

# CSET 2200

Spanning tree

# Questions

## Completion of VLAN Demo

# Spanning Tree - The problem

- ▶ Loops
- ▶ Need to add redundant links
- ▶ Backup without intervention

# Solution - Spanning Tree

- ▶ Develops a loop free topology
- ▶ Defined in 802.1D
- ▶ Updated over the years
- ▶ 802.1Q is most recent

## Spanning Tree (contd)

- ▶ Spanning tree selects a root bridge
- ▶ Bridge with lowest priority
- ▶ If tied lowest mac

## Spanning tree (contd)

- ▶ Each switch finds lowest cost path to root
- ▶ Costs vary based on technology
- ▶ Ethernet uses bandwidth
- ▶ Lowest cost port is root port (RP)

## Spanning tree (contd)

- ▶ Each segment finds lowest cost to root
- ▶ Port connecting that segment is designated port (DP)
- ▶ All ports that aren't RP or DP block



# BPDU

- ▶ Spanning tree communicates with BPDU
- ▶ Stands for Bridge Protocol Data Units
- ▶ Exchanged regularly (2 seconds)

# Learning process

- ▶ Ports comes up and blocks
- ▶ Listening (Waiting for BPDU)
- ▶ Learning (Populates MAC table but still block)
- ▶ Forwarding (Passes data)
- ▶ Could also be Blocking or Disabled

# Time to converge

- ▶ Default for Listen and Learn each 15 seconds
- ▶ Means ports take 30 seconds to come active
- ▶ Can cause outages as networks reconfigure

# VLANs and STP

- ▶ All VLANs shared a tree originally
- ▶ Two technologies to solve
  - ▶ Multiple Spanning Tree (MST)
  - ▶ Per VLAN spanning tree (PVST)

## Other improvements

- ▶ Rapid Spanning Tree improves convergence time
- ▶ RPVST

# Design Considerations

- ▶ Want root towards the middle of the network
- ▶ Careful root design is important in large network
- ▶ With PVST want all links active between VLANs

## Example

# Questions



Next session TBD - will email

- ▶ Maybe NAT
- ▶ Maybe ACL
- ▶ Need to review Lab