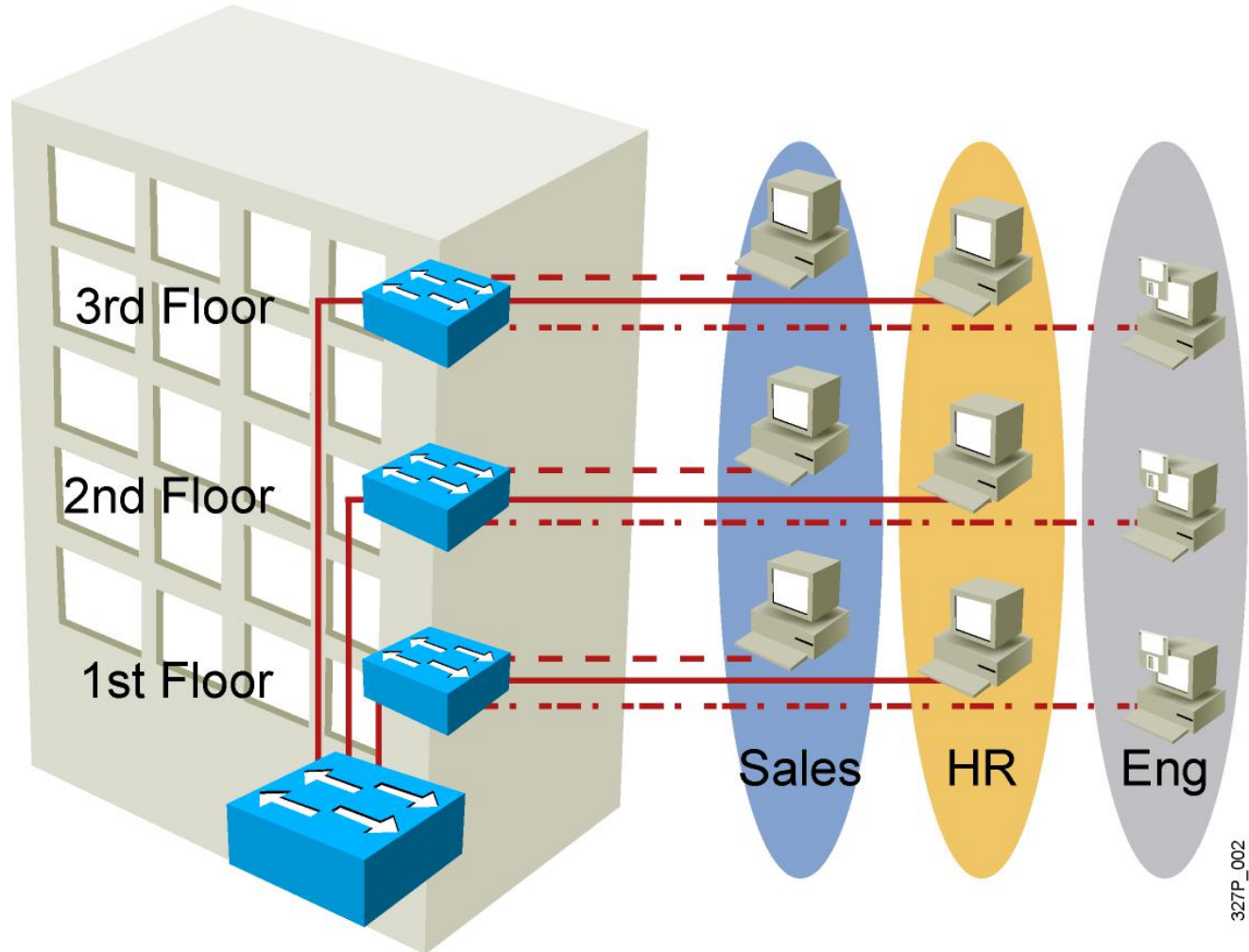


Implementing VLANs and Trunks



VLAN Overview

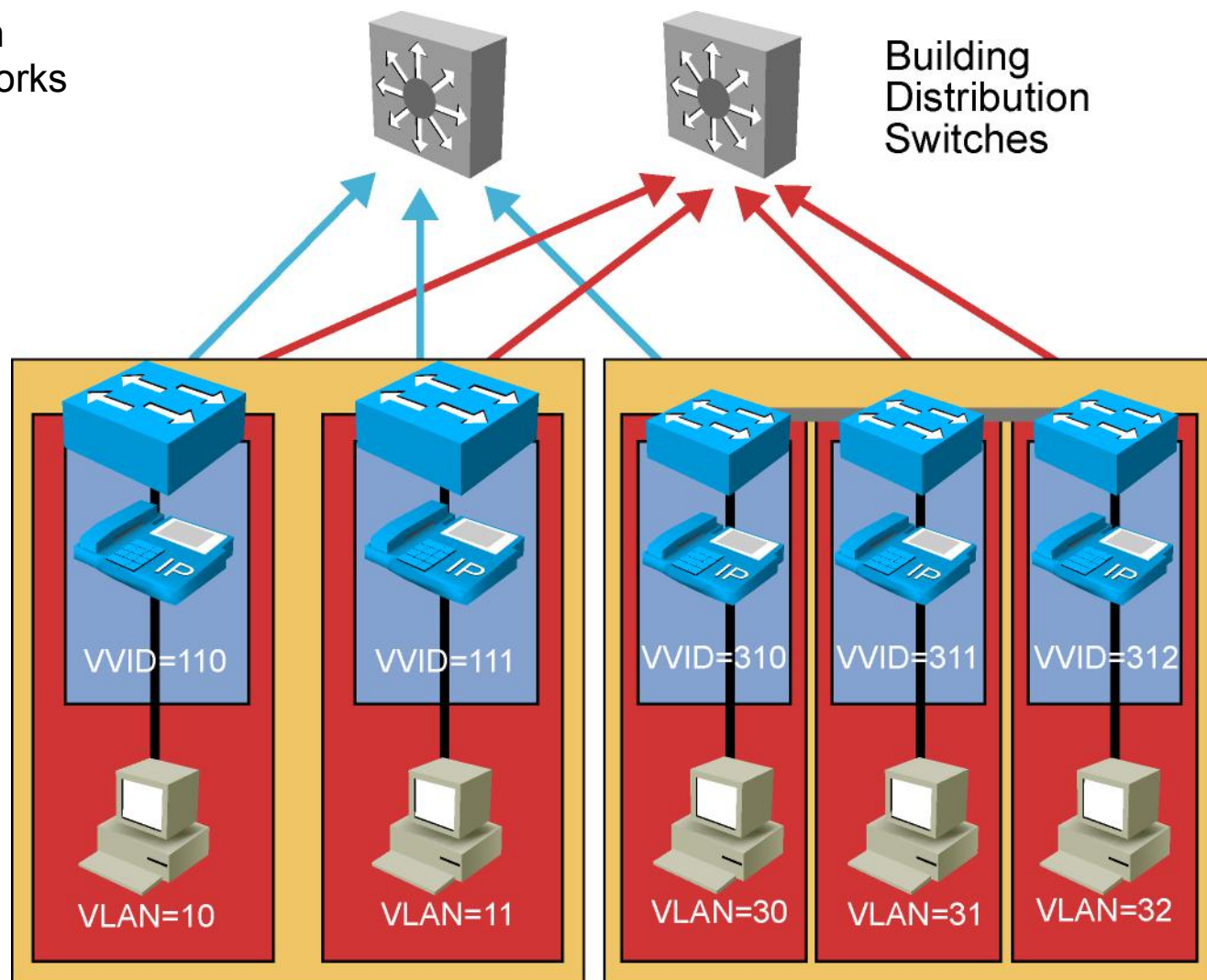
- Segmentation
- Flexibility
- Security



VLAN = Broadcast Domain = Logical Network (Subnet)

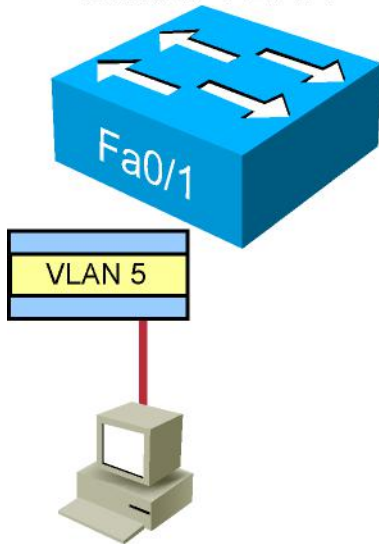
Advantages of Voice VLANs

- Phones segmented in separate logical networks
- Provides network segmentation and control
- Allows administrators to create and enforce QoS
- Lets administrators add and enforce security policies

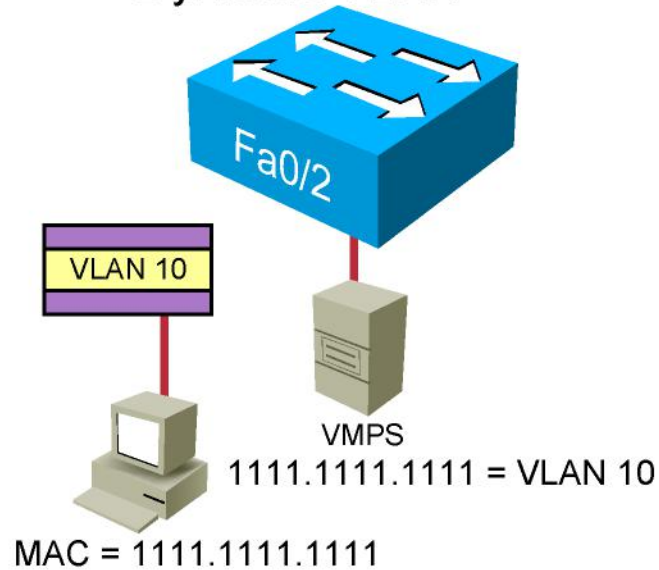


VLAN Membership Modes

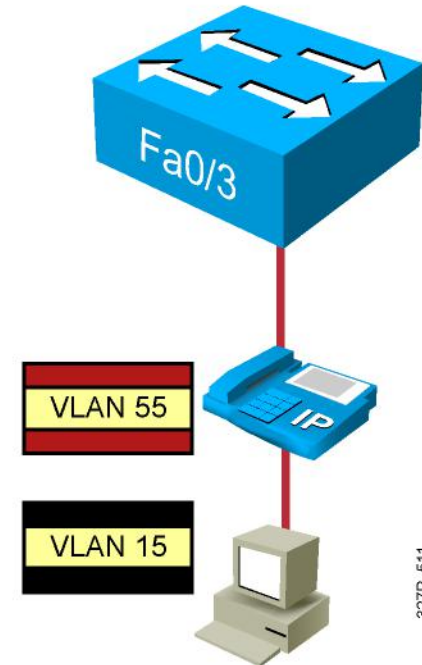
Static VLAN



Dynamic VLAN

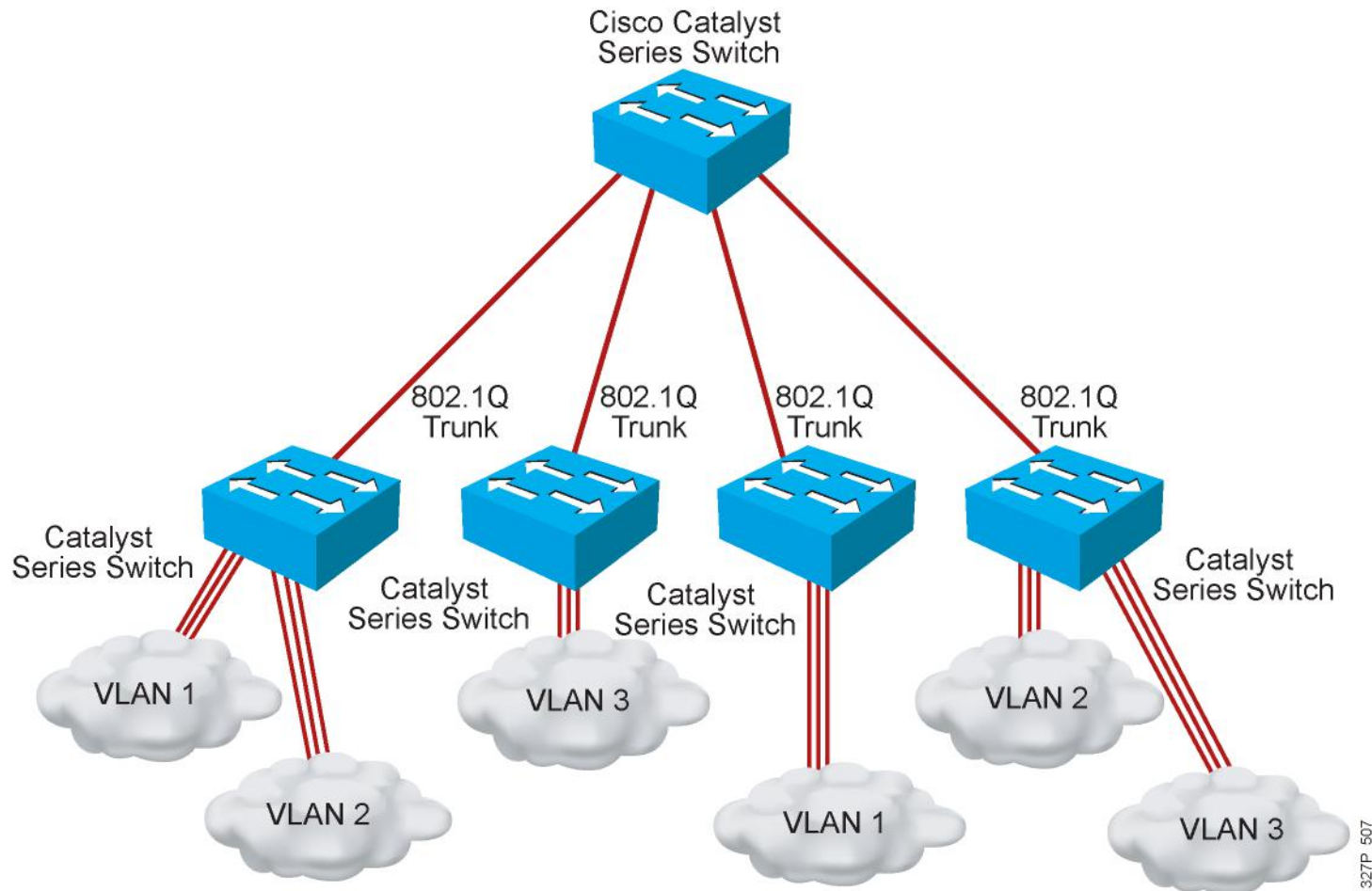


Voice VLAN



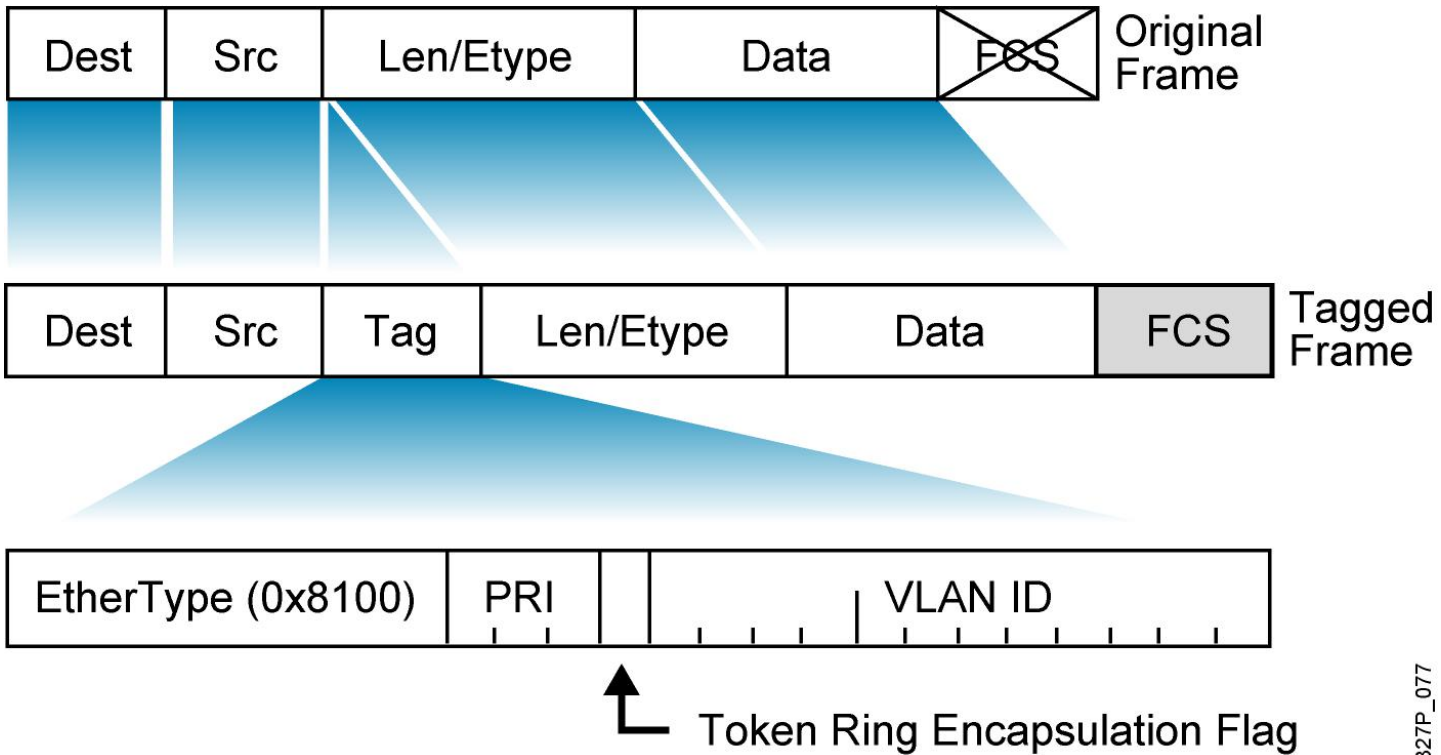
327P_511

802.1Q Trunking



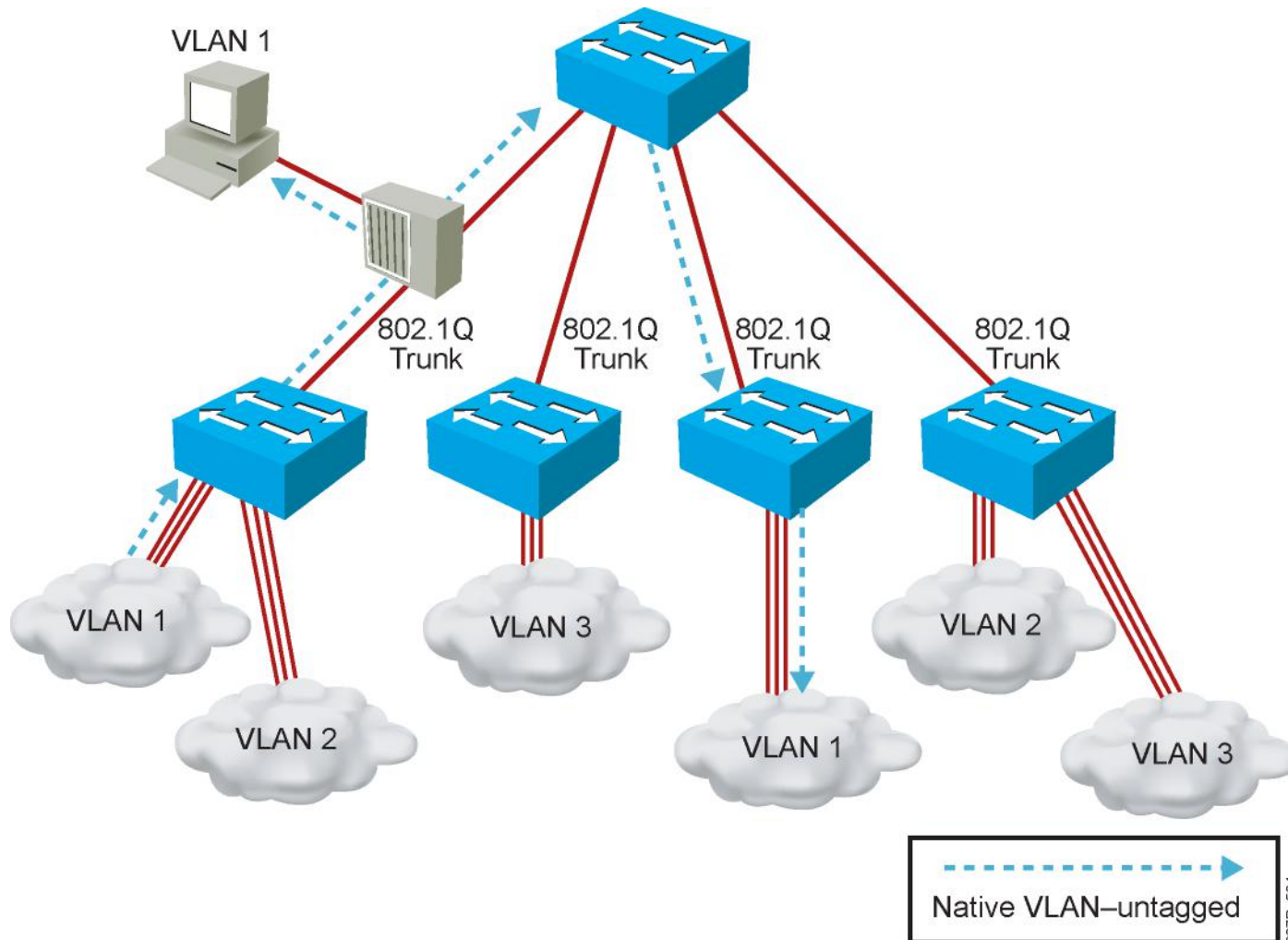
327P_507

802.1Q Frame



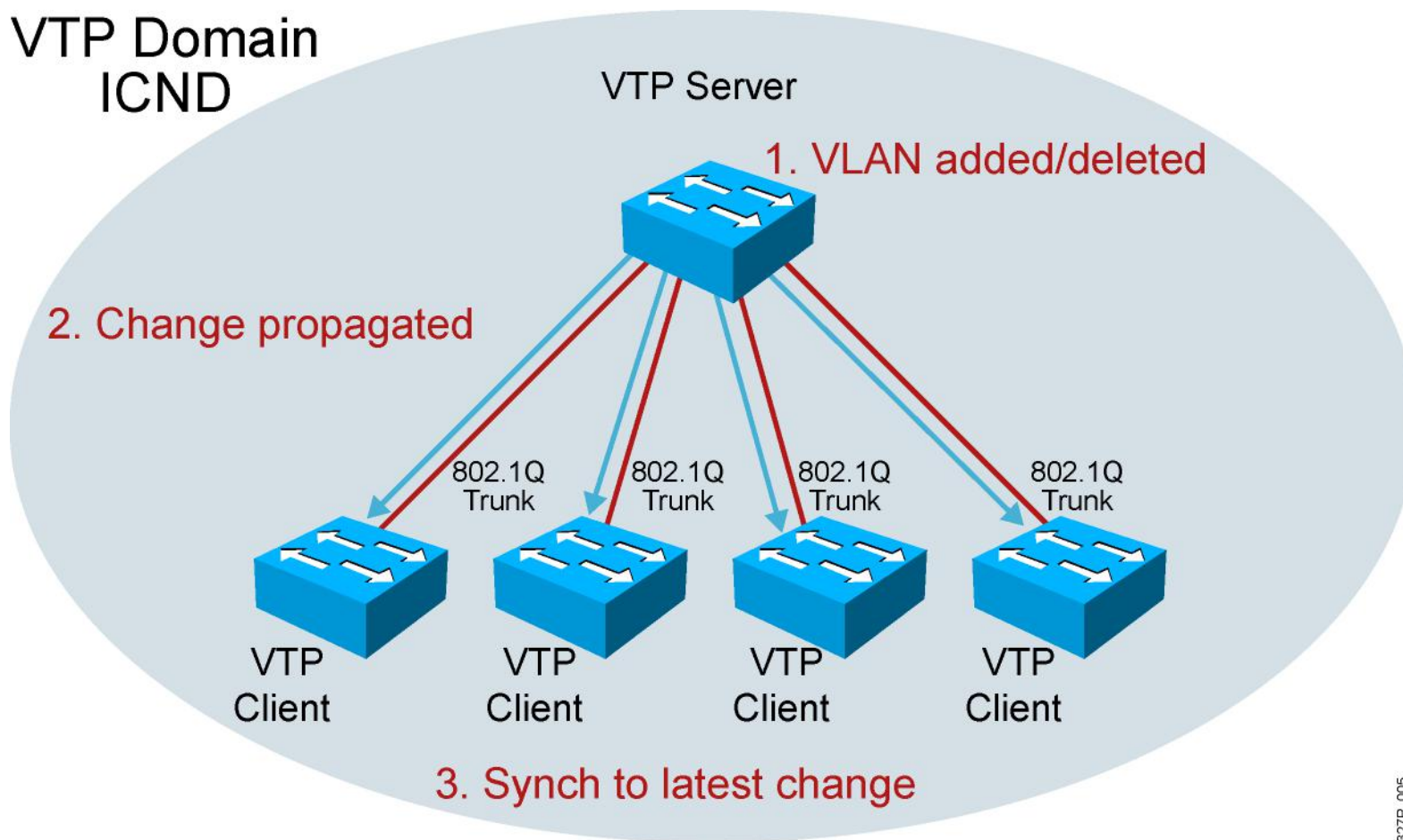
327P_077

Understanding Native VLANs



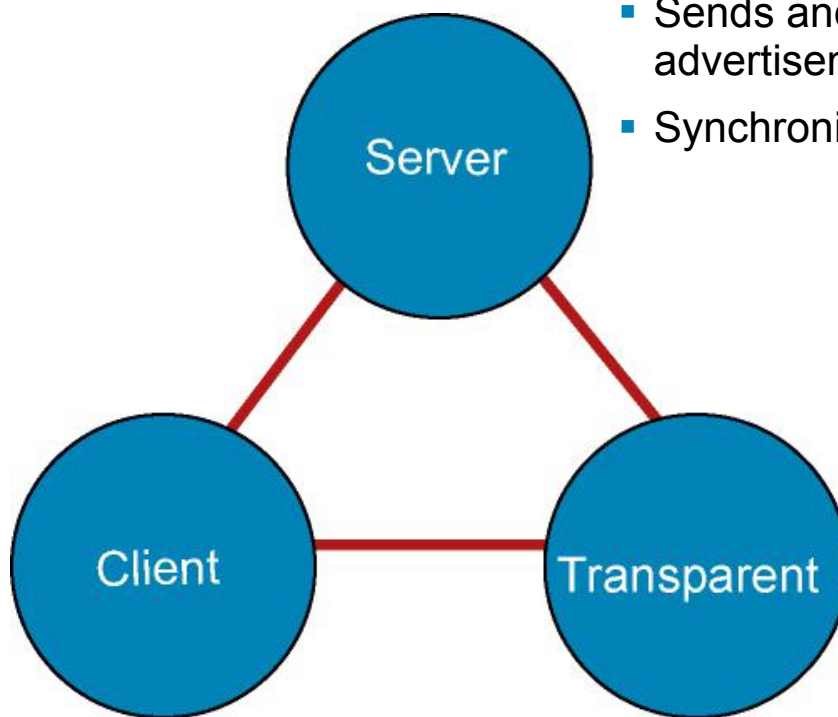
VTP Features

VTP Domain ICND



VTP Modes

- Cannot create, change, or delete VLANs
- Sends and forwards advertisements
- Synchronizes



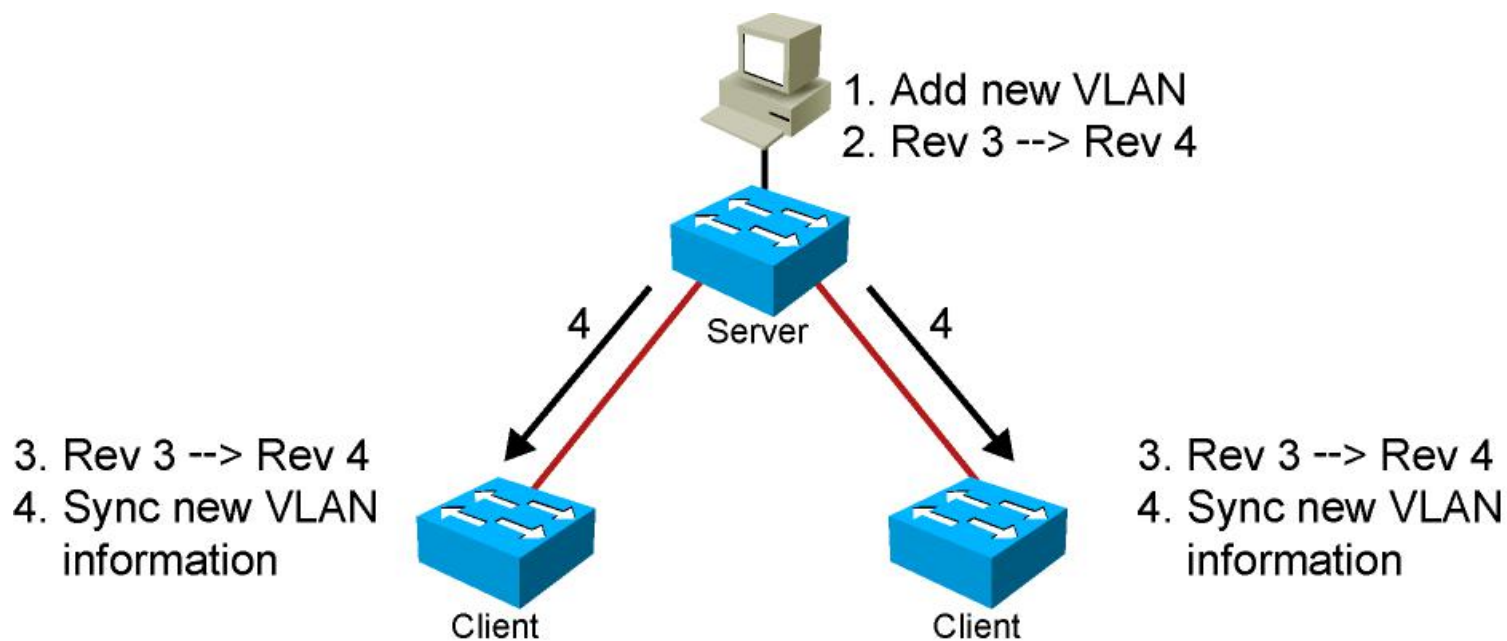
- Create VLANs
- Modify VLANs
- Delete VLANs
- Sends and forwards advertisements
- Synchronizes

- Create local VLANs only
- Modify local VLANs only
- Delete local VLANs only
- Forwards advertisements
- Does not synchronize

327P_078

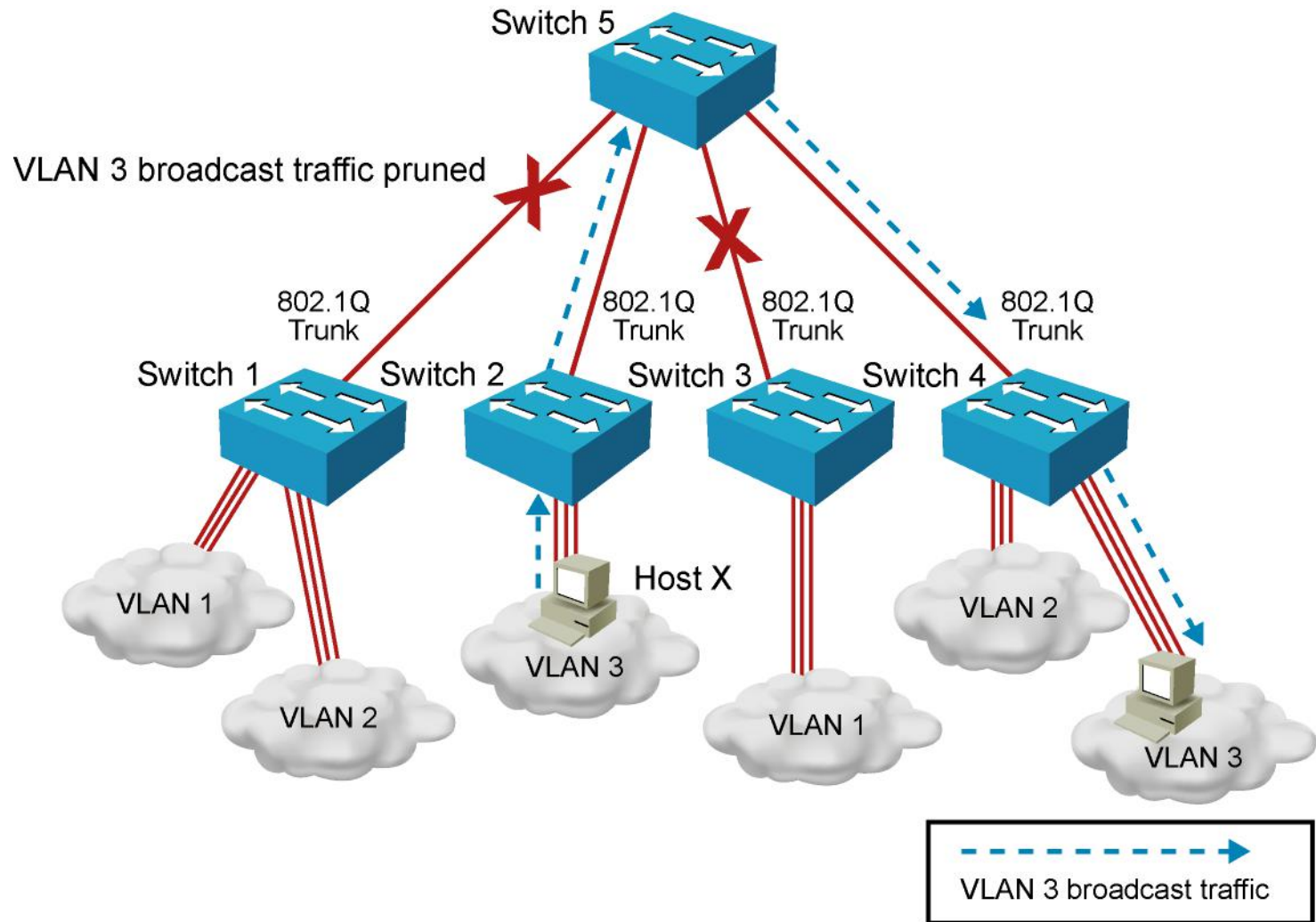
VTP Operation

- VTP advertisements are sent as multicast frames.
- VTP servers and clients are synchronized to the latest revision number.
- VTP advertisements are sent every 5 minutes or when there is a change.



927P_006

VTP Pruning



Configuring VLANs and Trunks

1. Configure and verify VTP.
2. Configure and verify 802.1Q trunks.
3. Create or modify a VLAN on the VTP server switch.
4. Assign switch ports to a VLAN and verify.
5. Execute adds, moves, and changes.
6. Save the VLAN configuration.

VTP Configuration Guidelines

- VTP defaults for the Cisco Catalyst switch:
 - VTP domain name: None
 - VTP mode: Server mode
 - VTP pruning: Enabled or disabled (model specific)
 - VTP password: Null
 - VTP version: Version 1
- A new switch can automatically become part of a domain once it receives an advertisement from a server.
- A VTP client can overwrite a VTP server database if the client has a higher revision number.
- A domain name cannot be removed after it is assigned; it can only be reassigned.

Creating a VTP Domain

```
SwitchX# configure terminal
SwitchX(config)# vtp mode [ server | client | transparent ]
SwitchX(config)# vtp domain domain-name
SwitchX(config)# vtp password password
SwitchX(config)# vtp pruning
SwitchX(config)# end
```

VTP Configuration and Verification Example

```
SwitchX(config)# vtp domain ICND
Changing VTP domain name to ICND
SwitchX(config)# vtp mode transparent
Setting device to VTP TRANSPARENT mode.
SwitchX(config)# end

SwitchX# show vtp status
VTP Version                : 2
Configuration Revision     : 0
Maximum VLANs supported locally : 64
Number of existing VLANs   : 17
VTP Operating Mode         : Transparent
VTP Domain Name            : ICND
VTP Pruning Mode           : Disabled
VTP V2 Mode                : Disabled
VTP Traps Generation       : Disabled
MD5 digest                 : 0x7D 0x6E 0x5E 0x3D 0xAF 0xA0 0x2F 0xAA
Configuration last modified by 10.1.1.4 at 3-3-93 20:08:05
SwitchX#
```

Configuring 802.1Q Trunking

SwitchX(config-if) #

```
switchport mode {access | dynamic {auto | desirable} | trunk}
```

- Configures the trunking characteristics of the port

SwitchX(config-if) #

```
switchport mode trunk
```

- Configures the port as a VLAN trunk

Verifying a Trunk

```
SwitchX# show interfaces interface [switchport | trunk]
```

```
SwitchX# show interfaces fa0/11 switchport
Name: Fa0/11
Switchport: Enabled
Administrative Mode: trunk
Operational Mode: down
Administrative Trunking Encapsulation: dot1q
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
. . .
```

```
SwitchX# show interfaces fa0/11 trunk
```

Port	Mode	Encapsulation	Status	Native vlan
Fa0/11	desirable	802.1q	trunking	1

Port	Vlans allowed on trunk
Fa0/11	1-4094

Port	Vlans allowed and active in management domain
Fa0/11	1-13

VLAN Creation Guidelines

- The maximum number of VLANs is switch-dependent.
- Most Cisco Catalyst desktop switches support 128 separate spanning-tree instances, one per VLAN.
- VLAN 1 is the factory default Ethernet VLAN.
- Cisco Discovery Protocol and VTP advertisements are sent on VLAN 1.
- The Cisco Catalyst switch IP address is in the management VLAN (VLAN 1 by default).
- If using VTP, the switch must be in VTP server or transparent mode to add or delete VLANs.

Adding a VLAN

```
SwitchX# configure terminal
SwitchX(config)# vlan 2
SwitchX(config-vlan)# name switchlab99
```

Verifying a VLAN

```
SwitchX# show vlan [brief | id vlan-id || name vlan-name]
```

```
SwitchX# show vlan id 2
```

VLAN	Name	Status	Ports
2	switchlab99	active	Fa0/2, Fa0/12

VLAN	Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1	Trans2
2	enet	100002	1500	-	-	-	-	-	0	0

```
SwitchX#
```

Assigning Switch Ports to a VLAN

```
SwitchX(config-if) #
```

```
switchport access [vlan vlan# | dynamic]
```

```
SwitchX# configure terminal
```

```
SwitchX(config)# interface range fastethernet 0/2 - 4
```

```
SwitchX(config-if)# switchport access vlan 2
```

```
SwitchX# show vlan
```

VLAN	Name	Status	Ports
1	default	active	Fa0/1
2	switchlab99	active	Fa0/2, Fa0/3, Fa0/4

Verifying VLAN Membership

```
SwitchX# show vlan brief
```

```
SwitchX# show vlan brief
```

VLAN Name	Status	Ports
1 default	active	Fa0/1
2 switchlab99	active	Fa0/2, Fa0/3, Fa0/4
3 vlan3	active	
4 vlan4	active	
1002 fddi-default	act/unsup	
1003 token-ring-default	act/unsup	

VLAN Name	Status	Ports
1004 fddinet-default	act/unsup	
1005 trnet-default	act/unsup	

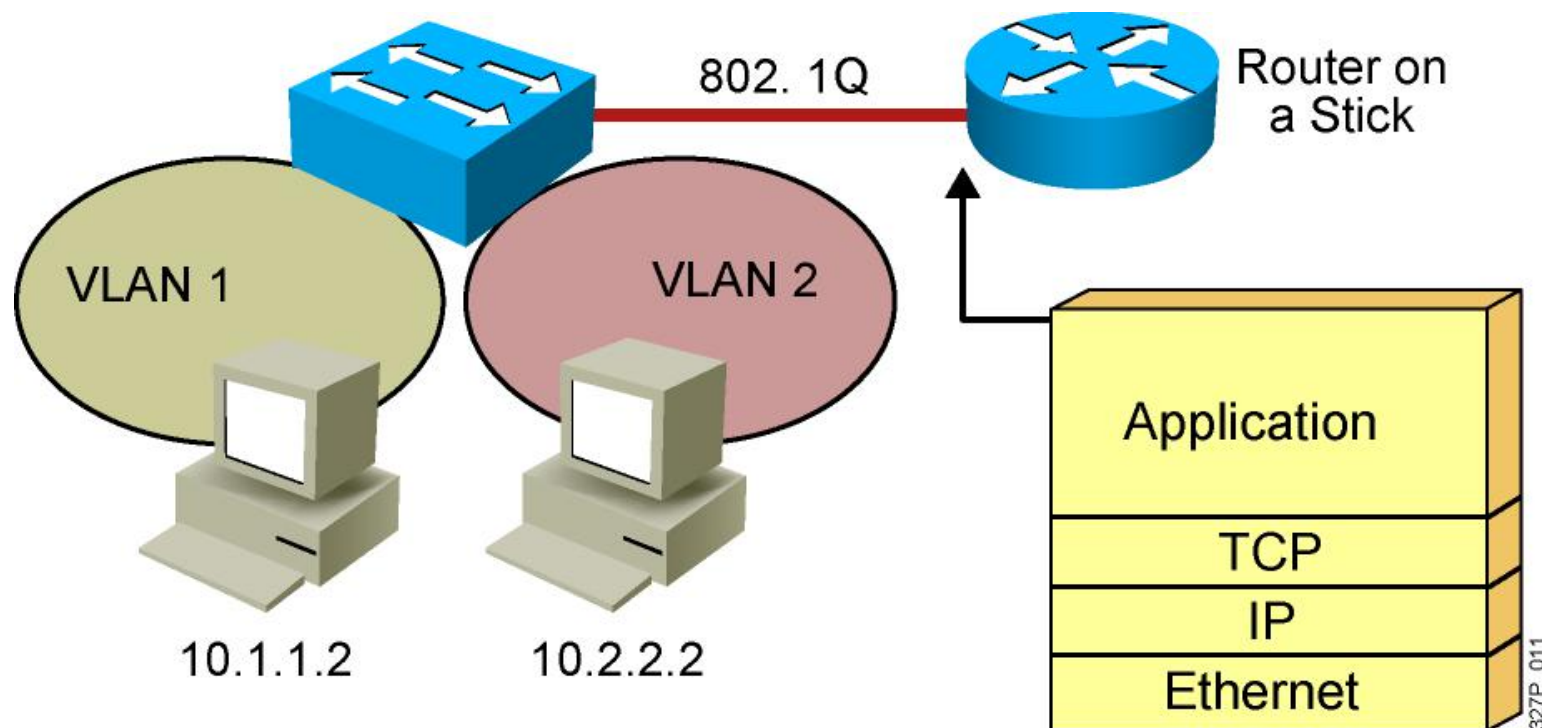
Verifying VLAN Membership (Cont.)

SwitchX(config-if)#

```
show interfaces interface switchport
```

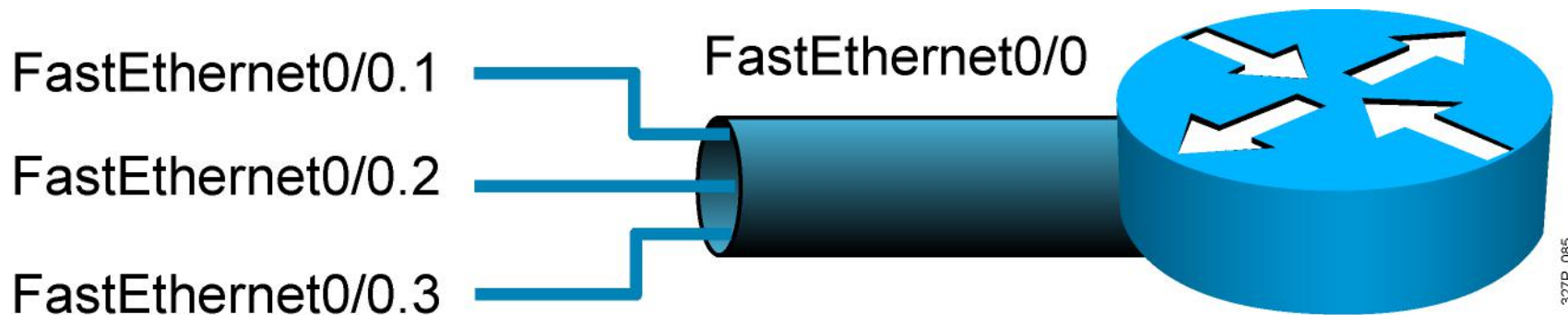
```
SwitchX# show interfaces fa0/2 switchport
Name: Fa0/2
Switchport: Enabled
Administrative Mode: dynamic auto
Operational Mode: static access
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: native
Negotiation of Trunking: On
Access Mode VLAN: 2 (switchlab99)
Trunking Native Mode VLAN: 1 (default)
--- output omitted ----
```

VLAN-to-VLAN Overview



- Network layer devices combine multiple broadcast domains.

Dividing a Physical Interface into Subinterfaces



- Physical interfaces can be divided into multiple subinterfaces.

Routing Between VLANs with 802.1Q Trunks

