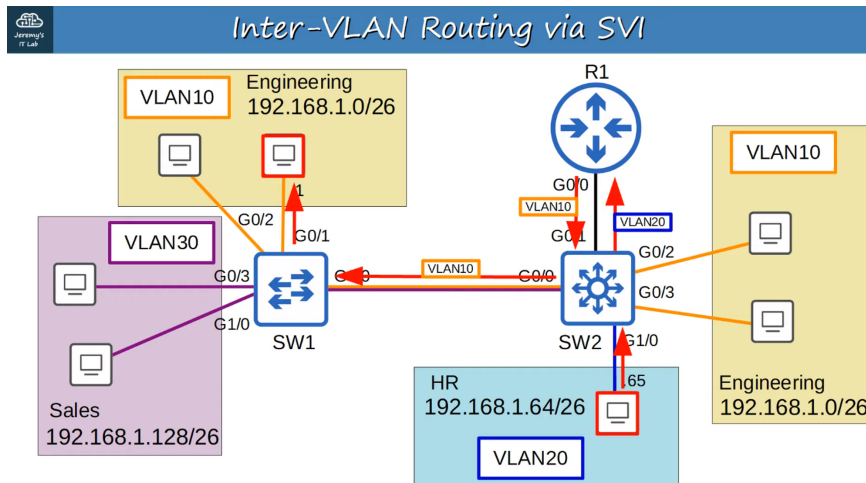
Inter-VLAN Routing via SVI



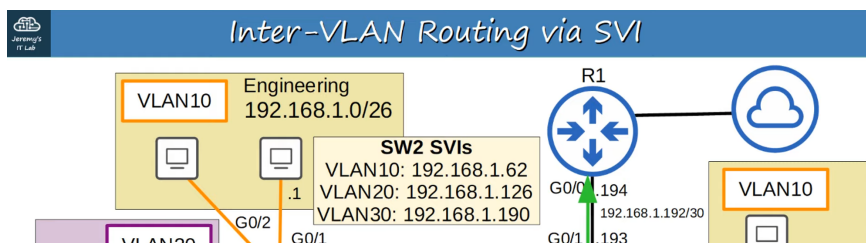
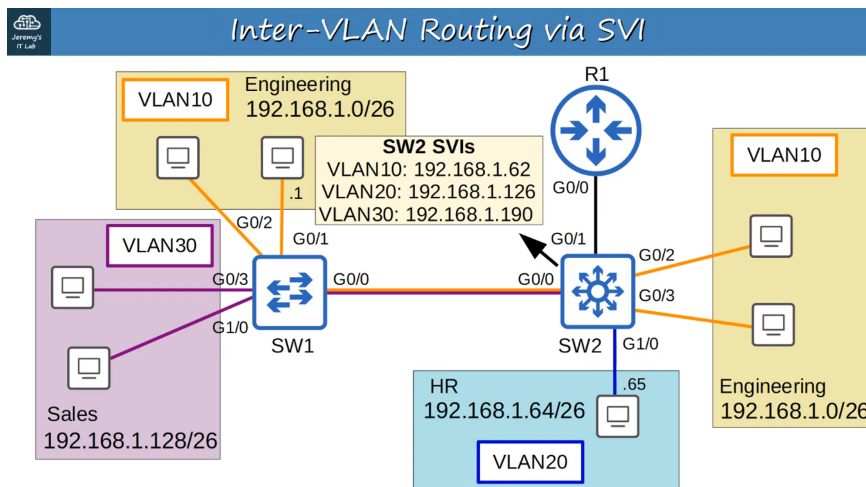


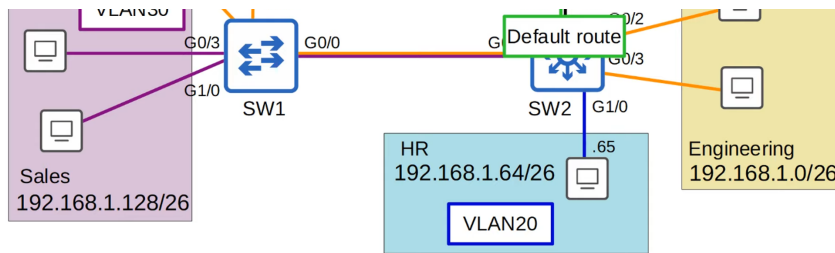
SW2 Replaced with a Layer 3 Switch

Multi-VLAN connections to R1 removed and replaced with a point-to-point Layer 3 connection



- SVIs (Switch Virtual Interfaces) are the virtual interfaces you can assign IP addresses to in a MULTILAYER SWITCH.
- Configure each HOST to use the SVI (NOT the ROUTER R1) as their Gateway Address
- To send traffic to different SUBNETS / VLANs, the PCs will send traffic to the SWITCH, and the SWITCH will route the traffic.





Clearing R1 configuration to set to work with the Layer 3 Point-to-Point connection

```

Inter-VLAN Routing via SVI

R1(config)#no interface g0/0.10
R1(config)#no interface g0/0.20
R1(config)#no interface g0/0.30
R1(config)#default interface g0/0
Interface GigabitEthernet0/0 set to default configuration
R1(config)#do show ip interface brief

```

Interface	IP-Address	OK?	Method	Status	Protocol
GigabitEthernet0/0	unassigned	YES	NVRAM	up	up
GigabitEthernet0/0.10	unassigned	YES	manual	deleted	down
GigabitEthernet0/0.20	unassigned	YES	manual	deleted	down
GigabitEthernet0/0.30	unassigned	YES	manual	deleted	down
GigabitEthernet0/1	unassigned	YES	NVRAM	administratively down	down
GigabitEthernet0/2	unassigned	YES	NVRAM	administratively down	down
GigabitEthernet0/3	unassigned	YES	NVRAM	administratively down	down

#no interface : removes the VLAN interface

#default interface g0/0 : resets the g0/0 interface to it's default settings

Then configure the default R1 G0/0 interface's to IP address : 192.168.1.194 (as per the network diagram)

Configuration of SW2 to use SVI and the Layer 3 Point-to-Point connection with R1

```

Inter-VLAN Routing via SVI

SW2(config)#default interface g0/1
Interface GigabitEthernet0/1 set to default configuration
SW2(config)#ip routing
SW2(config)#interface g0/1
SW2(config-if)#no switchport
SW2(config-if)#ip address 192.168.1.193 255.255.255.252
SW2(config-if)#do show ip interface brief

```

Interface	IP-Address	OK?	Method	Status	Protocol
GigabitEthernet0/0	unassigned	YES	unset	up	up
GigabitEthernet0/2	unassigned	YES	unset	up	up
GigabitEthernet0/3	unassigned	YES	unset	up	up
GigabitEthernet0/1	192.168.1.193	YES	manual	up	up
GigabitEthernet1/0	unassigned	YES	unset	up	up
GigabitEthernet1/1	unassigned	YES	unset	up	up
GigabitEthernet1/2	unassigned	YES	unset	up	up
GigabitEthernet1/3	unassigned	YES	unset	up	up
GigabitEthernet2/0	unassigned	YES	unset	up	up
GigabitEthernet2/1	unassigned	YES	unset	up	up
GigabitEthernet2/2	unassigned	YES	unset	up	up
GigabitEthernet2/3	unassigned	YES	unset	up	up

"default interface " : resets settings on specified interface to defaults

"ip routing" : IMPORTANT command to enable Layer 3 routing on the SWITCH

"no switchport" : configures the interface from a Layer 2 Switchport to a Layer 3 "routed port"

The sets the Default Route to R1 (192.168.1.194) so that all traffic leaving the network gets routed through R1's Gateway of Last Resort (aka The Default Gateway)


```

SW2(config-if)#exit
SW2(config)#ip route 0.0.0.0 0.0.0.0 192.168.1.194
SW2(config)#do show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override

Gateway of last resort is 192.168.1.194 to network 0.0.0.0

S*    0.0.0.0/0 [1/0] via 192.168.1.194
      192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C      192.168.1.192/30 is directly connected, GigabitEthernet0/1
L      192.168.1.193/32 is directly connected, GigabitEthernet0/1
SW2(config)#

```

Inter-VLAN Routing via SVI

```

SW2#show interfaces status

```

Port	Name	Status	Vlan	Duplex	Speed	Type
Gi0/0		connected	trunk	auto	auto	unknown
Gi0/2		connected	10	auto	auto	unknown
Gi0/3		connected	10	auto	auto	unknown
Gi0/1		connected	routed	auto	auto	unknown
Gi1/0		connected	20	auto	auto	unknown
Gi1/1		connected	1	auto	auto	unknown
Gi1/2		connected	1	auto	auto	unknown
Gi1/3		connected	1	auto	auto	unknown
Gi2/0		connected	1	auto	auto	unknown
Gi2/1		connected	1	auto	auto	unknown
Gi2/2		connected	1	auto	auto	unknown
Gi2/3		connected	1	auto	auto	unknown
Gi3/0		connected	1	auto	auto	unknown
Gi3/1		connected	1	auto	auto	unknown
Gi3/2		connected	1	auto	auto	unknown
Gi3/3		connected	1	auto	auto	unknown

```

SW2#

```

SVI CONFIGURATION ON SW2 (Virtual LAYER 3 ROUTING INTERFACES)



Inter-VLAN Routing via SVI

```

SW2(config)#interface vlan10
SW2(config-if)#ip address 192.168.1.62 255.255.255.192
SW2(config-if)#no shutdown
SW2(config-if)#interface vlan20
SW2(config-if)#ip address 192.168.1.126 255.255.255.192
SW2(config-if)#no shutdown
SW2(config-if)#interface vlan30
SW2(config-if)#ip address 192.168.1.190 255.255.255.192
SW2(config-if)#no shutdown

```

SVIs are shut down by default, so remember to use "no shutdown"

Inter-VLAN Routing via SVI

```

SW2(config-if)#interface vlan40
SW2(config-if)#ip address 40.40.40.40 255.255.255.0
SW2(config-if)#no shutdown
SW2(config-if)#do show ip interface brief

```

Interface	IP-Address	OK?	Method	Status	Protocol
GigabitEthernet0/0	unassigned	YES	unset	up	up
GigabitEthernet0/2	unassigned	YES	unset	up	up
GigabitEthernet0/3	unassigned	YES	unset	up	up
GigabitEthernet0/1	192.168.1.193	YES	manual	up	up

Vlan10	192.168.1.62	YES	manual	up	up
Vlan20	192.168.1.126	YES	manual	up	up
Vlan30	192.168.1.190	YES	manual	up	up
Vlan40	40.40.40.40	YES	manual	down	down

Creating an unknown SVI (VLAN 40) and the Status/Protocol is “down/down”

What are the conditions for a SVI to be “up/up” ?

- The VLAN must exist on the SWITCH
- The SWITCH must have at least ONE access port in the VLAN in an “up/up” state AND/OR one TRUNK port that allows the VLAN that is in an “up/up” state
- The VLAN must not be shutdown (you can use the “shutdown” command to disable a VLAN)
- The SVI must not be shutdown (SVIs are disabled, by default)

Inter-VLAN Routing via SVI

```
SW2(config-if)#do show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override

Gateway of last resort is 192.168.1.194 to network 0.0.0.0

S*    0.0.0.0/0 [1/0] via 192.168.1.194
      192.168.1.0/24 is variably subnetted, 8 subnets, 3 masks
C      192.168.1.0/26 is directly connected, Vlan10
L      192.168.1.62/32 is directly connected, Vlan10
C      192.168.1.64/26 is directly connected, Vlan20
L      192.168.1.126/32 is directly connected, Vlan20
C      192.168.1.128/26 is directly connected, Vlan30
L      192.168.1.190/32 is directly connected, Vlan30
C      192.168.1.192/30 is directly connected, GigabitEthernet0/1
L      192.168.1.193/32 is directly connected, GigabitEthernet0/1
SW2(config-if)#
```

The VLAN trunk has been successfully replaced by an Layer 3 SWITCH SVI.

All hosts should be able to connect with each other (tested with “ping”) as well as reach the external internet (via the Cloud symbol attached to R1)