

# Internold Networks CCNA Live Webclass (INCLW)

Week 4 of 8



# Agenda

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- » Lab Topology Solution
- » Subnetting Examples
- » VLSM
- » VLANs and Trunking
- » Static Routing
- » Lab Activity Challenge



# Lab Topology

Full Configurations



# Solution to Lab Activity

## » Check Week 3 Module in Members Area

Main Network:  
172.16.8.0/25

S1: 172.16.8.0/28

S2: 172.16.8.16/28

S3: 172.16.8.32/28

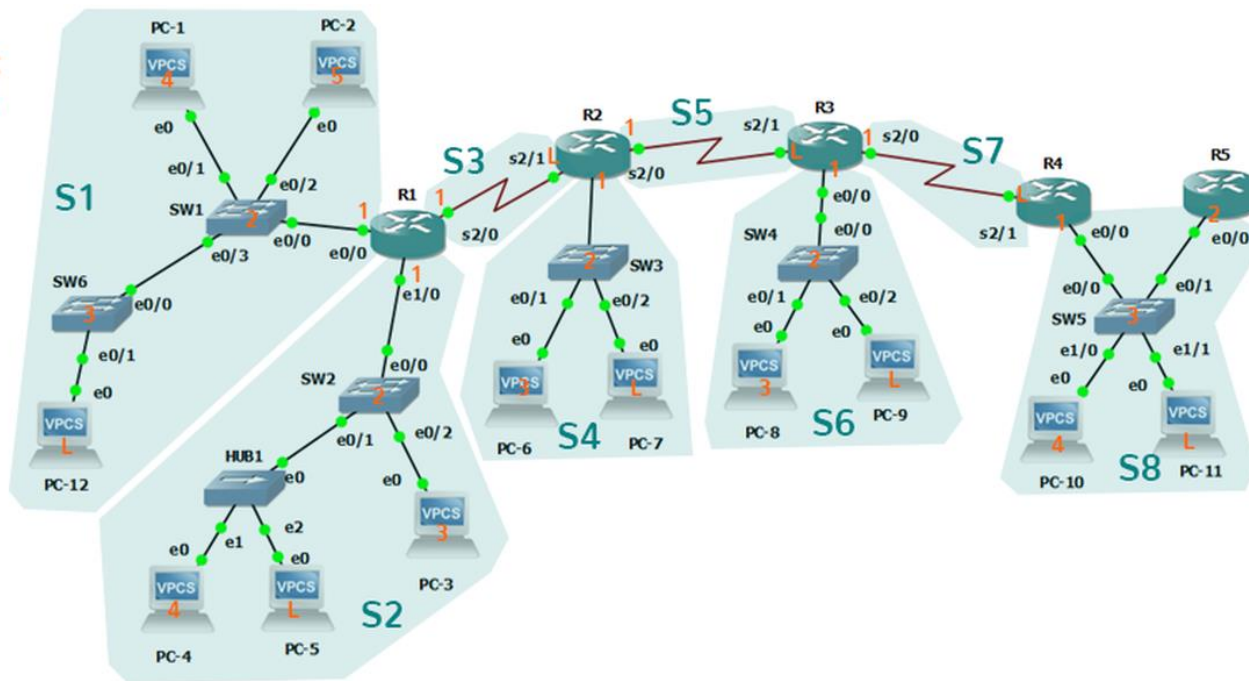
S4: 172.16.8.48/28

S5: 172.16.8.64/28

S6: 172.16.8.80/28

S7: 172.16.8.96/28

S8: 172.16.8.112/28



# Default Interface Command

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## » Default Interface

- Switch(config)#default interface <interface>



## » Configuration

- R1(config)#interface <dce serial interface>
- R1(config-if)#clock rate threshold ?
- R1(config-if)#clock rate threshold 64000

## » Consider s2/0 as our DCE interface in our Lab

# MAC Address Show Commands

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## » Show commands

- SW#show mac-address-table dynamic
- SW#show mac-address-table interface <interface>
- SW#show mac-address-table address <mac-address>



# Saving Configurations

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## » Possible command options:

- SW1#copy running-config startup-config
- SW1#copy run start
- SW1#write
- SW1#wr



# Subnetting

## Examples and Practice Quiz



# Quick Recap on Basic Subnetting

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- » More examples in Members Area (week 3)
- » Practice Exercises
- » Classful subnetting (Subnet Mask)
- » Classless subnetting (CIDR)



# Subnetting Demo

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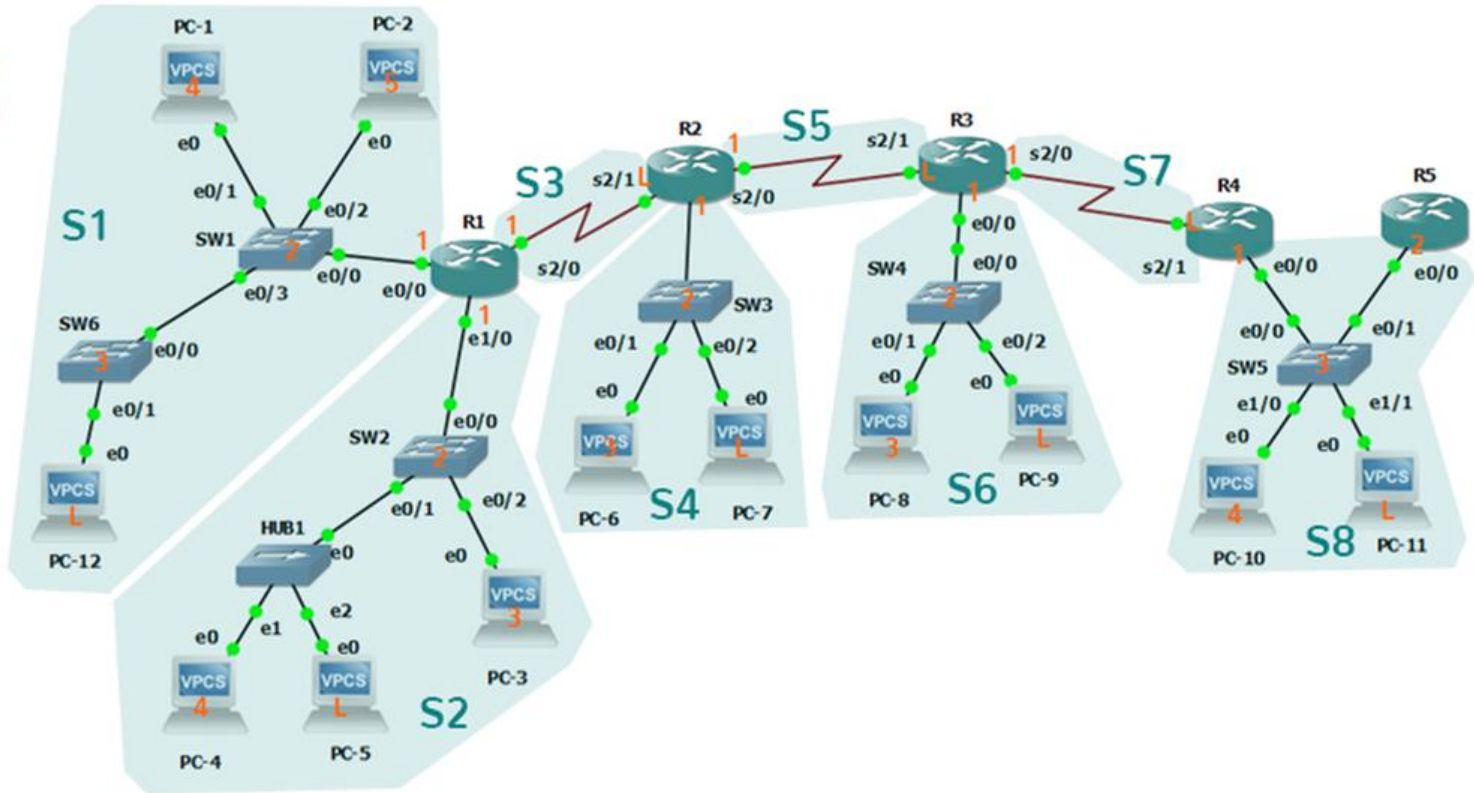
# VLISM

## Concept and Design

# Variable Length Subnet Mask (VLSM)

Main Network:  
172.16.8.0/25

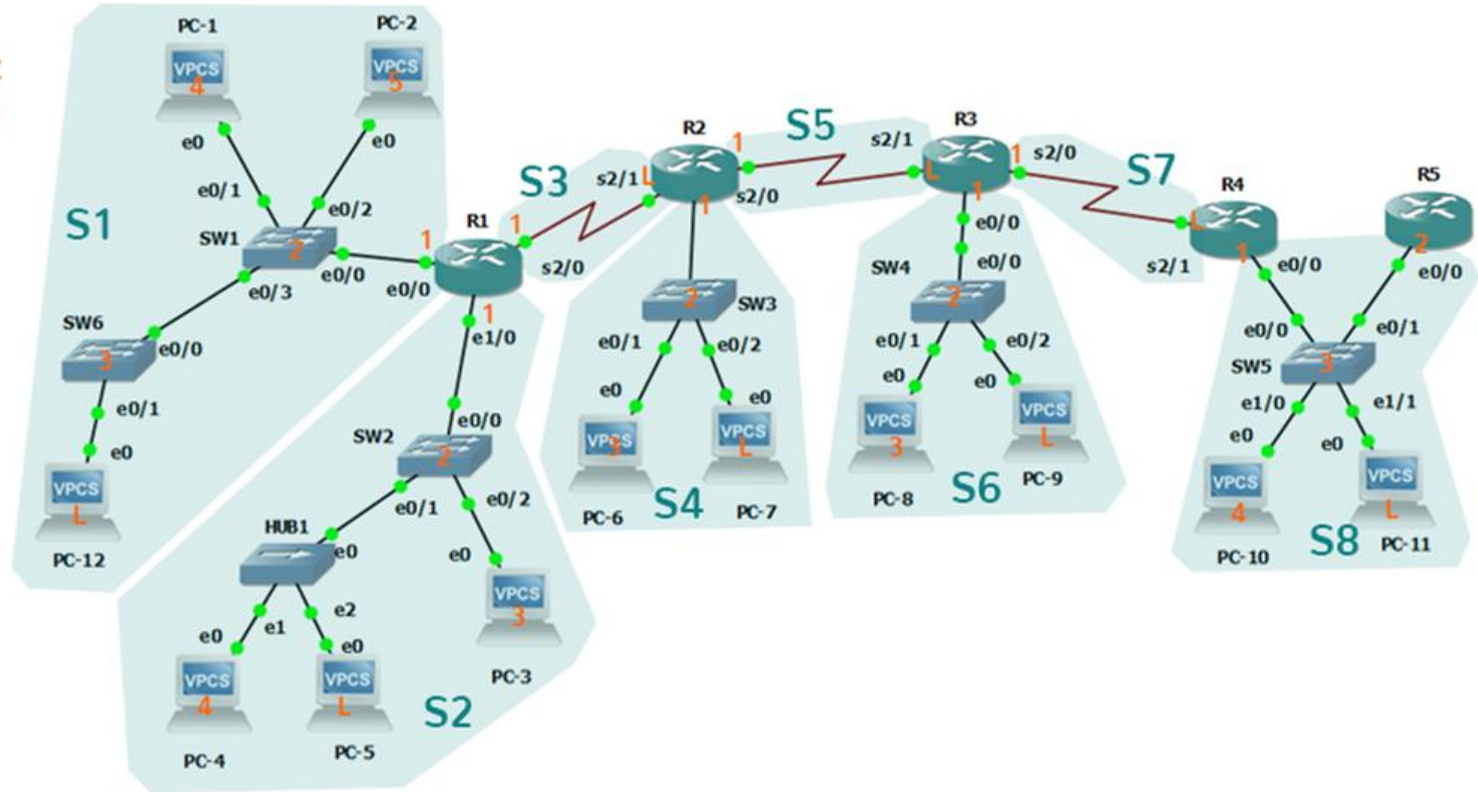
S1: 172.16.8.0/28  
S2: 172.16.8.16/28  
S3: 172.16.8.32/28  
S4: 172.16.8.48/28  
S5: 172.16.8.64/28  
S6: 172.16.8.80/28  
S7: 172.16.8.96/28  
S8: 172.16.8.112/28



# Variable Length Subnet Mask (VLSM)

Main Network:  
172.16.8.0/25

S1: 30 hosts  
S2: 30 hosts  
S8: 14 hosts  
S4: 6 hosts  
S6: 6 hosts  
S3: 2 hosts  
S5: 2 hosts  
S6: 2 hosts



# Variable Length Subnet Mask (VLSM)

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Main Network:  
172.16.8.0/25

S1: 30 hosts

S2: 30 hosts

S8: 14 hosts

S4: 6 hosts

S6: 6 hosts

S3: 2 hosts

S5: 2 hosts

S6: 2 hosts



# More VLSM Examples

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- » More examples will be added in Week 4 Module in Members Area

# Broadcast / Collision Domains

## Concepts



# Broadcast and Collision Domain

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## » Collision Domain

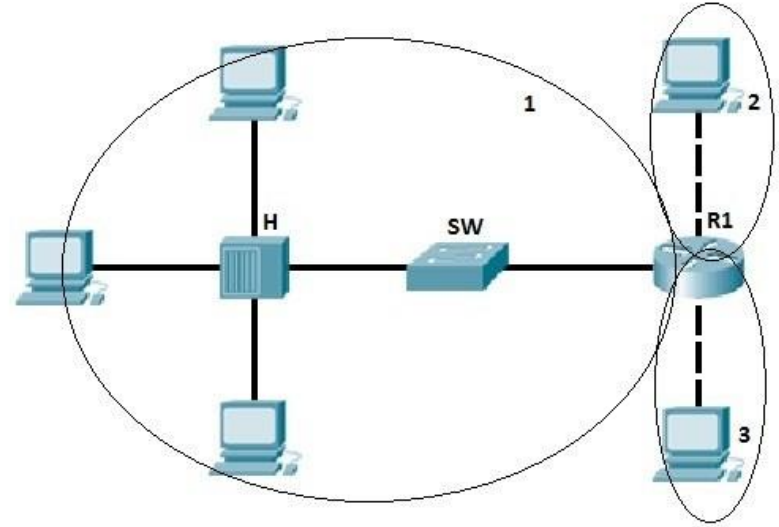
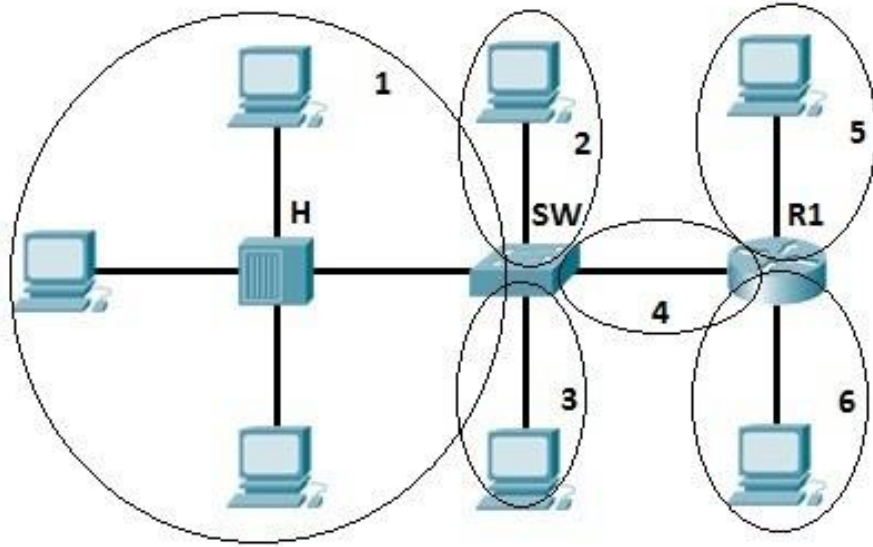
- Area in a network where two ethernet frames can collide.
- A **Hub** is one collision domain
- Each **Switch** interface is one collision domain

## » Broadcast Domain

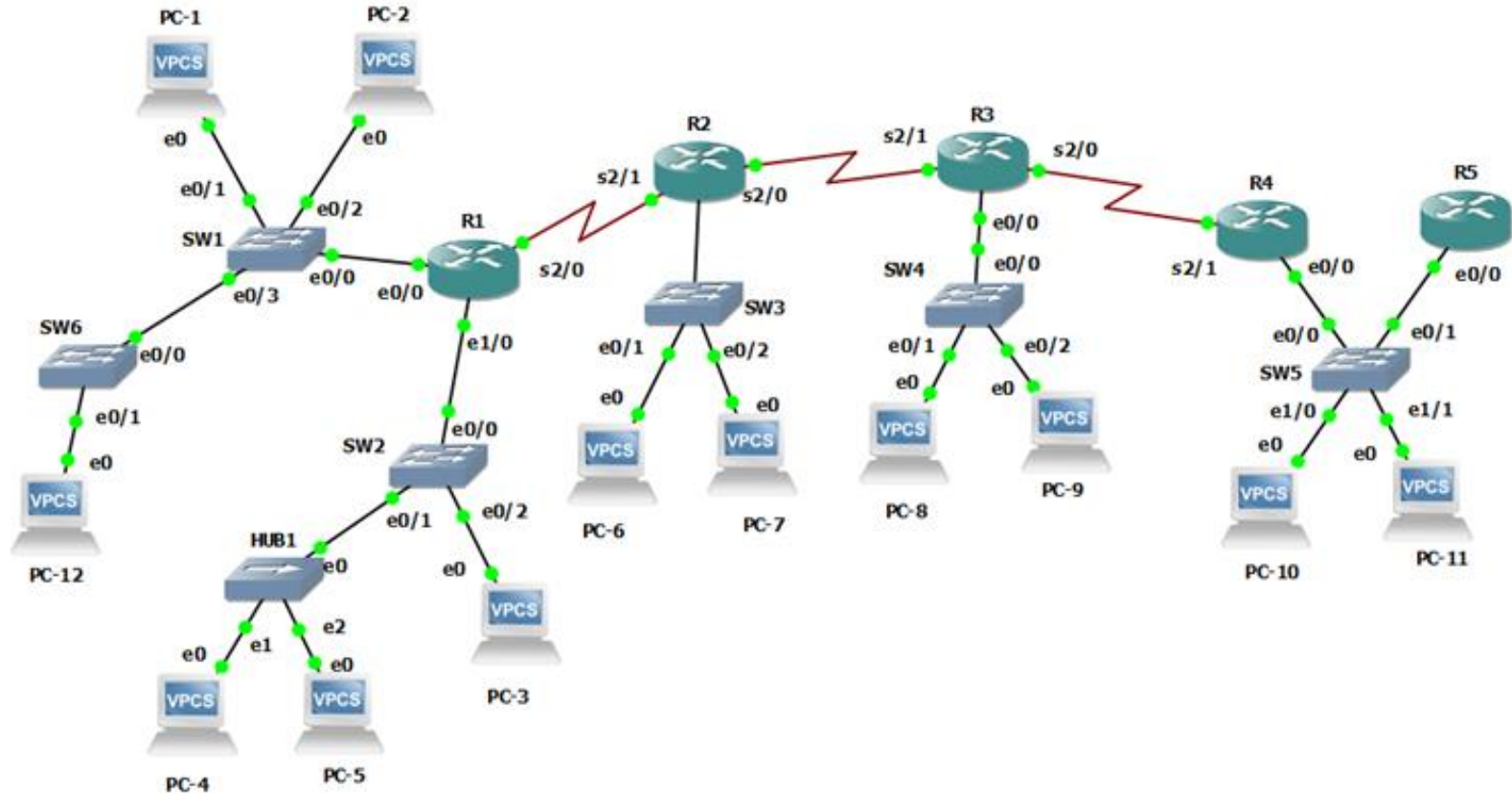
- Contains all devices that can reach each other at the data link layer by using broadcast.
- A **Switch** or a **Bridge** is one broadcast domain
- Each **Router** interface is one broadcast domain



# Broadcast and Collision Domain



# Broadcast and Collision Domain ::: Lab Topology



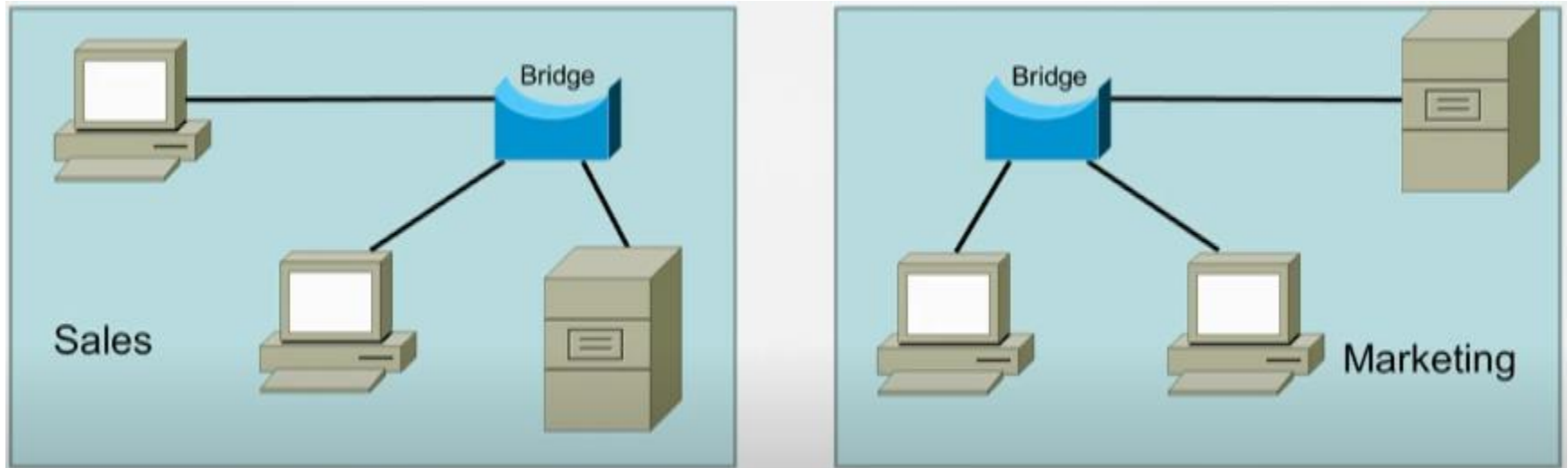
# VLANs

What are they and how do we configure them?



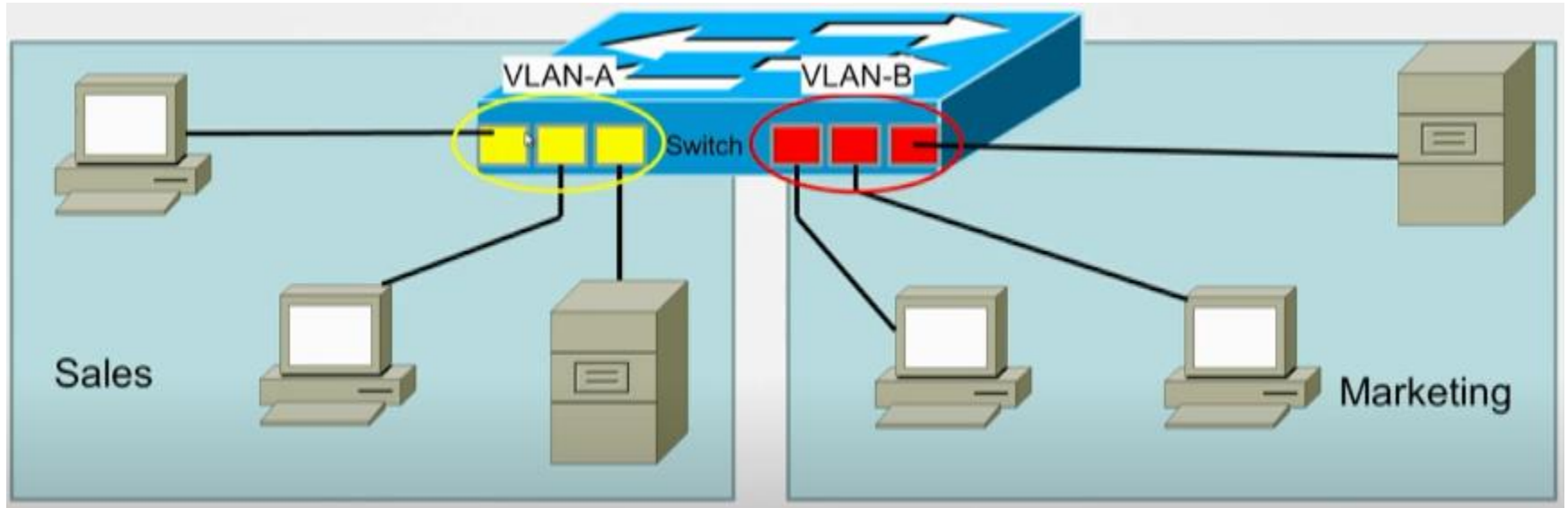
# VLAN Concept

## » Virtual Local Area Networks



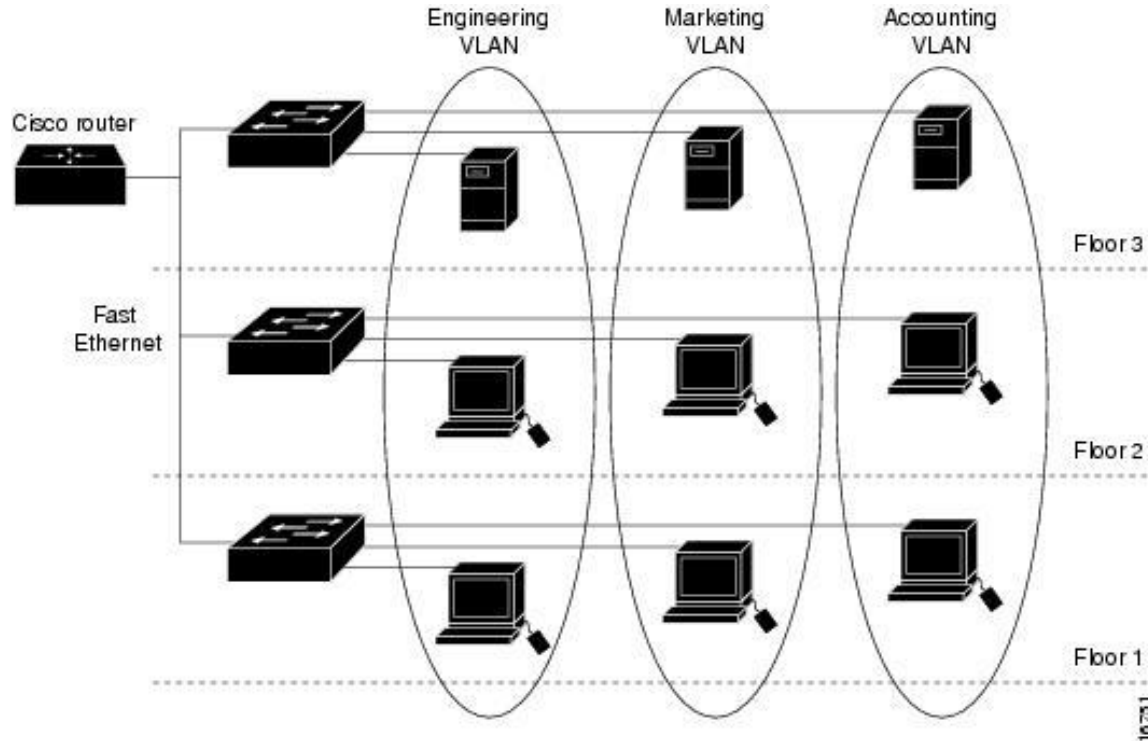
# VLAN Concept

## » Virtual Local Area Networks



# What are VLANs?

## » Virtual Local Area Networks



# Features of VLANs

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- » Separates broadcast domains
- » Provides better security



# Range of VLANs

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## » VLAN range is 1-4094

- 1-1001 are usable normal-range VLANs
- 1002-1005 are reserved for token ring
- 1006-4094 are extended-range VLANs



# How to Configure VLAN

## » VLAN database (legacy method)

- SW1# vlan database
- SW1(vlan-database)# vlan <vlan-id>
- SW1(vlan-database)# end

## » Modern method

- SW1(config)# vlan <vlan id>
- SW1(config-vlan)# name <vlan name>

# Configure Access Ports

- » Access Port – switchport for only a single broadcast domain or VLAN
- » Access port configuration
  - SW6(config)#interface <interface>
  - SW6(config-if)#switchport
  - SW6(config-if)#switchport mode access
  - SW6(config-if)#switch access vlan <vlan-id>

# Verifying VLAN

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## » Verification commands

- SW1# show vlan <brief>
- SW1# show interface <interface> switchport



# VLAN Trunking

## Concepts and Configurations



# Port Types

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## » Trunk Port

- Two or more VLANs can be configured
- Carry multiple VLAN information
- By default, all the VLAN traffic is allowed

## » Access Port



# Trunking Encapsulation

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## » 802.1Q

- Open standard
- All traffic except native VLAN is inserted with a 802.1q tag
- Support concept of native VLAN



# Native VLAN

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- » Frame without a tag is considered a native VLAN traffic
- » Must match on both ends of the trunk
- » By default, native VLAN is 1
- » Can be changed using the command
  - Switch(config-if)# switchport trunk native vlan <vlan id>

# Trunk Encapsulation Configuration

## » Static

- SW1(config-if)#interface <interface>
- SW1(config-if)#switchport
- SW1(config-if)#switchport trunk encapsulation dot1q
- SW1(config-if)#switchport mode trunk

## » Dynamic

- DTP

## » Verifying VLAN and trunking

- Switch# show vlan <brief>
- Switch# show interface trunk
- Switch# show interface status
- Switch# show interface <interface> switchport

# Dynamic Trunking Protocol

## Concepts and Configurations



# Dynamic Trunking Protocol (DTP)

## » DTP Configuration

- Switch(config-if)# switchport mode dynamic [desirable|auto]

## » Desirable

- Actively seeking for trunking

## » Auto

- Passive. Just waiting for the other end to initiate trunking

## » All combinations will work except **Auto-Auto**

# Dynamic Trunking Protocol (DTP)

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## » Disable DTP

- Switch(config-if)# switchport nonegotiate

## » Verification command

- Switch# show interface trunk
- Switch# show interface <interface> switchport



# Spanning Tree Protocol

Prevents Switching Loops



# Introduction to IOS

Cisco Operating System



# Static Routing

Manually Configured

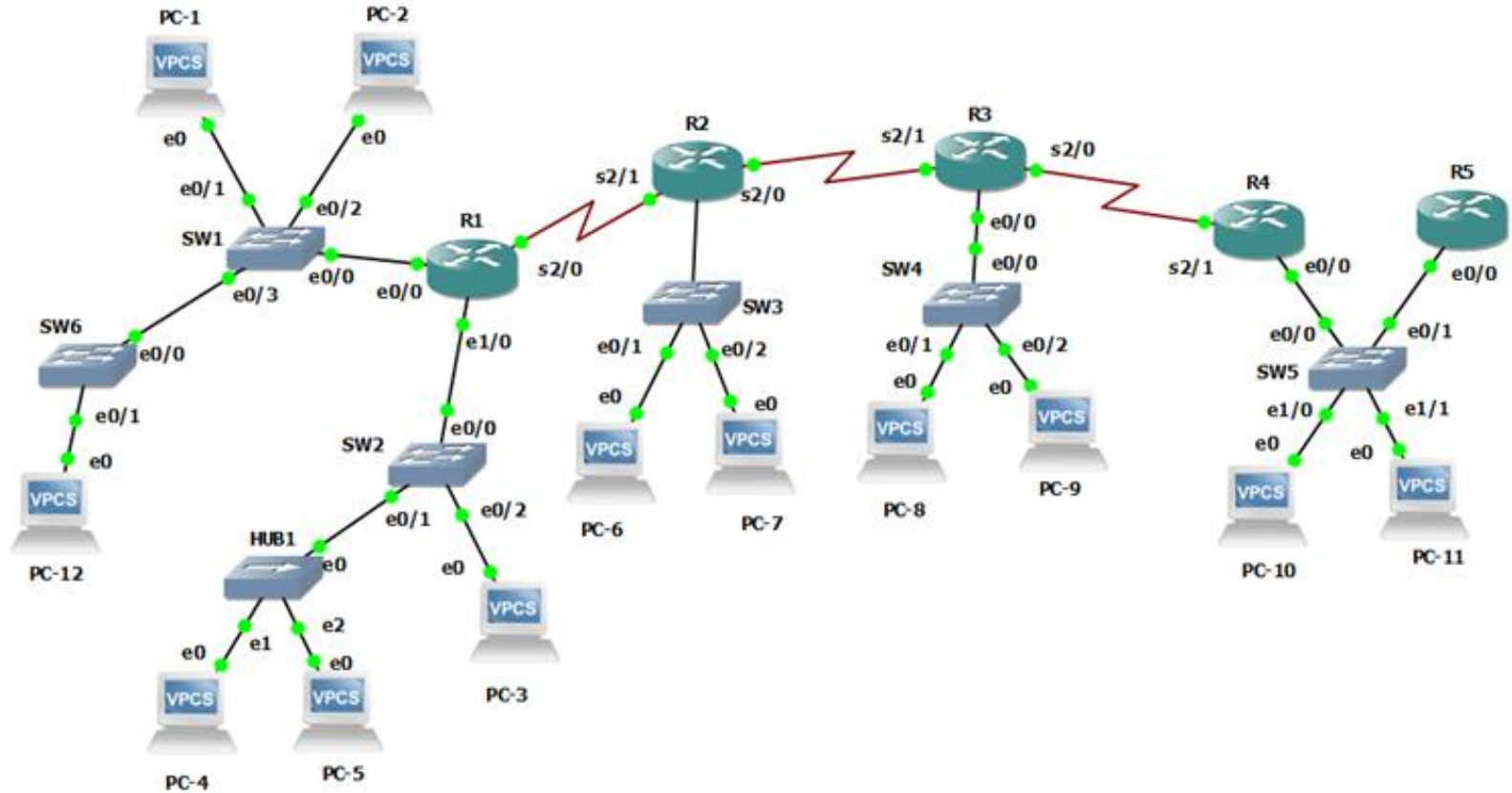


# Static Routing

- » Routers forward packets based from the entries in the routing table.
- » Routing table entries can be either:
  - Manually configure (static routing)
  - Dynamically learned (dynamic routing)
- » **Configure Static Routing**
  - `switch(config)# ip route <ip-addr> <ip-mask> <next-hop>`



# Lab Activity Challenge



# Routing Information Protocol

Dynamic Routing Protocol



# Questions?

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# Q&A

# Thank You

... for the opportunity to share.