VLANs

LAN Switching and Wireless – Chapter 3

Objectives

- Explain the role of VLANs in a converged network.
- Explain the role of trunking VLANs in a converged network.
- Configure VLANs on the switches in a converged network topology.
- Troubleshoot the common software or hardware misconfigurations associated with VLANs on switches in a converged network topology.

Explain the Role of VLANs in a Converged Network

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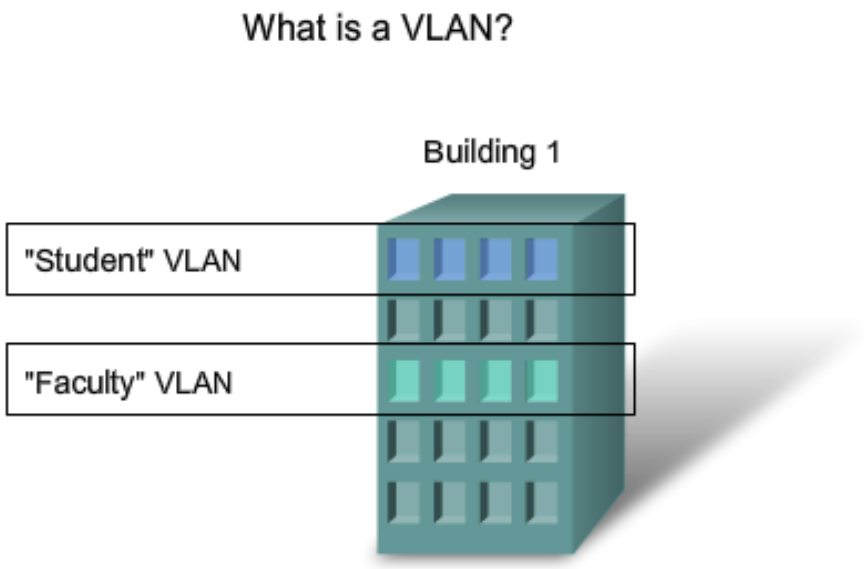
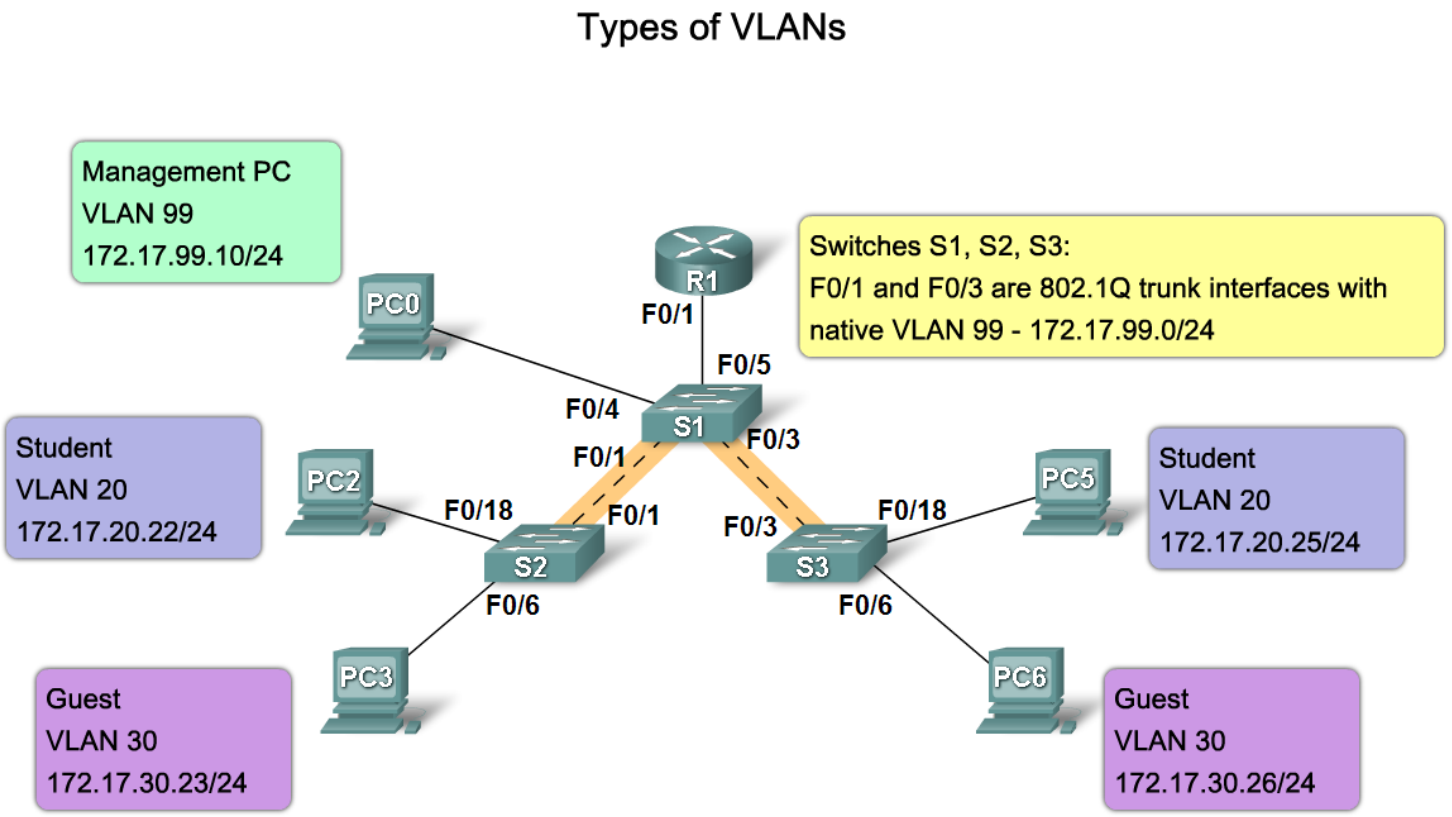


- A VLAN is an independent LAN network.
- A VLAN allows student and faculty PCs to be separated although they share the same infrastructure.
- A VLAN can be named for easier identification.

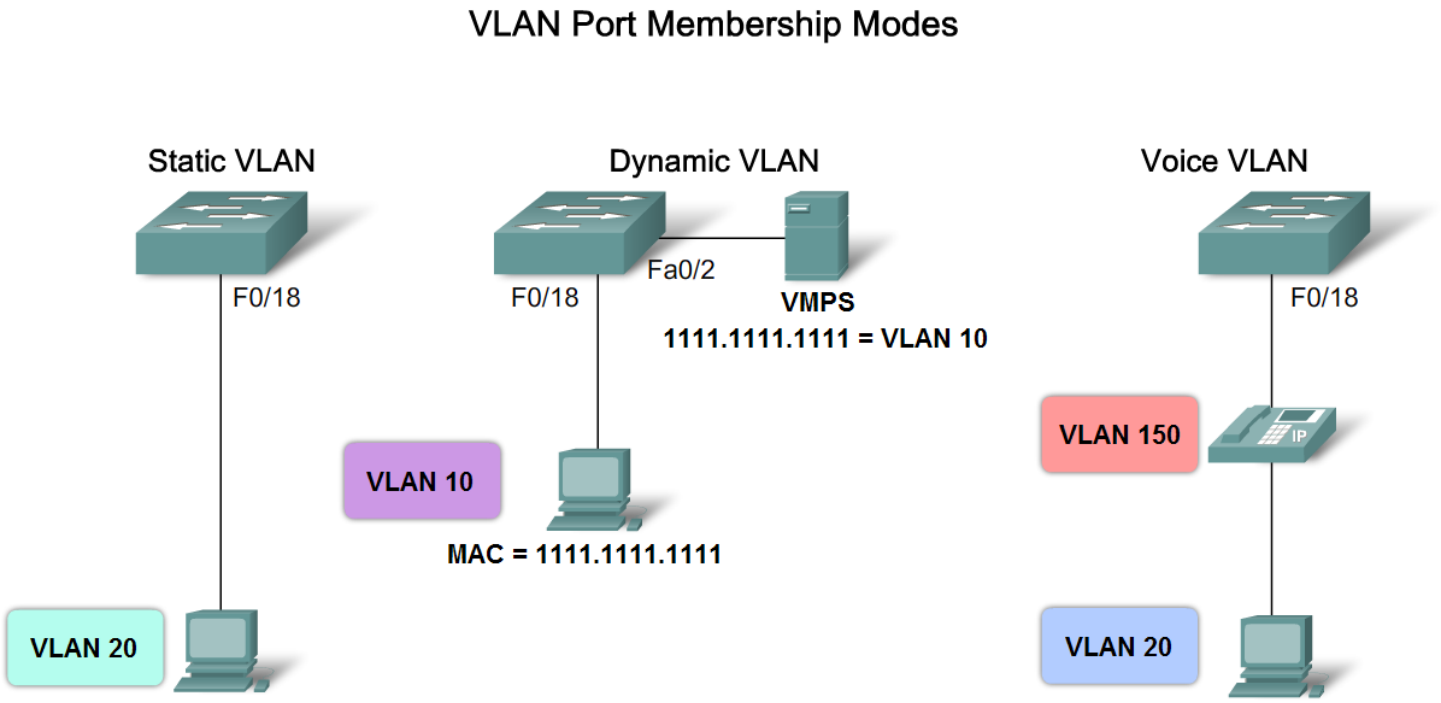
Explain the Role of VLANs in a Converged Network

- Describe the different types VLANs



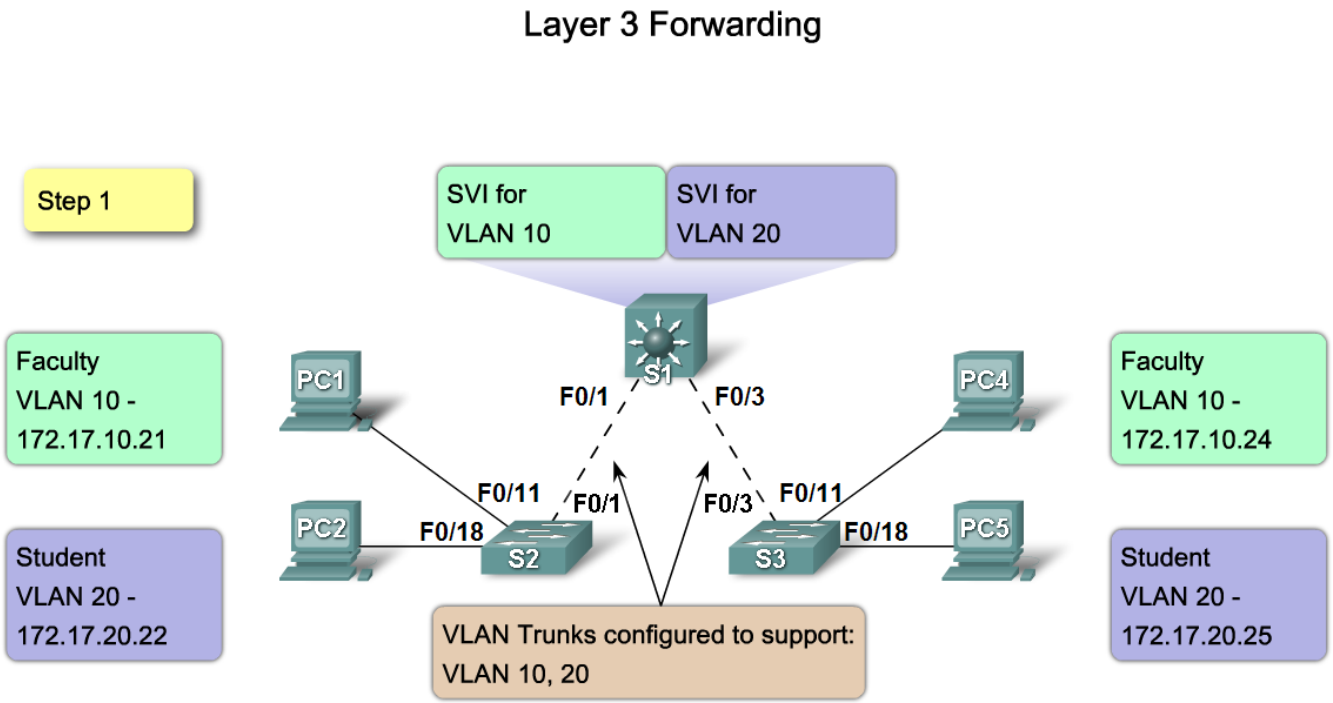
Explain the Role of VLANs in a Converged Network

- Describe the VLAN port membership modes



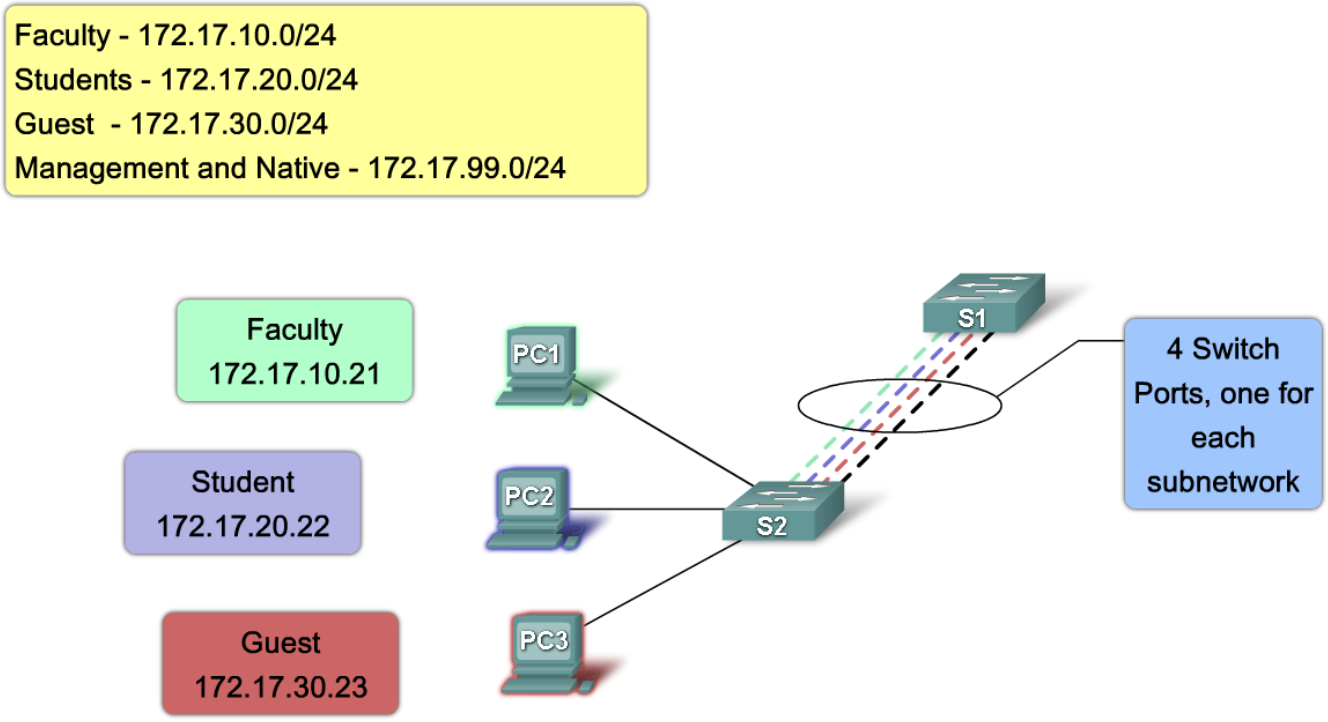
Explain the Role of VLANs in a Converged Network

- Describe how to manage broadcast domains with VLANs



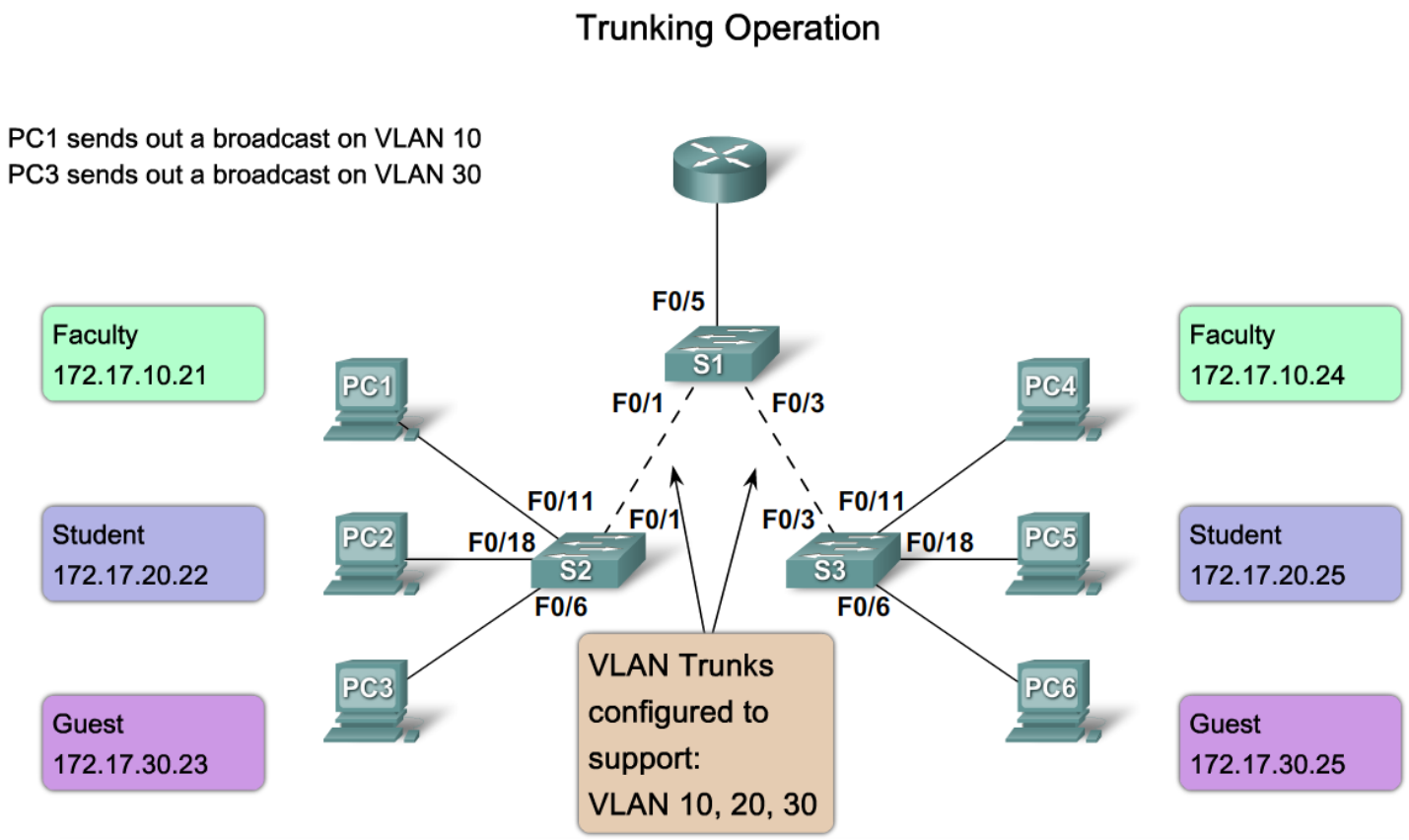
Explain the Role of Trunking VLANs in a Converged Network

- Explain the role of a trunk when using multiple VLANs in a converged network



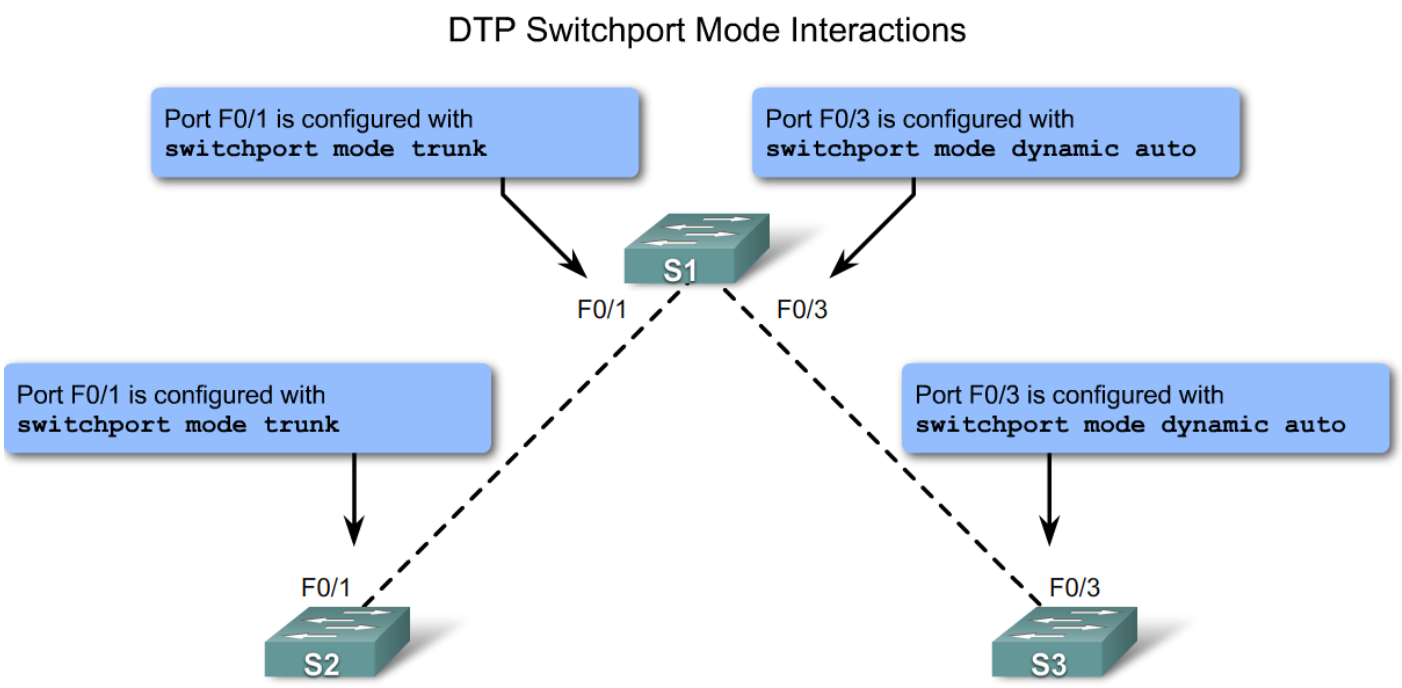
Explain the Role of Trunking VLANs in a Converged Network

- Describe how a trunk works



Explain the Role of Trunking VLANs in a Converged Network

- Describe the switch port trunking modes



Configure VLANs on the Switches in a Converged Network Topology

- Describe the steps to configure trunks and VLANs

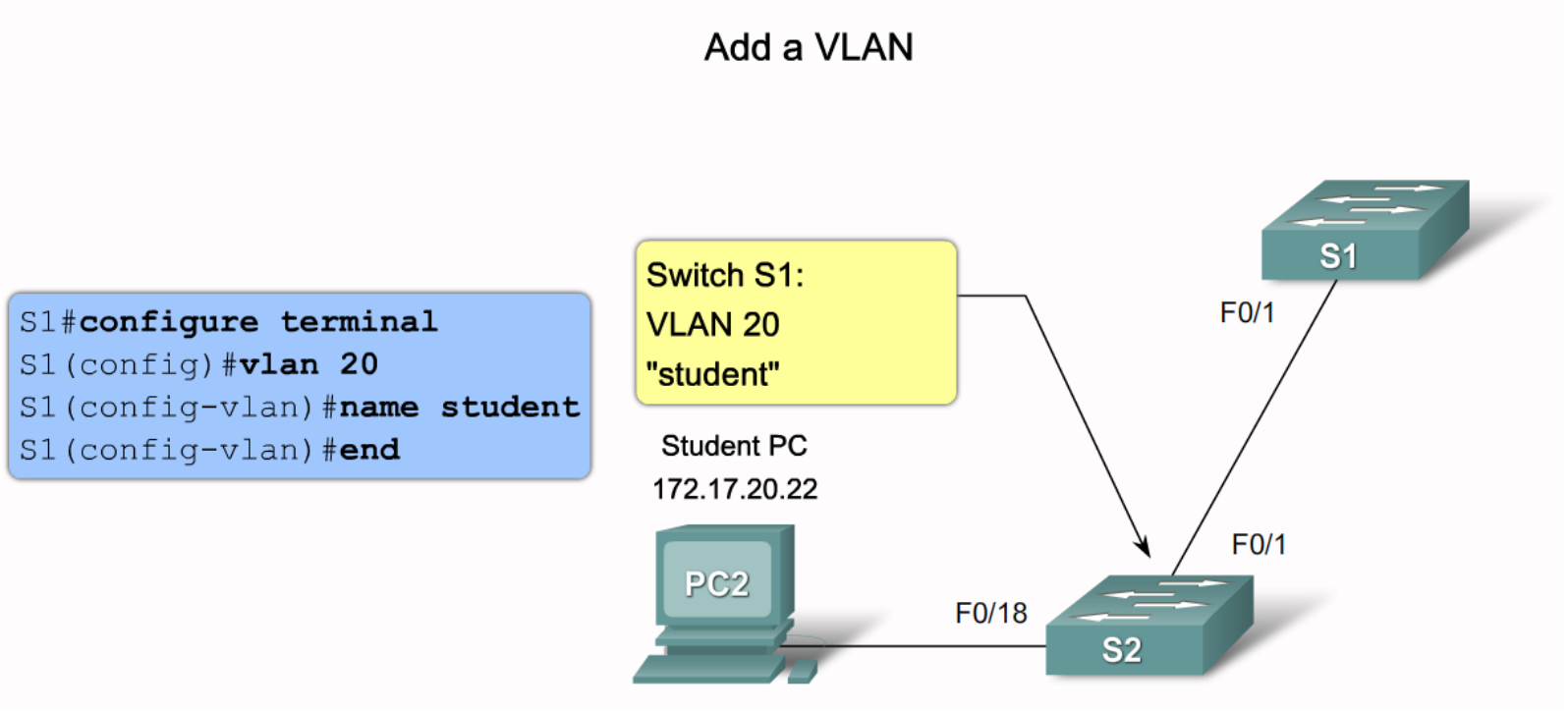
Configuring VLANs and Trunks Overview

Use the following steps to configure and verify VLANs and trunks on a switched network:

1. Create the VLANs.
2. Assign switch ports to VLANs statically.
3. Verify VLAN configuration.
4. Enable trunking on the inter-switch connections.
5. Verify trunk configuration.

Configure VLANs on the Switches in a Converged Network Topology

- Describe the Cisco IOS commands used to create a VLAN on a Cisco Catalyst switch



Configure VLANs on the Switches in a Converged Network Topology

- Describe the Cisco IOS commands used to manage VLANs on a Cisco Catalyst switch

Verify VLANs and Port Memberships

Show VLAN Command

Cisco IOS CLI Command Syntax	
show vlan [brief | id *vlan-id* **| name** *vlan-name* **| summary].**	
Display one line for each VLAN with the VLAN name, status, and its ports.	**brief**
Display information about a single VLAN identified by VLAN ID number. For vlan-id, the range is 1 to 4094.	**id** *vlan-id*
Display information about a single VLAN identified by VLAN name. The VLAN name is an ASCII string from 1 to 32 characters.	**name** *vlan-name*
Display VLAN summary information.	**summary**

Show Interfaces Command

Cisco IOS CLI Command Syntax	
show interfaces *[interface-id* **| vlan** *vlan-id]* **| switchport**	
Valid interfaces include physical ports (including type, module, and port number) and port channels. The port-channel range is 1 to 6.	*interface-id*
VLAN identification. The range is 1 to 4094.	**vlan** *vlan-id*
Display the administrative and operational status of a switching port, including port blocking and port protection settings.	**switchport**

Configure VLANs on the Switches in a Converged Network Topology

- Describe the Cisco IOS commands used to create a trunk on a Cisco Catalyst switch

Configure an 802.1Q Trunk

Cisco IOS CLI Command Syntax	
Enter global configuration mode.	S1#**configure terminal**
Enters the interface configuration mode for the defined interface.	S1(config)#**interface** *interface id*
Force the link connecting the switches to be a trunk link.	S1(config-if)#**switchport mode trunk**
Specify another VLAN as the native VLAN for untagged for IEEE 802.1Q trunks.	S1(config-if)#**switchport trunk native vlan** *vlan id*
Return to privileged EXEC mode.	S1(config-if)#**end**

Troubleshoot Common Software or Hardware Misconfigurations Associated with VLANs

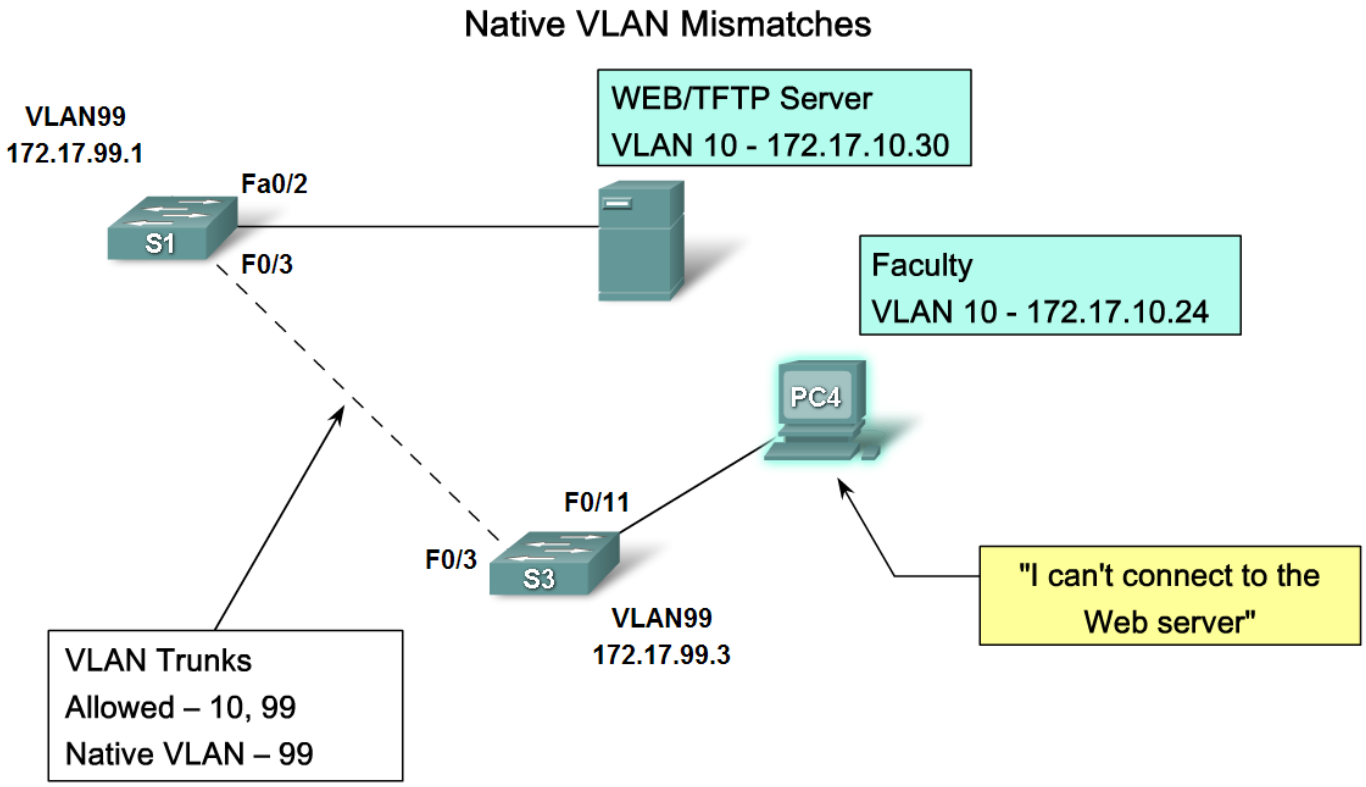
- Describe the common problems with VLANs and trunks

Common Problems with VLANs and Trunks

Problem	Result	Example
Native VLAN mismatches	Pose a security risks and create unintended results.	For example one port has defined as VLAN 99, the other defined as VLAN 100.
Trunk mode mismatches	Causes loss of network connectivity.	For example on port configured as trunk mode "off" and the other as trunk mode "on".
VLANs and IP Subnets	Causes loss of network connectivity.	For example user computers may have been configured with the incorrect IP addresses.
Allowed VLANs on Trunks	Causes unexpected traffic or no traffic is being sent over the trunk.	The list of allowed VLANs does not support current VLAN trunking requirements.

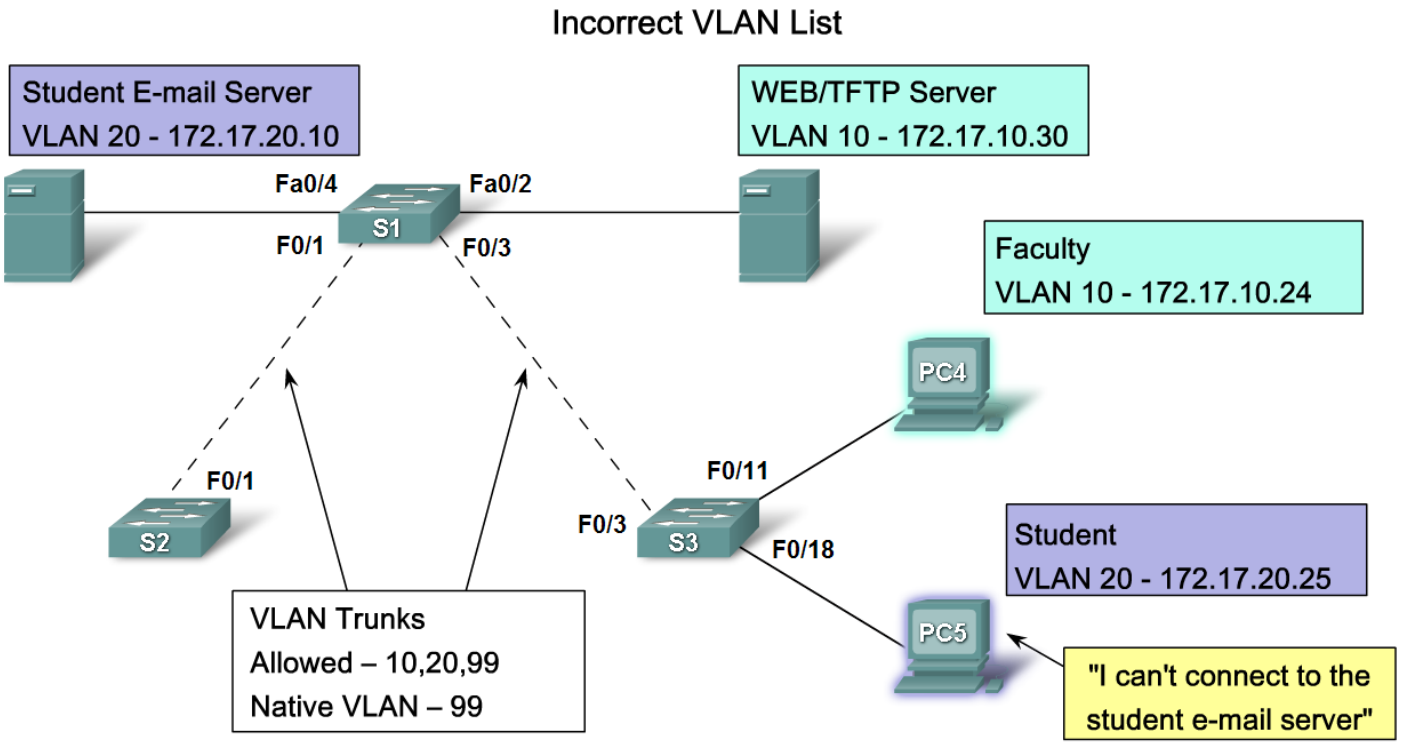
Troubleshoot Common Software or Hardware Misconfigurations Associated with VLANs

- Describe the common problems with VLANs and trunks



Troubleshoot Common Software or Hardware Misconfigurations Associated with VLANs

- Describe how to use the troubleshooting procedure to fix a common problem with VLAN configurations



Summary

- VLANS

  Allows an administrator to logically group devices that act as their own network

  Are used to segment broadcast domains

  Some benefits of VLANs include

    Cost reduction, security, higher performance, better management

Summary

- Types of Traffic on a VLAN include
  - Data
  - Voice
  - Network protocol
  - Network management
- Communication between different VLANs requires the use of
  - Routers

Summary

- Trunks

  A common conduit used by multiple VLANS for intra-VLAN communication

- EEE 802.1Q

  The standard trunking protocol

  Uses frame tagging to identify the VLAN to which a frame belongs

  Does not tag native VLAN traffic