



# VLAN Routing



# Foreword

- The implementation of VLAN technology within an enterprise network effectively establishes broadcast domains that control the scope of traffic. One of the limitations of broadcast domains is that communication at the link layer is hindered between hosts that are not part of the same VLAN. Traditional link layer switches supporting VLANs are not capable of forwarding traffic between these broadcast domains, and therefore routing must be introduced to facilitate communication. The application of VLAN routing when using link layer switches, together with a device capable of routing VLAN traffic is introduced, along with details of how layer three switches capable of network layer operations can enable communication over VLAN defined broadcast domains.

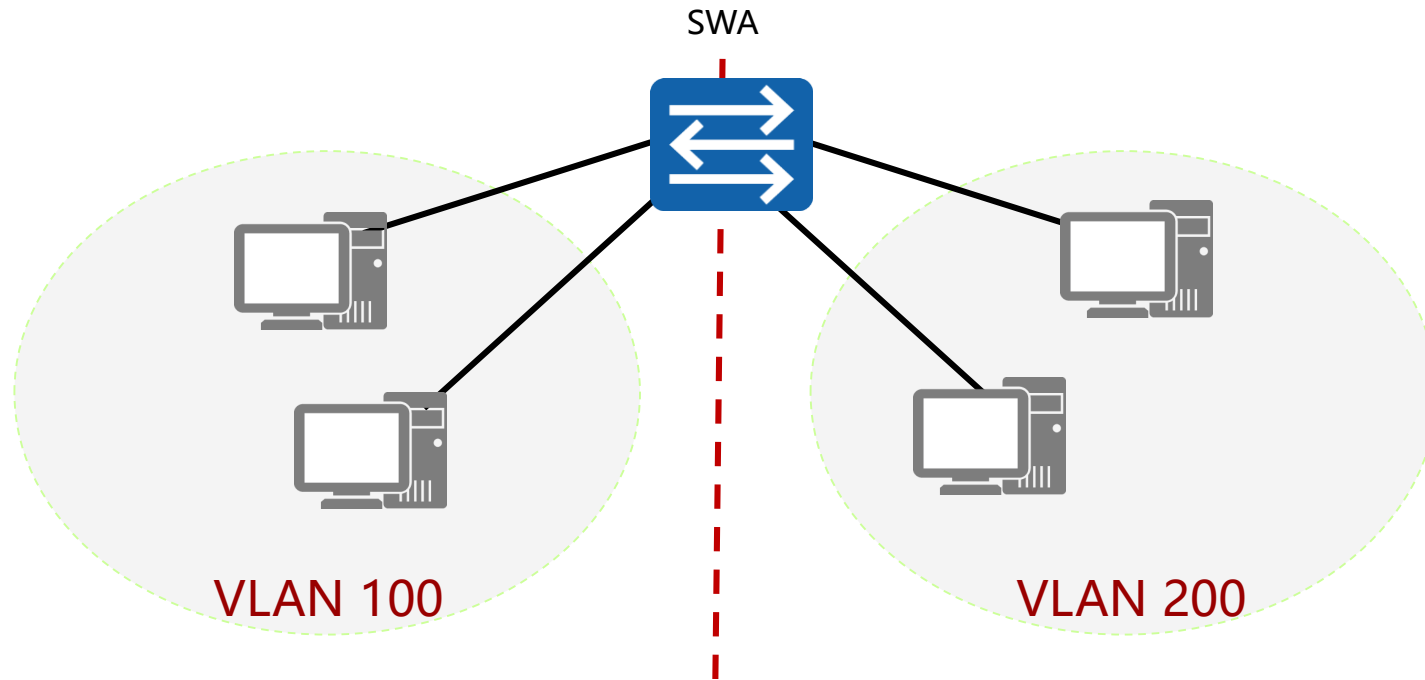


# Objectives

- Upon completion of this section, you will be able to:
  - Explain the purpose of VLAN routing.
  - Explain how VLAN routing is achieved for layer 2 & layer 3 switches.
  - Configure VLAN routing.



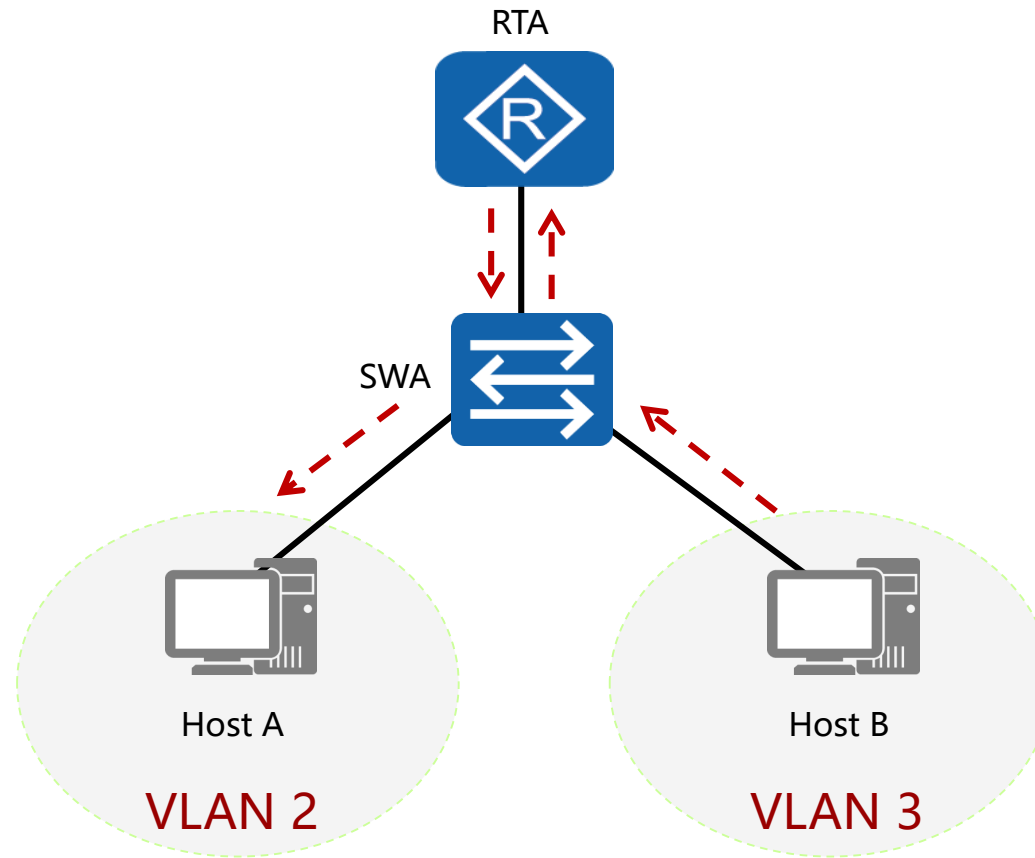
# VLAN Disadvantages



- Attempts to limit broadcast domain size through VLAN implementation isolates users.



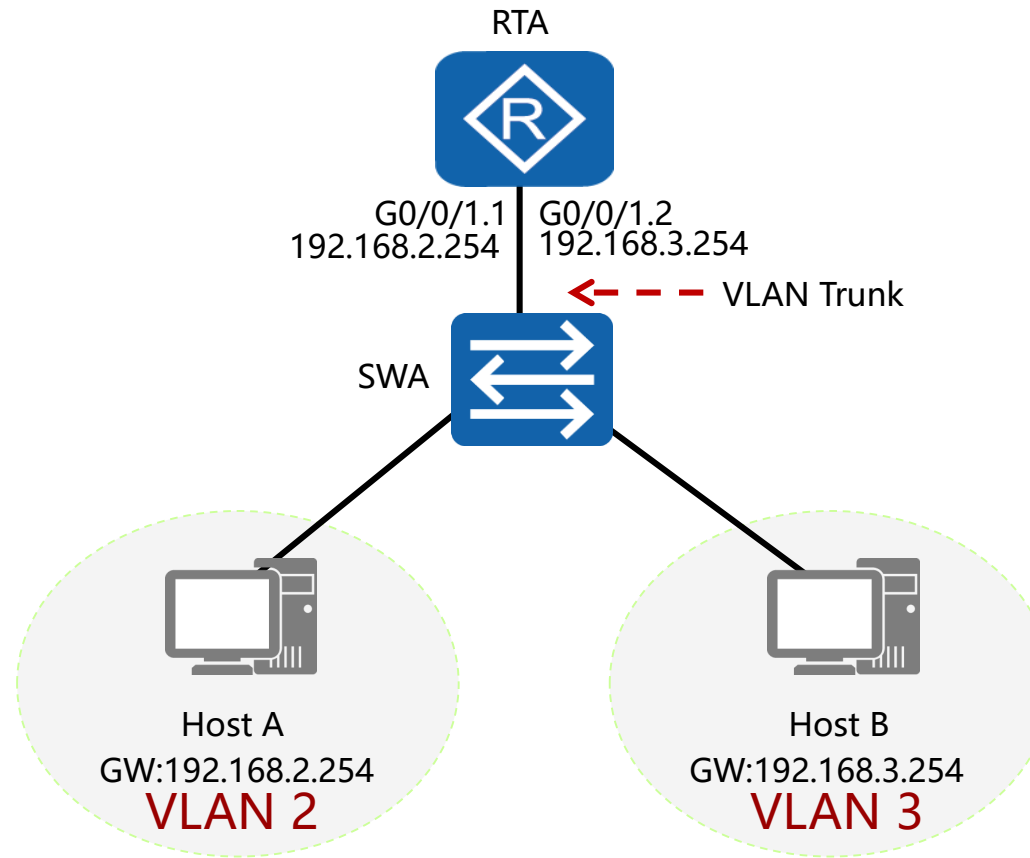
# VLAN Routing



- VLAN frames are routed over a trunk link for port conservation.



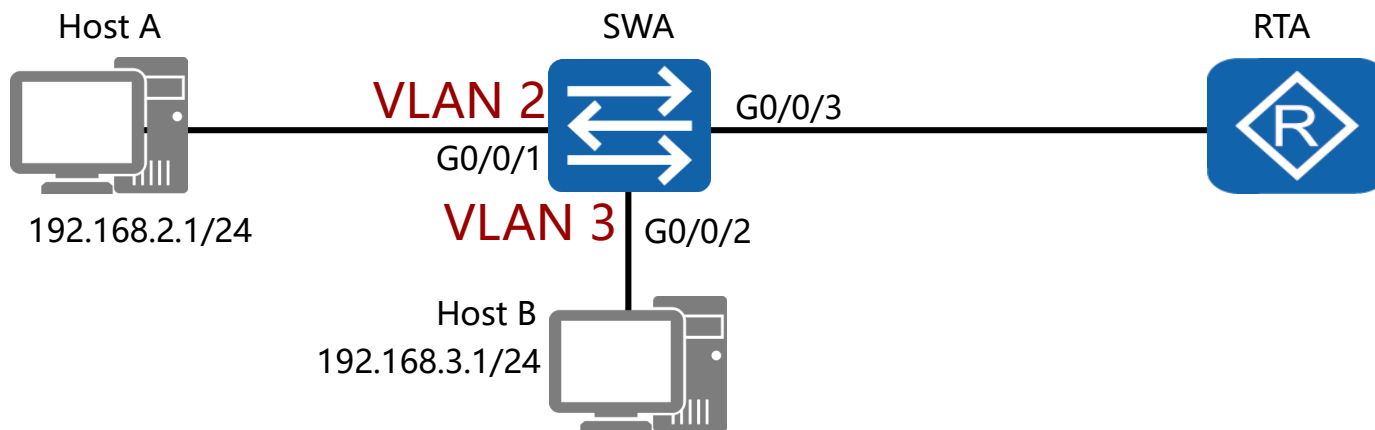
# VLAN Routing Features



- A single trunk supports VLAN routes by using sub-interfaces.



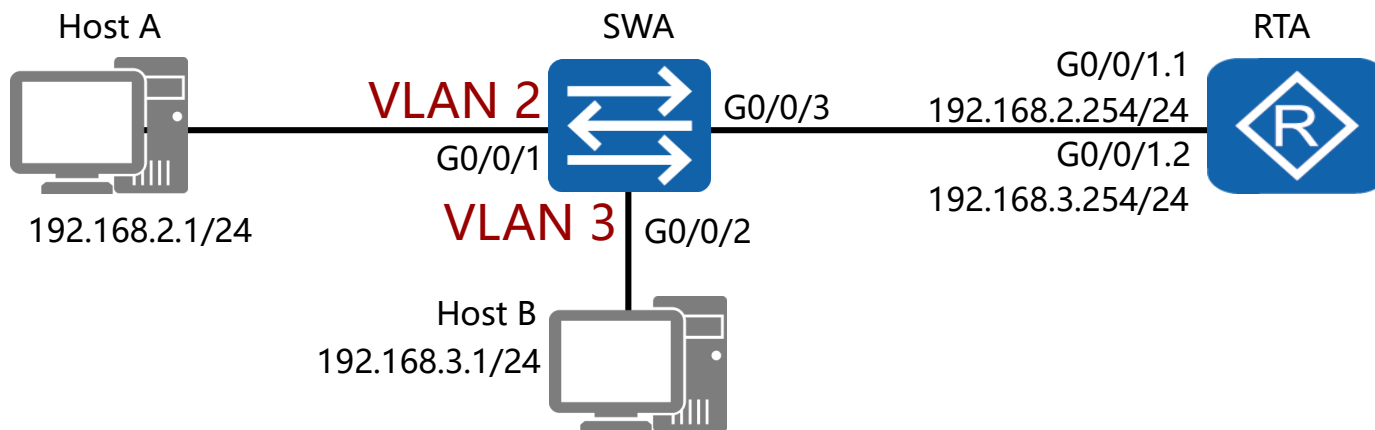
# VLAN Routing Configuration



```
[SWA]vlan batch 2 3
[SWA-GigabitEthernet0/0/1]port link-type access
[SWA-GigabitEthernet0/0/1]port default vlan 2
[SWA-GigabitEthernet0/0/2]port link-type access
[SWA-GigabitEthernet0/0/2]port default vlan 3
[SWA-GigabitEthernet0/0/3]port link-type trunk
[SWA-GigabitEthernet0/0/3]port trunk allow-pass vlan all
```



# VLAN Routing Configuration



```
[RTA]interface GigabitEthernet0/0/1.1
[RTA-GigabitEthernet0/0/1.1]dot1q termination vid 2
[RTA-GigabitEthernet0/0/1.1]ip address 192.168.2.254 24
[RTA-GigabitEthernet0/0/1.1]arp broadcast enable
[RTA]interface GigabitEthernet0/0/1.2
[RTA-GigabitEthernet0/0/1.2]dot1q termination vid 3
[RTA-GigabitEthernet0/0/1.2]ip address 192.168.3.254 24
[RTA-GigabitEthernet0/0/1.2]arp broadcast enable
```





# VLAN Routing Configuration

```
HostA>ping 192.168.3.1
```

```
Ping 192.168.3.1: 32 data bytes, Press Ctrl_C to break
```

```
From 192.168.3.1: bytes=32 seq=1 ttl=127 time=15 ms
```

```
From 192.168.3.1: bytes=32 seq=2 ttl=127 time=15 ms
```

```
From 192.168.3.1: bytes=32 seq=3 ttl=127 time=32 ms
```

```
From 192.168.3.1: bytes=32 seq=4 ttl=127 time=16 ms
```

```
From 192.168.3.1: bytes=32 seq=5 ttl=127 time=31 ms
```

```
--- 192.168.3.1 ping statistics ---
```

```
5 packet(s) transmitted
```

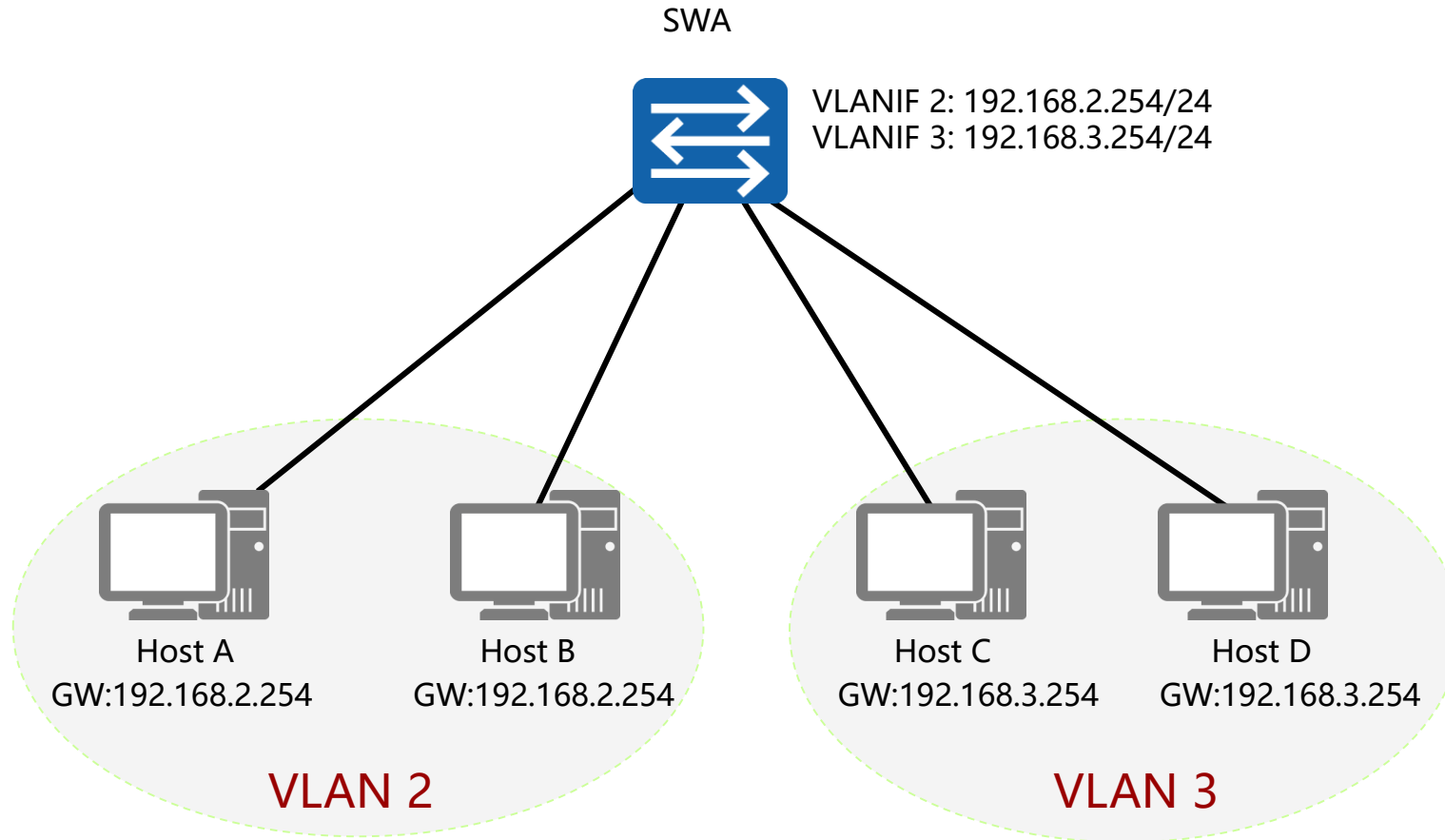
```
5 packet(s) received
```

```
0.00% packet loss
```

```
round-trip min/avg/max = 15/21/32 ms
```



# L3 Switch based VLAN Routing



- VLANIF are used by each VLAN as a route gateway.



# L3 Switch based VLAN Routing

## VLAN Interface

- Interfaccia “virtuale” che consente allo switch di comunicare ad L3.
- Interfaccia che può ricevere una completa configurazione IP.

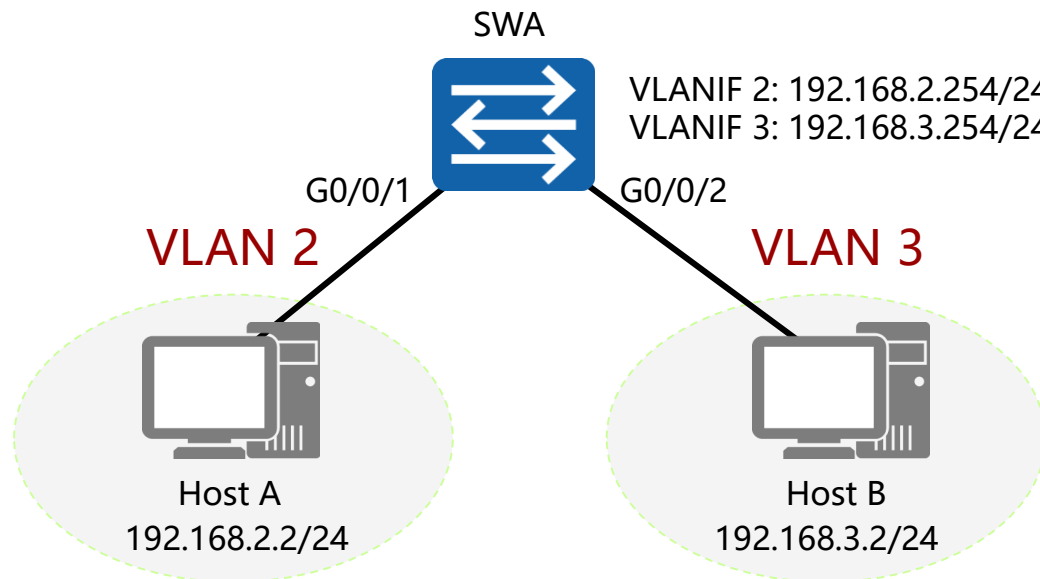
NOTA:

## **VLANIF ≠ “undo portswitch”:**

- VLANIF è una interfaccia virtuale che fa capo a più porte fisiche;
- Undo portswitch: cambia il comportamento di una porta fisica da L2 ad L3



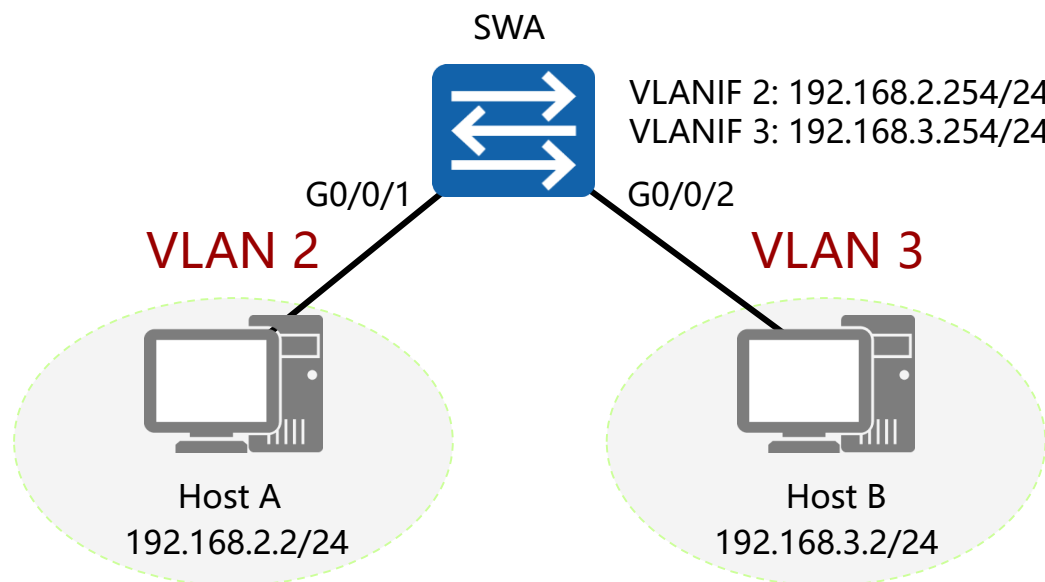
# L3 Switch Configuration



```
[SWA]vlan batch 2 3
[SWA]interface GigabitEthernet 0/0/1
[SWA-GigabitEthernet0/0/1]port link-type access
[SWA-GigabitEthernet0/0/1]port default vlan 2
[SWA]interface GigabitEthernet 0/0/2
[SWA-GigabitEthernet0/0/2]port link-type access
[SWA-GigabitEthernet0/0/2]port default vlan 3
```



# L3 Switch Configuration



```
[SWA]interface vlanif 2
[SWA-Vlanif2]ip address 192.168.2.254 24
[SWA-Vlanif2]quit
[SWA]interface vlanif 3
[SWA-Vlanif3]ip address 192.168.3.254 24
[SWA-Vlanif3]quit
```



# Summary

- What is the purpose of the dot1q termination vid <vlan-id> command?
- What is required to be configured on the switch to allow VLAN traffic to be forwarded to the configured sub-interfaces?

The background of the image shows silhouettes of several groups of business professionals in a modern office environment. They are standing on a highly reflective floor, and their reflections are clearly visible. The entire scene is overlaid with a semi-transparent blue filter. In the center, the text "Thank You" is written in a large, white, sans-serif font, with the website address "www.huawei.com" in a smaller, white, sans-serif font directly below it.

Thank You

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