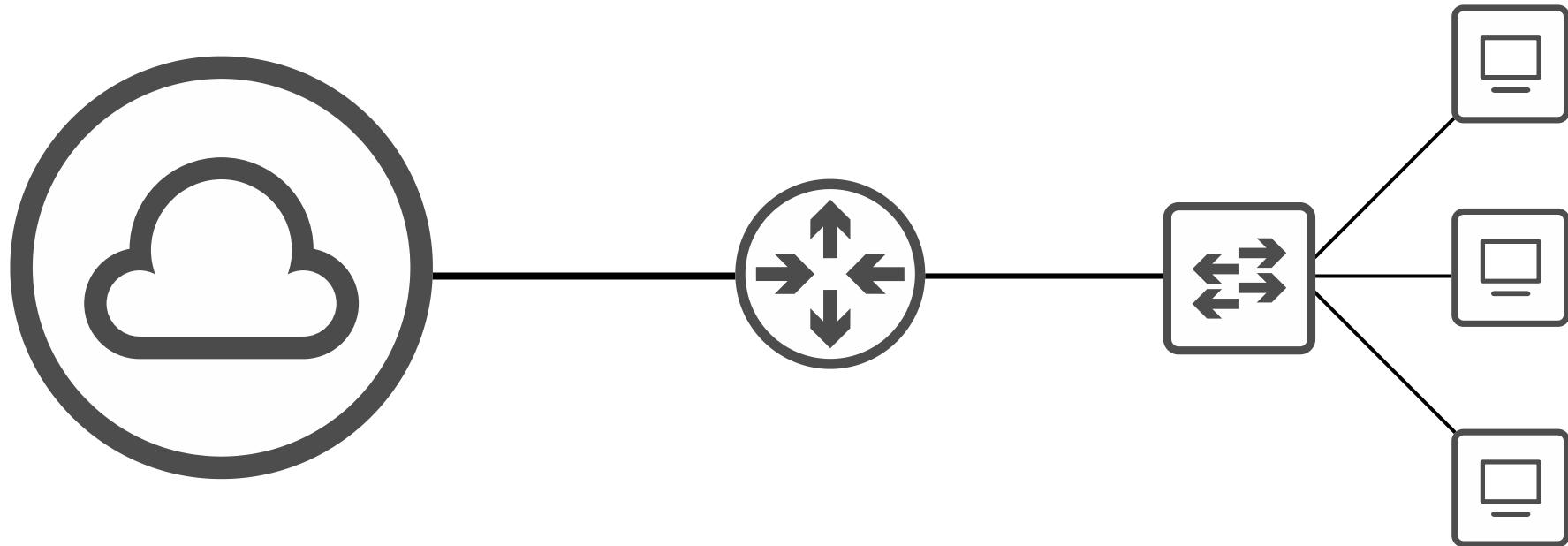


# CCNA 200-301 Day 18

## VLANs (Virtual Local Area Networks) Part 3



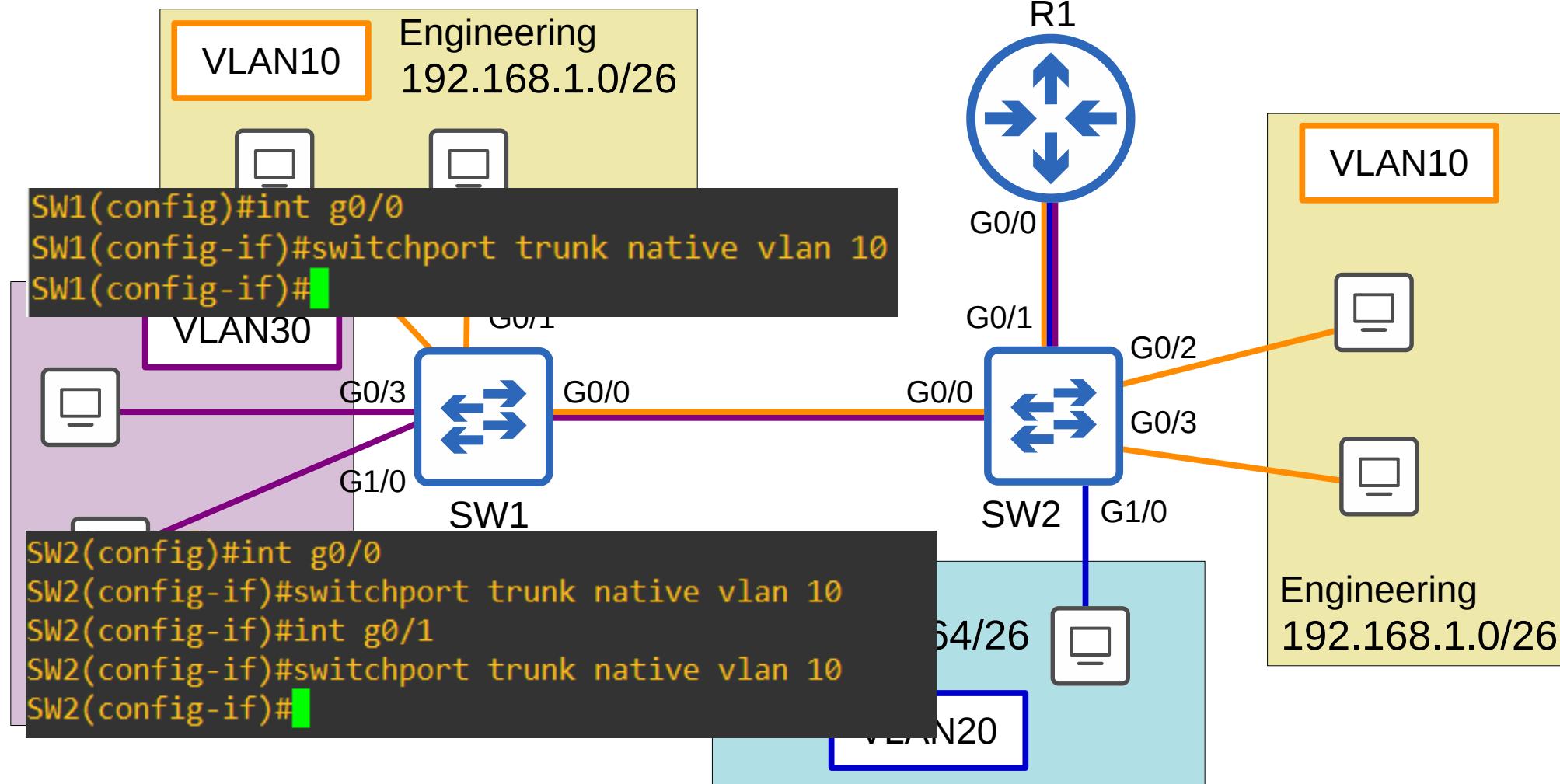
# Things we'll cover

- Native VLAN on a router
- Wireshark analysis
- Layer 3 Switching/Multilayer Switching

- DTP (Dynamic Trunking Protocol)
- VTP (VLAN Trunking Protocol)

NEXT VIDEO

# Native VLAN on a router (ROAS)

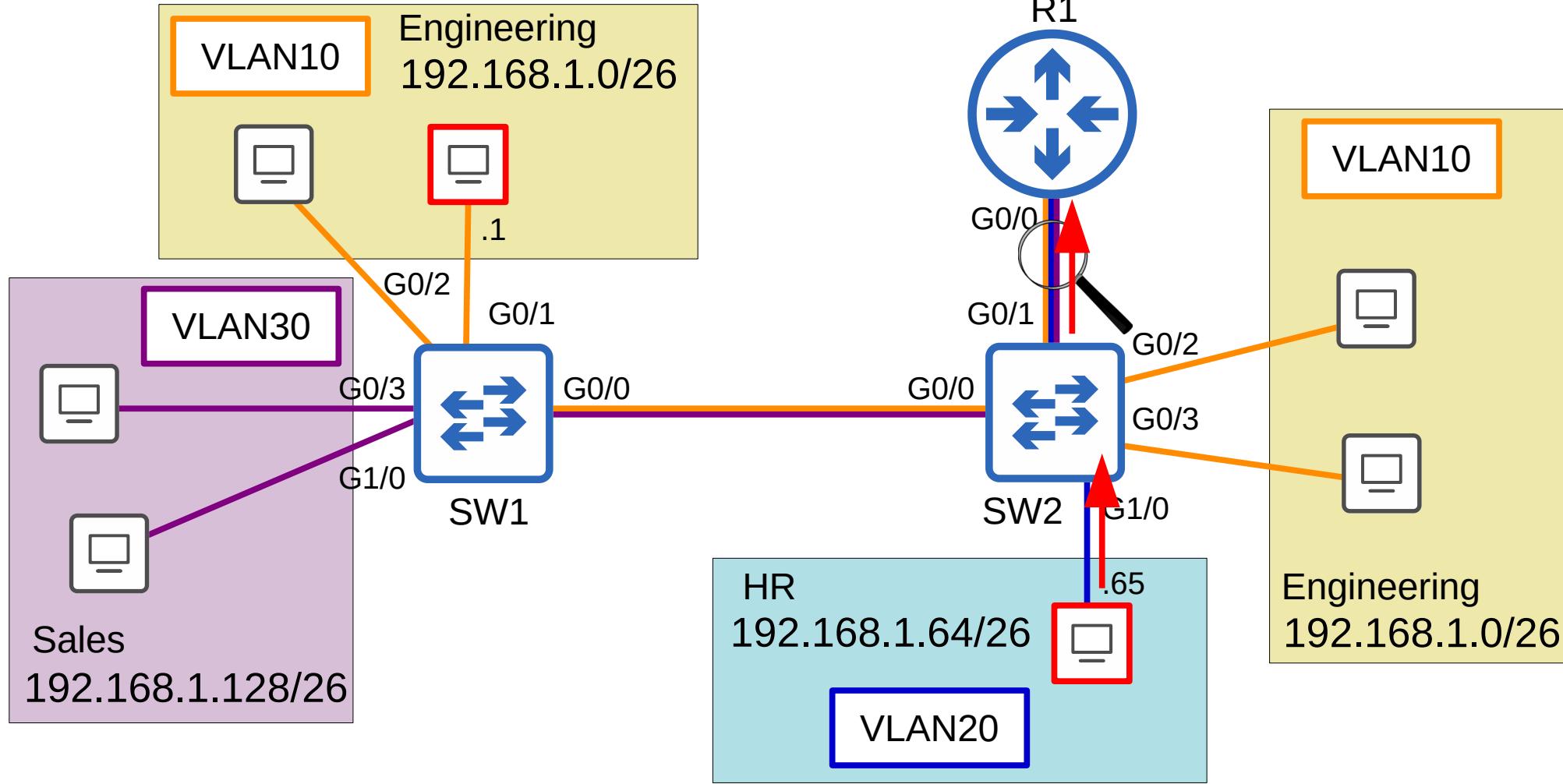


# Native VLAN on a router (ROAS)

- There are **2 methods** of configuring the native VLAN on a router:
  - Use the command **encapsulation dot1q *vlan-id* native** on the router subinterface.

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

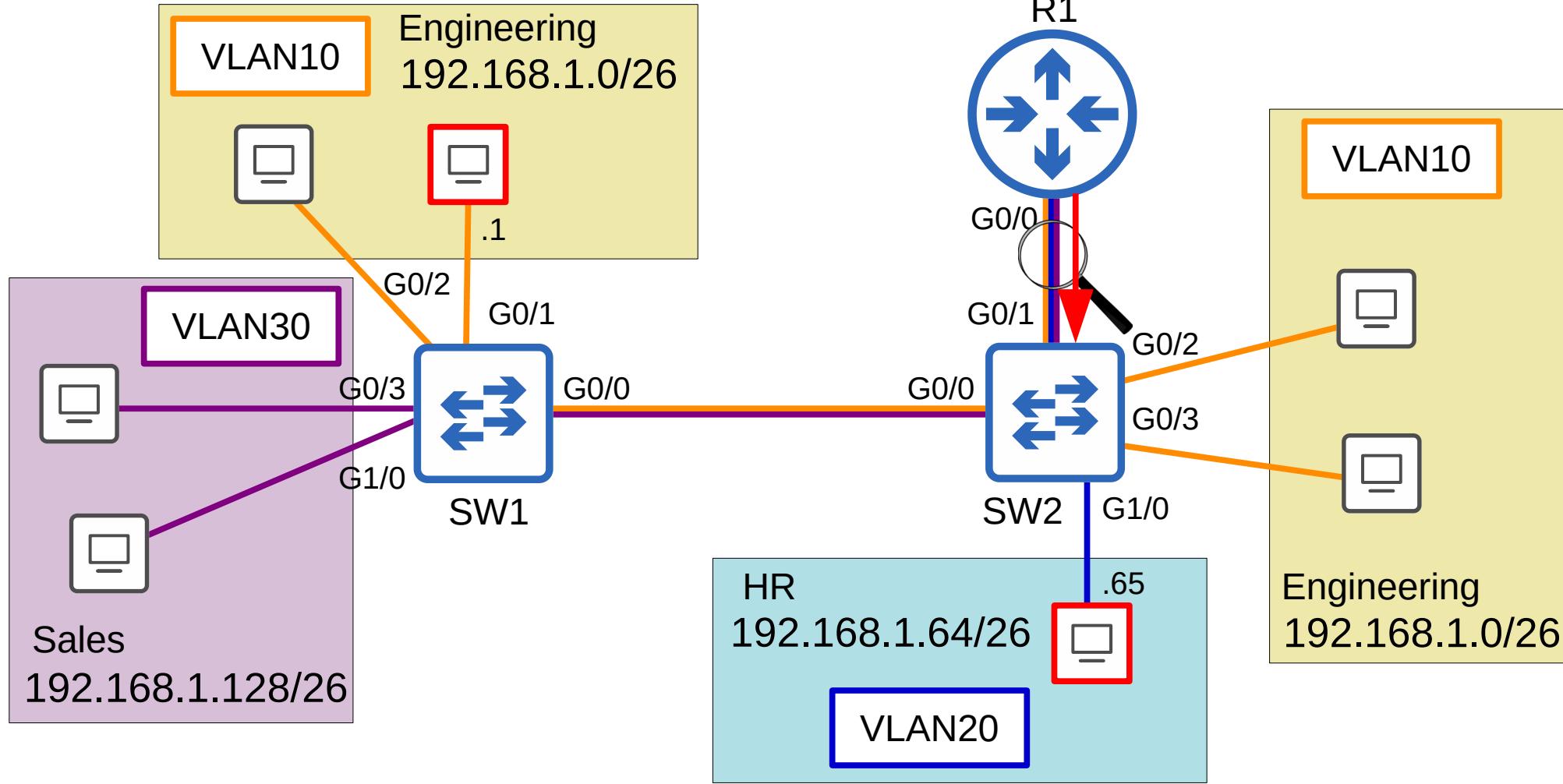
# Native VLAN on a router (ROAS)



# Wireshark Capture (SW2 → R1)

```
> Frame 104: 118 bytes on wire (944 bits), 118 bytes captured (944 bits) on interface 0
  ▼ Ethernet II, Src: 0c:bd:ad:00:70:00 (0c:bd:ad:00:70:00), Dst: 0c:bd:ad:c5:08:00 (0c:bd:ad:c5:08:00)
    > Destination: 0c:bd:ad:c5:08:00 (0c:bd:ad:c5:08:00)
    > Source: 0c:bd:ad:00:70:00 (0c:bd:ad:00:70:00)
    Type: 802.1Q Virtual LAN (0x8100)
  ▼ 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 20
    000. .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... = DEI: Ineligible
    .... 0000 0001 0100 = ID: 20
    Type: IPv4 (0x0800)
  > Internet Protocol Version 4, Src: 192.168.1.65, Dst: 192.168.1.1
  > Internet Control Message Protocol
```

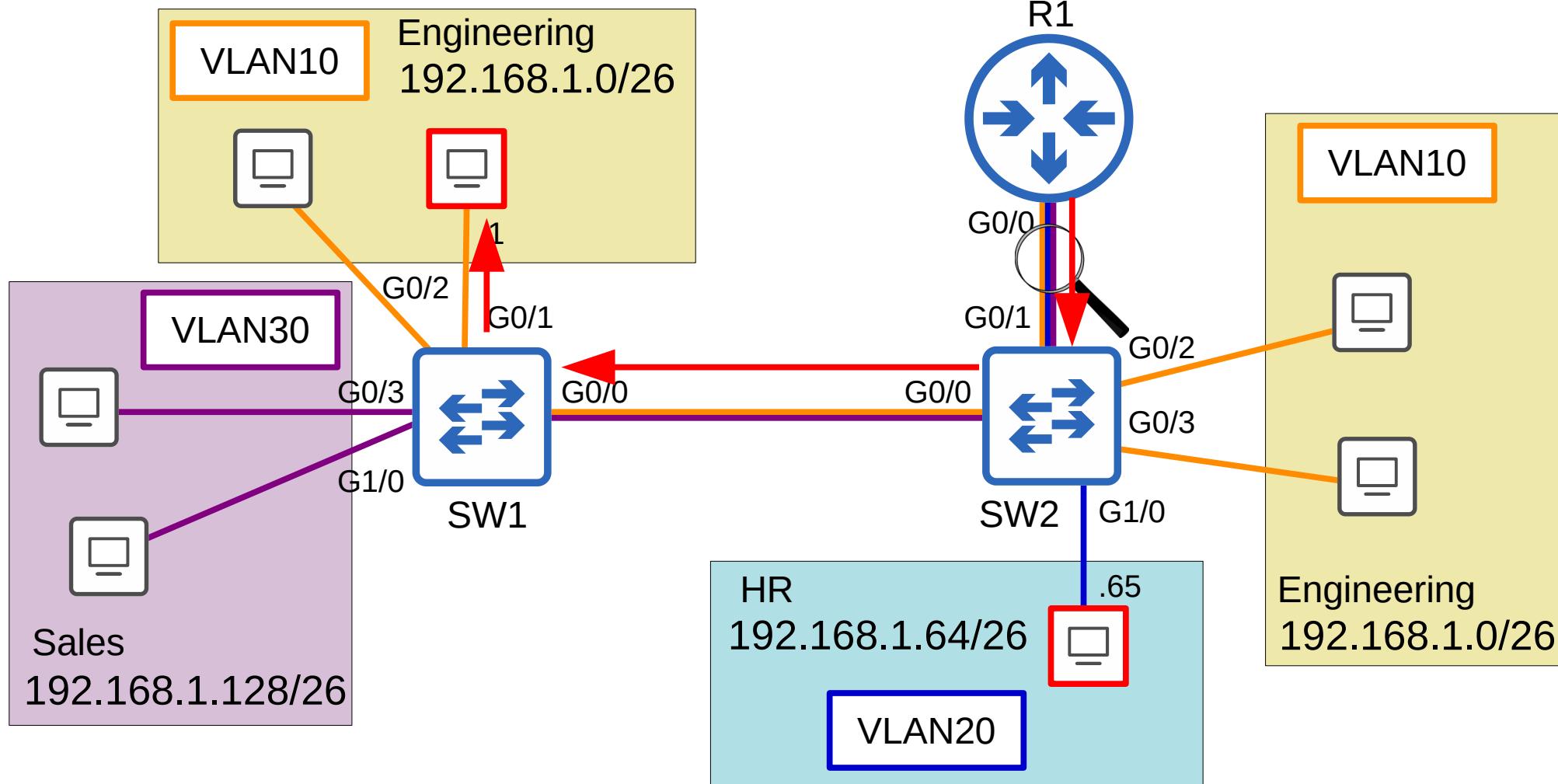
# Native VLAN on a router (ROAS)



# Wireshark Capture ( $R1 \rightarrow SW2$ )

- > Frame 105: 114 bytes on wire (912 bits), 114 bytes captured (912 bits) on interface 0
- <ul style="list-style-type: none;">- > Ethernet II, Src: 0c:bd:ad:c5:08:00 (0c:bd:ad:c5:08:00), Dst: 0c:bd:ad:84:0a:00 (0c:bd:ad:84:0a:00)
  - > Destination: 0c:bd:ad:84:0a:00 (0c:bd:ad:84:0a:00)
  - > Source: 0c:bd:ad:c5:08:00 (0c:bd:ad:c5:08:00)
  - > Type: IPv4 (0x0800)
- > Internet Protocol Version 4, Src: 192.168.1.65, Dst: 192.168.1.1
- > Internet Control Message Protocol

# Native VLAN on a router (ROAS)



# Native VLAN on a router (ROAS)

- There are **2 methods** of configuring the native VLAN on a

```
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)#
```

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

# Native VLAN on a router (ROAS)

```
!
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
```

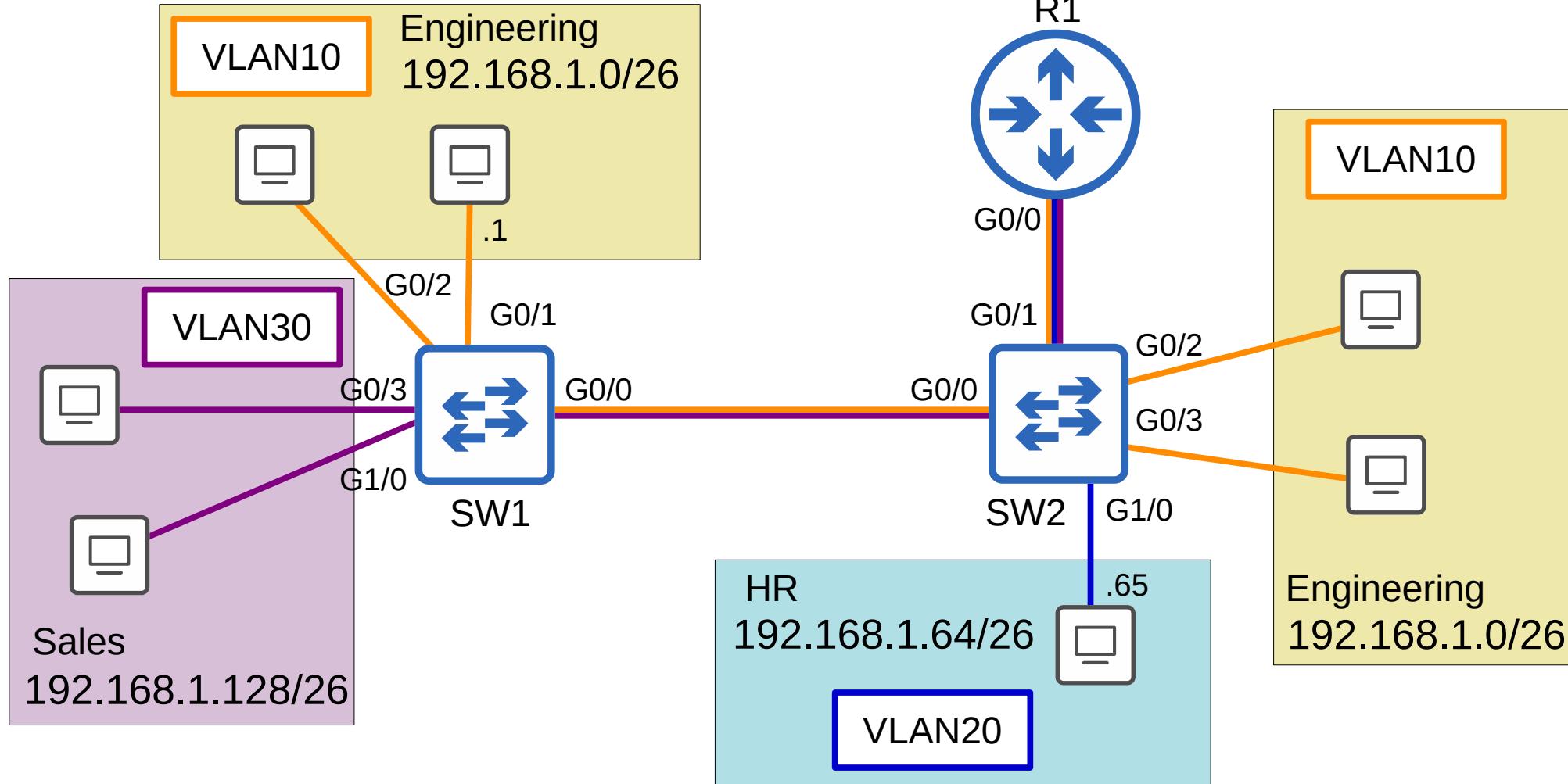
```
!
interface GigabitEthernet0/0.30
  encapsulation dot1Q 30
  ip address 192.168.1.190 255.255.255.192
```

```
!
```

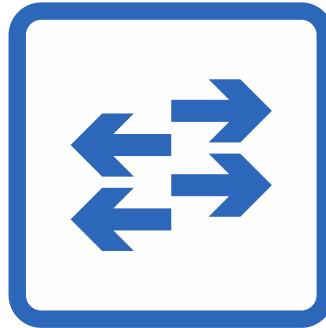
# Native VLAN on a router (ROAS)

- There are **2 methods** of configuring the native VLAN on a router:
  - Use the command **encapsulation dot1q *vlan-id*** **native** on the router subinterface.
  - Configure the IP address for the native VLAN on the router's physical interface (the **encapsulation dot1q *vlan-id*** command is not necessary)

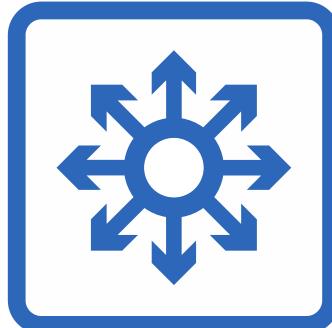
# Layer 3 (Multilayer) Switches



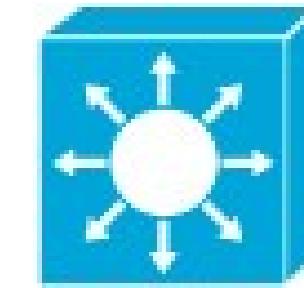
# Layer 3 (Multilayer) Switches



Layer 2 switch



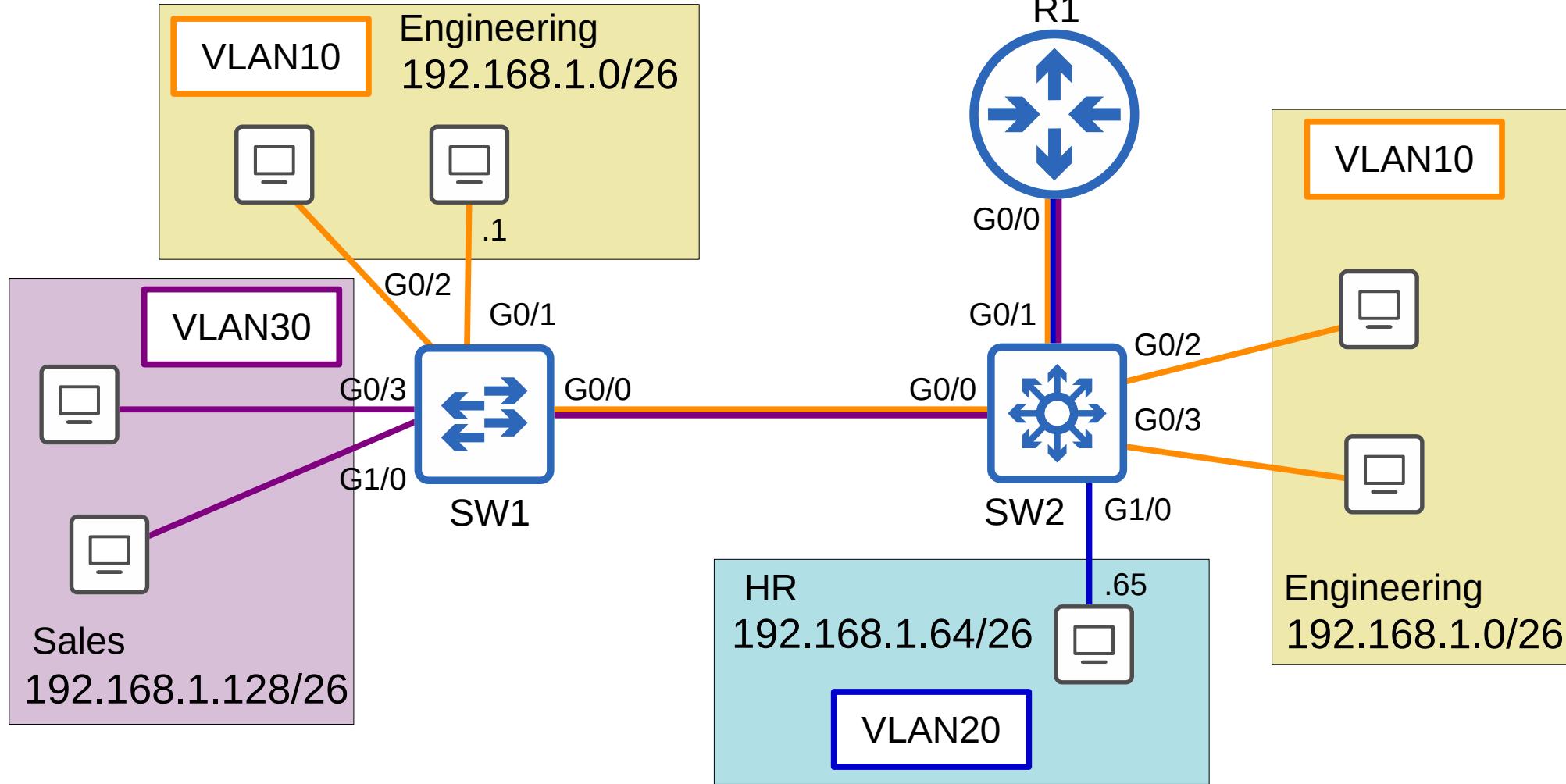
Layer 3 switch



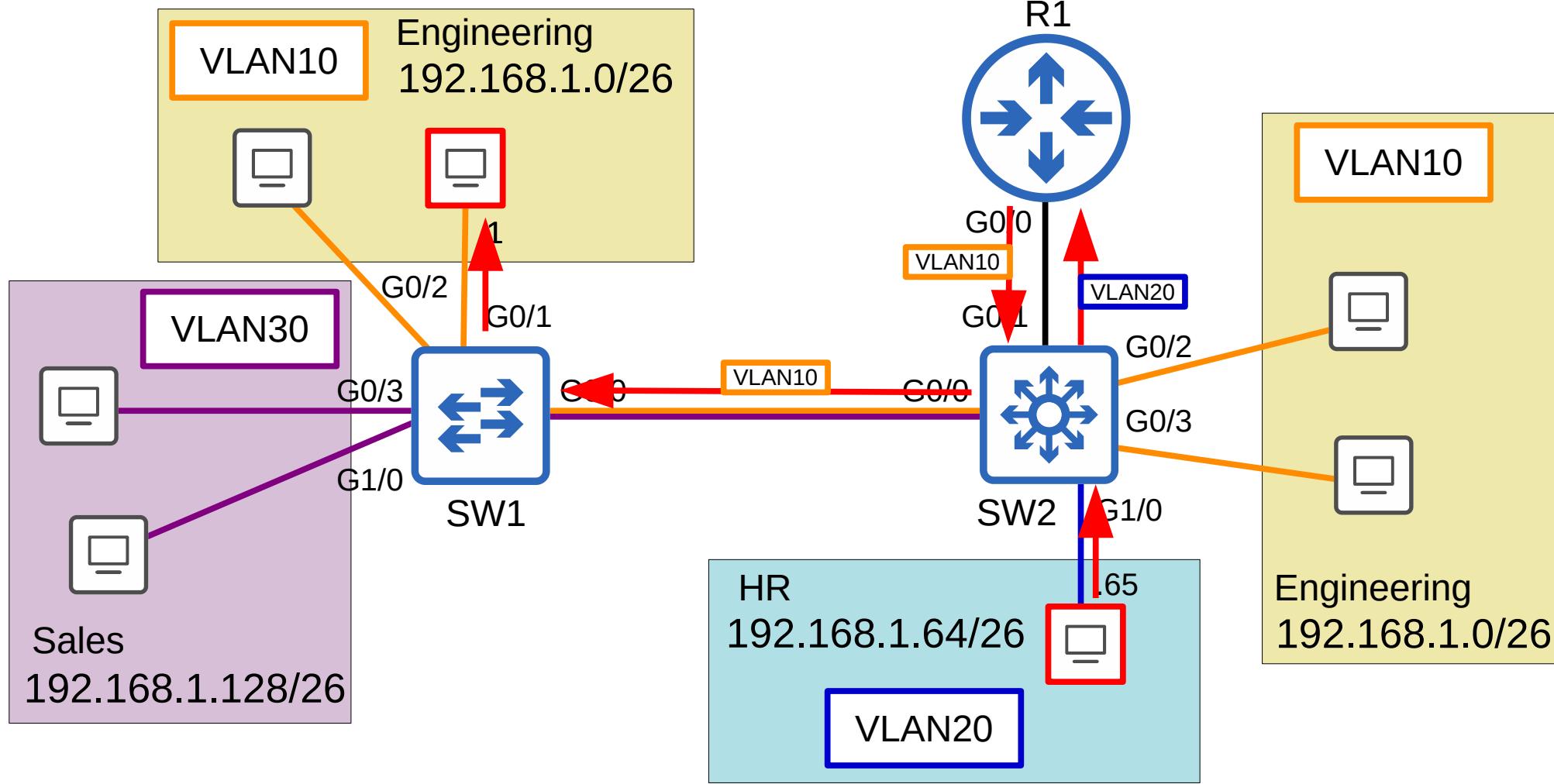
# Layer 3 (Multilayer) Switches

- A multilayer switch is capable of both *switching* AND *routing*.
- It is ‘Layer 3 aware’.
- You can assign IP addresses to its interfaces, 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.

# Layer 3 (Multilayer) Switches



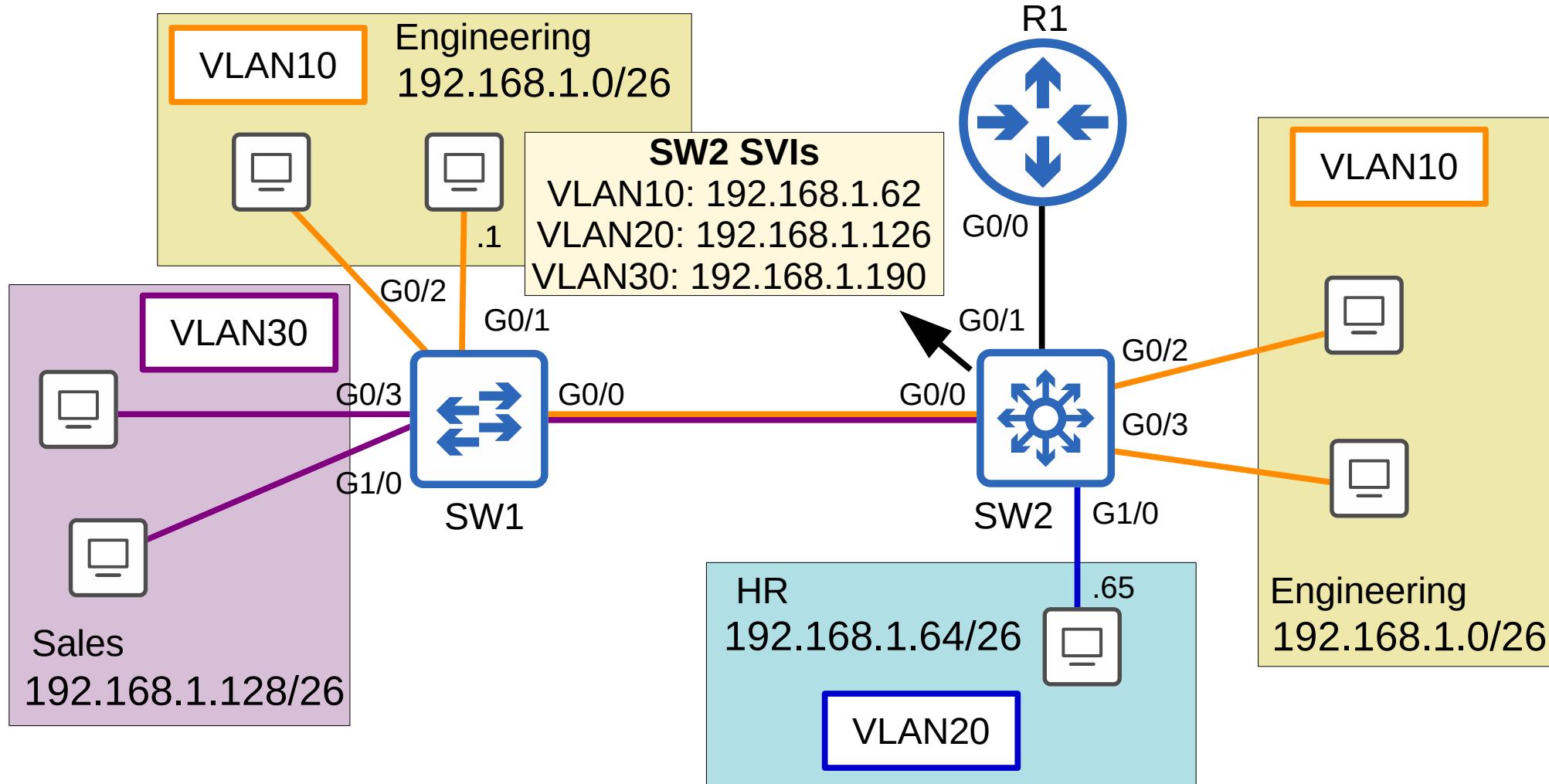
# Inter-VLAN Routing via SVI



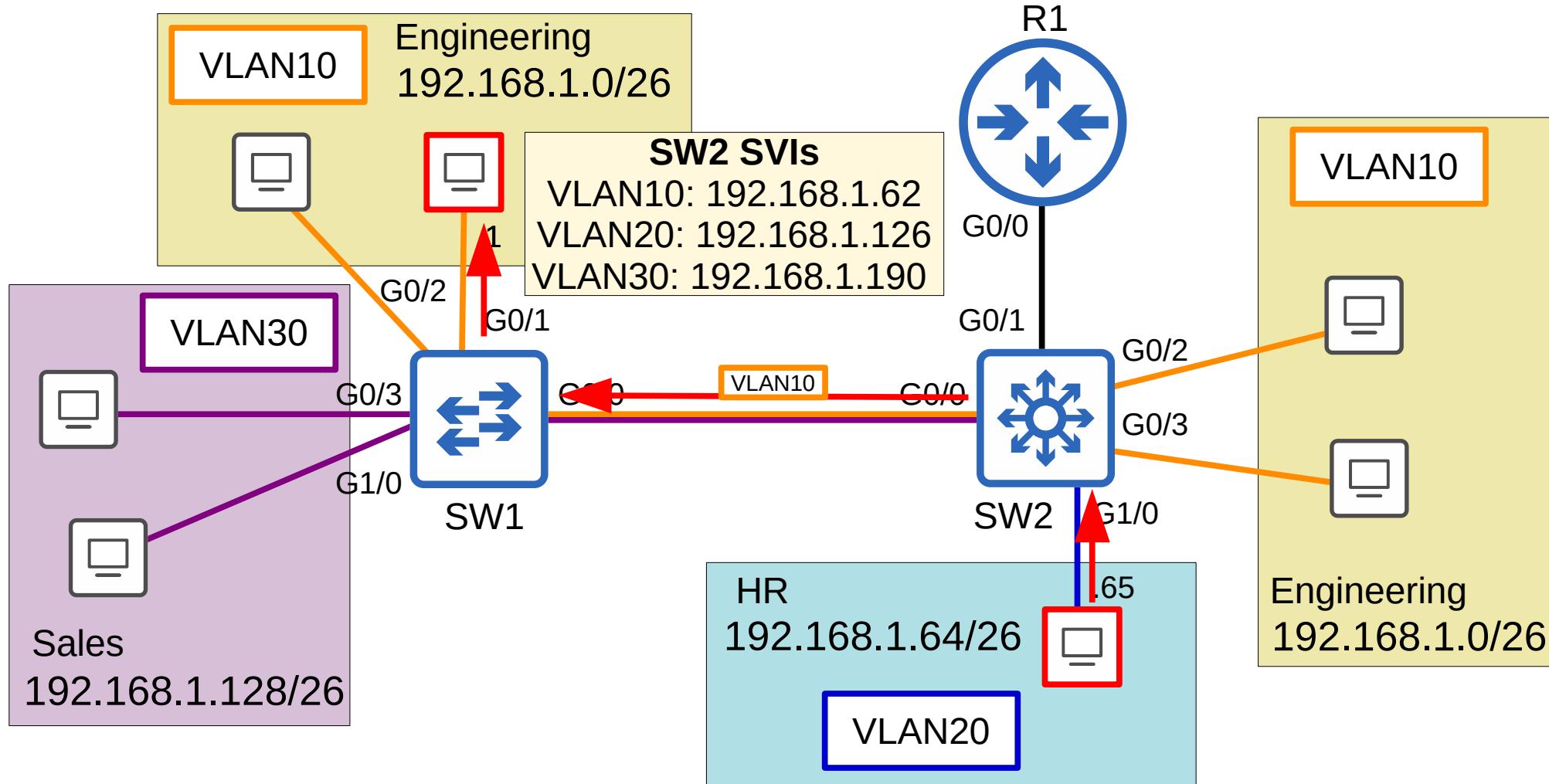
# Inter-VLAN Routing via SVI

- SVIs (Switch Virtual Interfaces) are the virtual interfaces you can assign IP addresses to in a multilayer switch.
- Configure each PC to use the SVI (NOT the router) 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.

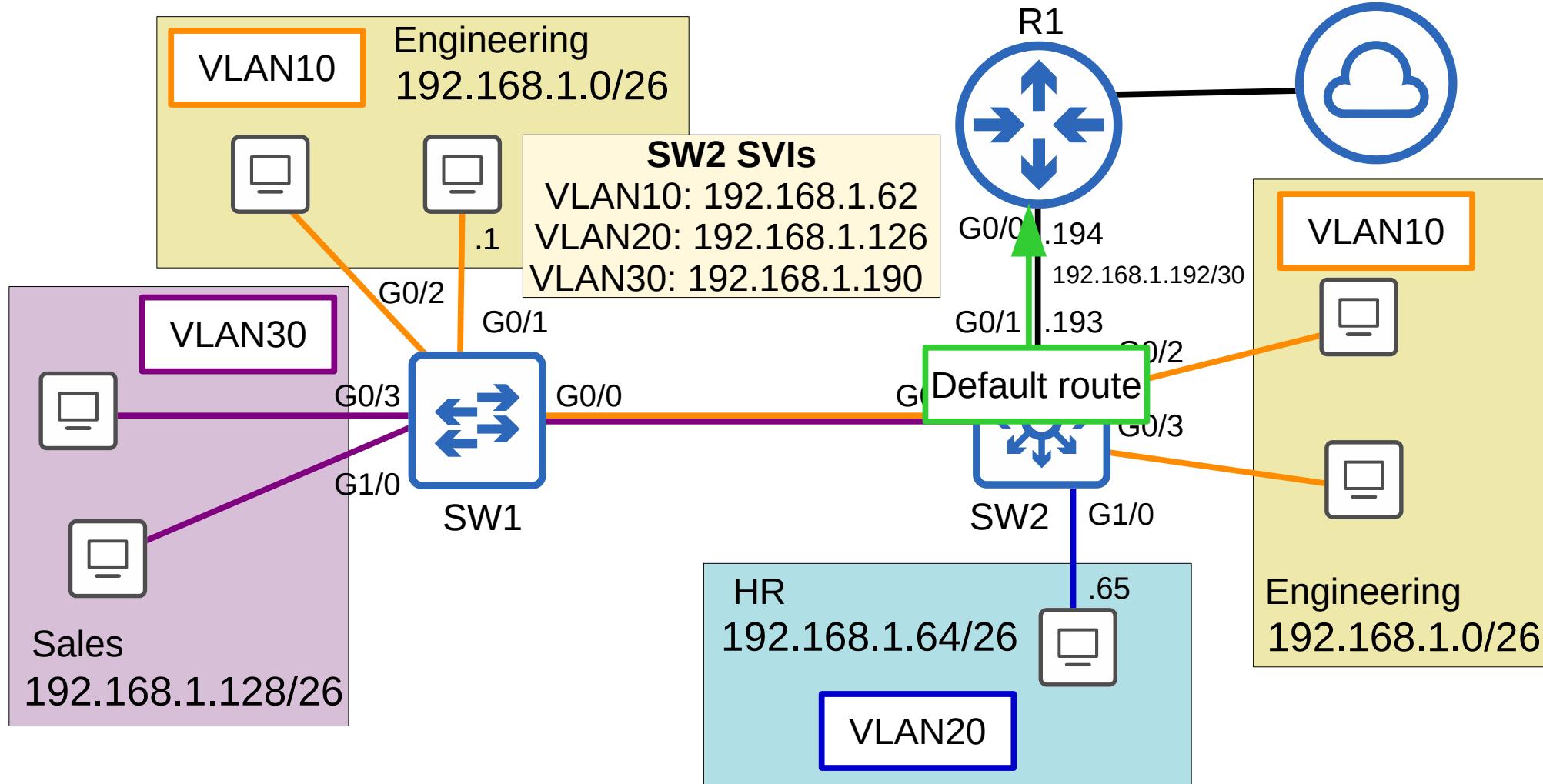
# Inter-VLAN Routing via SVI



# Inter-VLAN Routing via SVI



# Inter-VLAN Routing via SVI



# 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

```
R1(config)#[red]
```

# Inter-VLAN Routing via SVI

```
R1(config)#interface g0/0
R1(config-if)#ip address 192.168.1.194 255.255.255.252
R1(config-if)#do show ip interface brief
Interface          IP-Address      OK? Method Status      Protocol
GigabitEthernet0/0  192.168.1.194  YES manual 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
R1(config-if)#[REDACTED]
```

# Inter-VLAN Routing via SVI

```
SW2(config)#default interface g0/1  
Interface GigabitEthernet0/1 set to
```

This command enables Layer 3 routing on the switch.  
DO NOT FORGET

```
SW2(config)#ip routing
```

```
SW2(config)#interface g0/1
```

```
SW2(config-if)#no switchport
```

This configures the interface as a 'routed port'  
(Layer 3 port, not a Layer 2/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				
GigabitEthernet1/2	unassigned				
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

Configure an IP address on the interface  
like a regular router interface.

# Inter-VLAN Routing via SVI

```
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#
```

# 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 **shutdown** 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

- 1) The VLAN must exist on the switch.
- 2) 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.
- 3) The VLAN must not be shutdown (you can use the **shutdown** command to disable a VLAN).
- 4) The SVI must not be shutdown (SVIs are disabled by default)

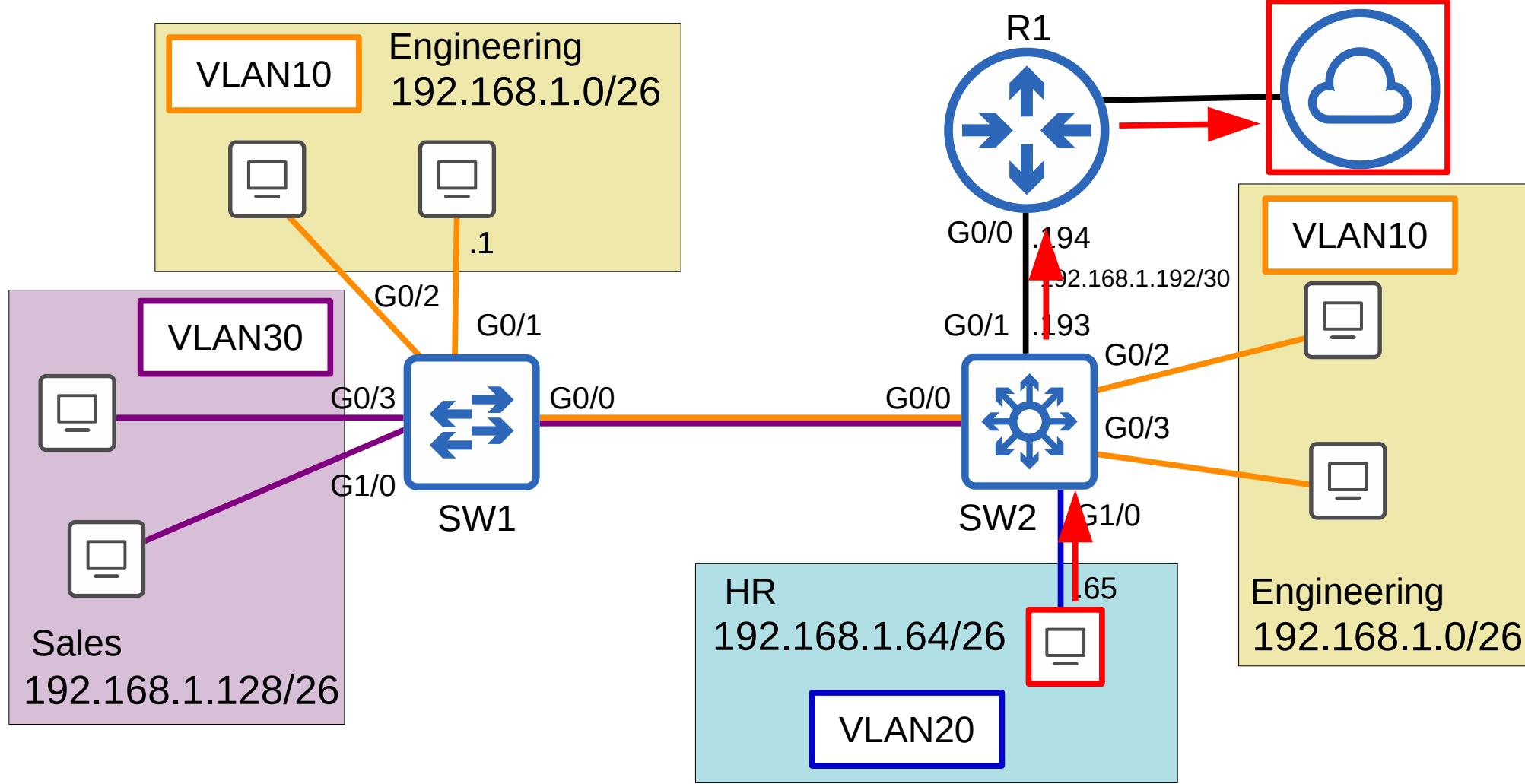
# Inter-VLAN Routing via SVI

```
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

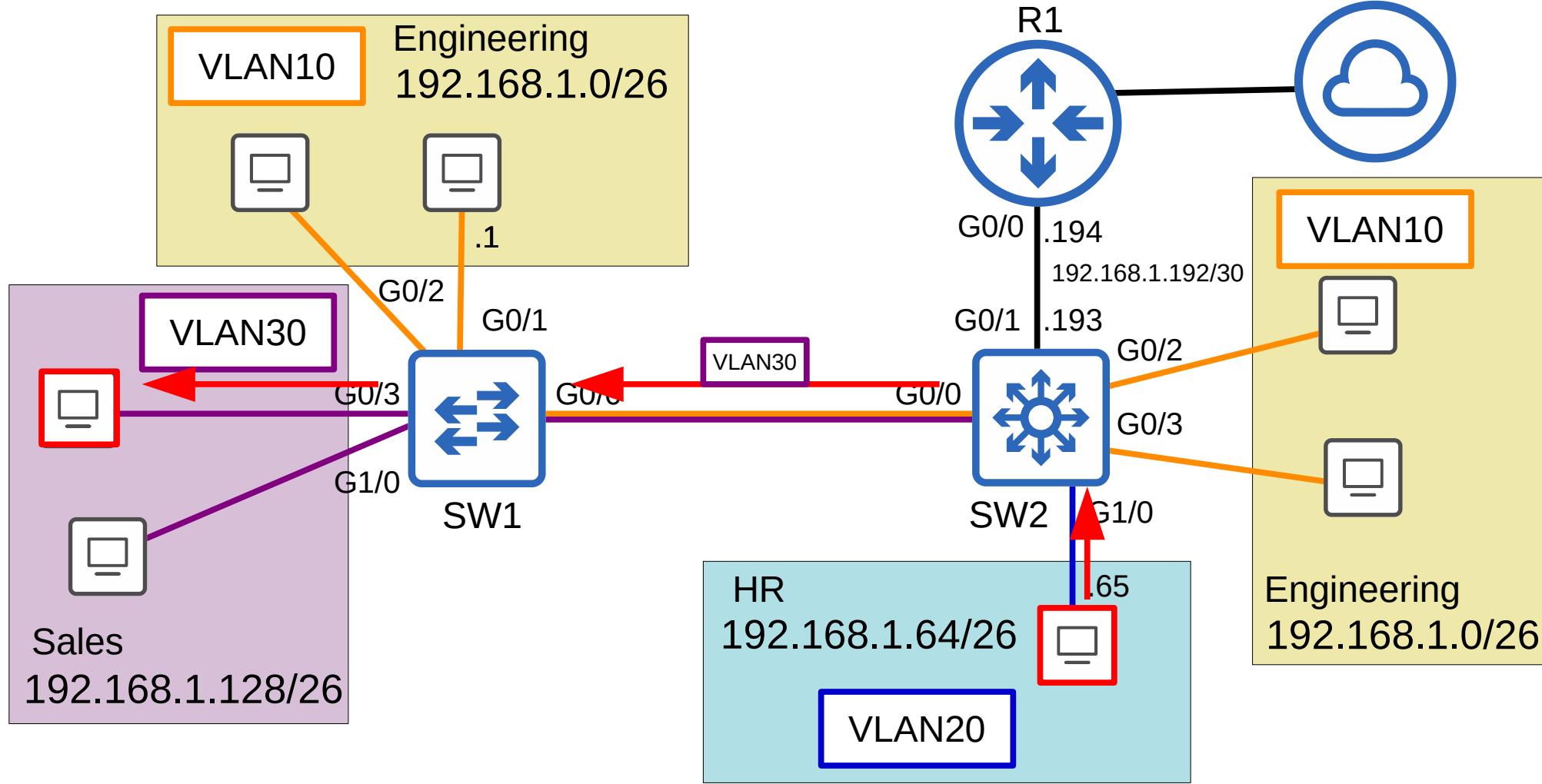
Gateway of last resort is 192.168.1.194 to network 0.0.0.0

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)#[ ]
```

# Inter-VLAN Routing via SVI



# Inter-VLAN Routing via SVI



# Things we'll cover

- Native VLAN on a router
- Wireshark analysis
- Layer 3 Switching/Multilayer Switching

- DTP (Dynamic Trunking Protocol)
- VTP (VLAN Trunking Protocol)

NEXT VIDEO

# QUIZ

+  **ExSim-Max™**  
PRACTICE EXAMS

# Quiz Question 1

Which TWO answers are valid options to configure the native VLAN on a router in a ROAS configuration? (select the two best answers, each answer is a complete solution)

- a) R1(config-if)# encapsulation dot1q 112  
R1(config-if)# ip address 192.168.1.1 255.255.255.0
- b) R1(config-subif)# encapsulation dot1q 112 native  
R1(config-subif)# ip address 192.168.1.1 255.255.255.0
- c) R1(config-if)# ip address 192.168.1.1 255.255.255.0
- d) R1(config-subif)# switchport trunk native vlan 112  
R1(config-subif)# ip address 192.168.1.1 255.255.255.0

## Quiz Question 2

You create an SVI for VLAN225 on SW1, assign an IP address, and enable it with **no shutdown**, but the interface remains down/down. Which TWO options might be causing this? (select two)

- a) VLAN225 doesn't exist on the switch.
- b) You didn't issue the **switchport mode trunk** command on VLAN225's SVI.
- c) You didn't issue the **switchport access vlan 225** command on VLAN225's SVI.
- d) No interfaces in VLAN225 are up/up.

# Quiz Question 3

Which command is used to configure a switch interface as a routed port?

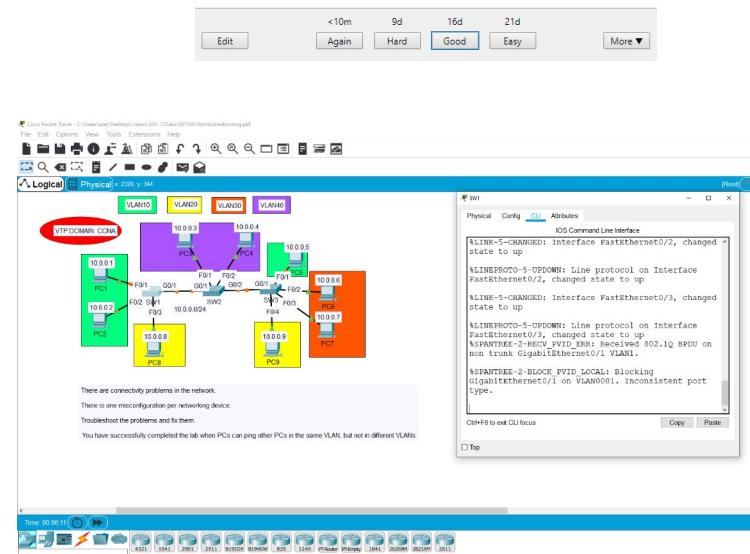
- a) **no switchport**
- b) **ip address ip-address subnet-mask**
- c) **ip routing**
- d) **switchport mode route**

# Supplementary Materials

- Review flash cards  
(link in the description)



- Packet Tracer lab



# JCNP-Level Channel Members



C Mohd



Johan Aleman

Channel failed to load



Mark von kanel



Алекса Миловановић



Miguel Bonilla



M Yousif



Samil Cañas



Boson Software



Sidi Ndoye



Magrathea



Devin Sukhu



Charlesetta Estelle



Lito Castillejo



Yonatan Makara



Mike Achee



Aleksander Zakrzewski



Vance Simmons

