NETWORK PROTOCOLS & SECURITY
23EC2210 R/A/E

Topic:

VLANS

Session – 13

AIM OF THE SESSION

To familiarize students with the different networking and internetworking devices

INSTRUCTIONAL OBJECTIVES

This Session is designed to:

1. Explain the concept and purpose of Virtual Local Area Networks (VLANs) in network architecture.
2. Demonstrate VLAN configuration and implementation on network devices.

LEARNING OUTCOMES

At the end of this session, you should be able to:

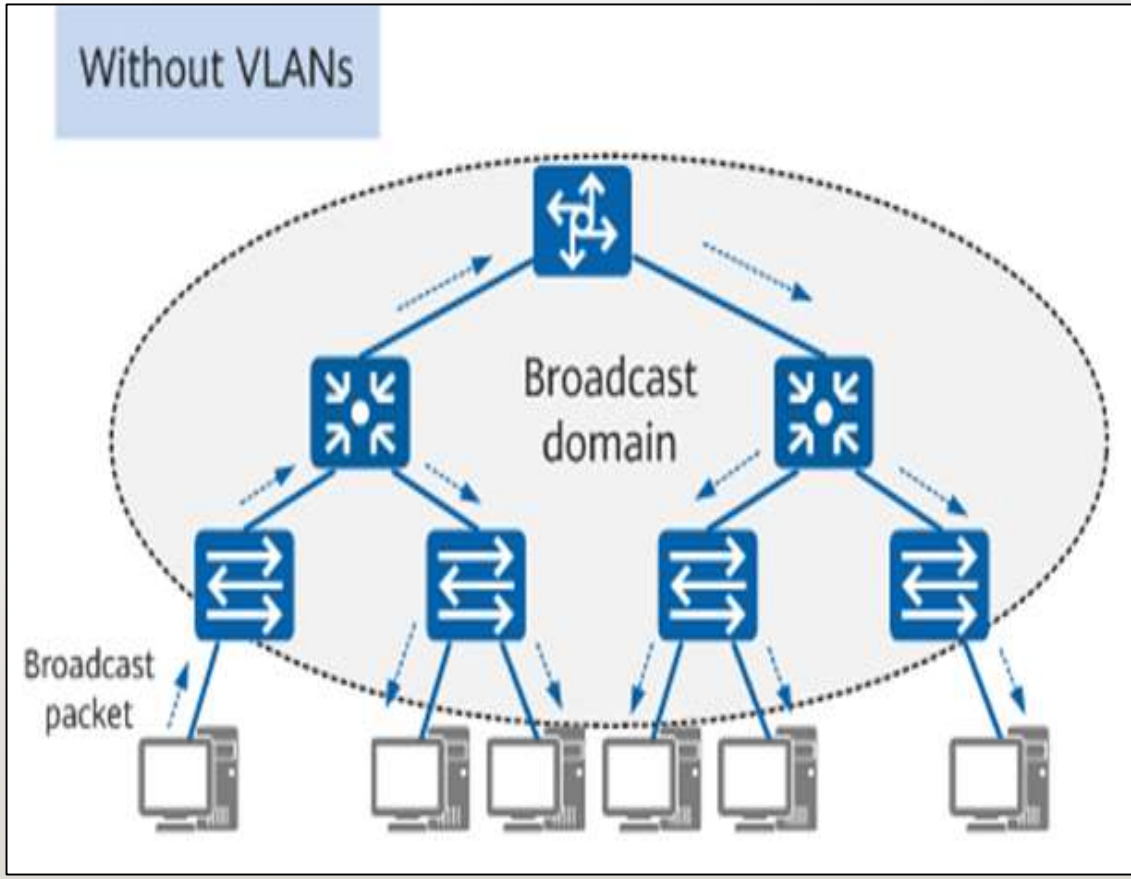
1. Explain the concept and significance of VLANs in network architecture.
2. Create and configure VLANs on network devices using appropriate methodologies.
3. Understand the role of VLAN trunking protocols in interconnecting VLANs.

AGENDA

- Virtual Local Area Network (VLAN)
- Benefits of Switched Network
- Benefits of VLAN
- Types of Ports in VLAN
- Frame Tagging

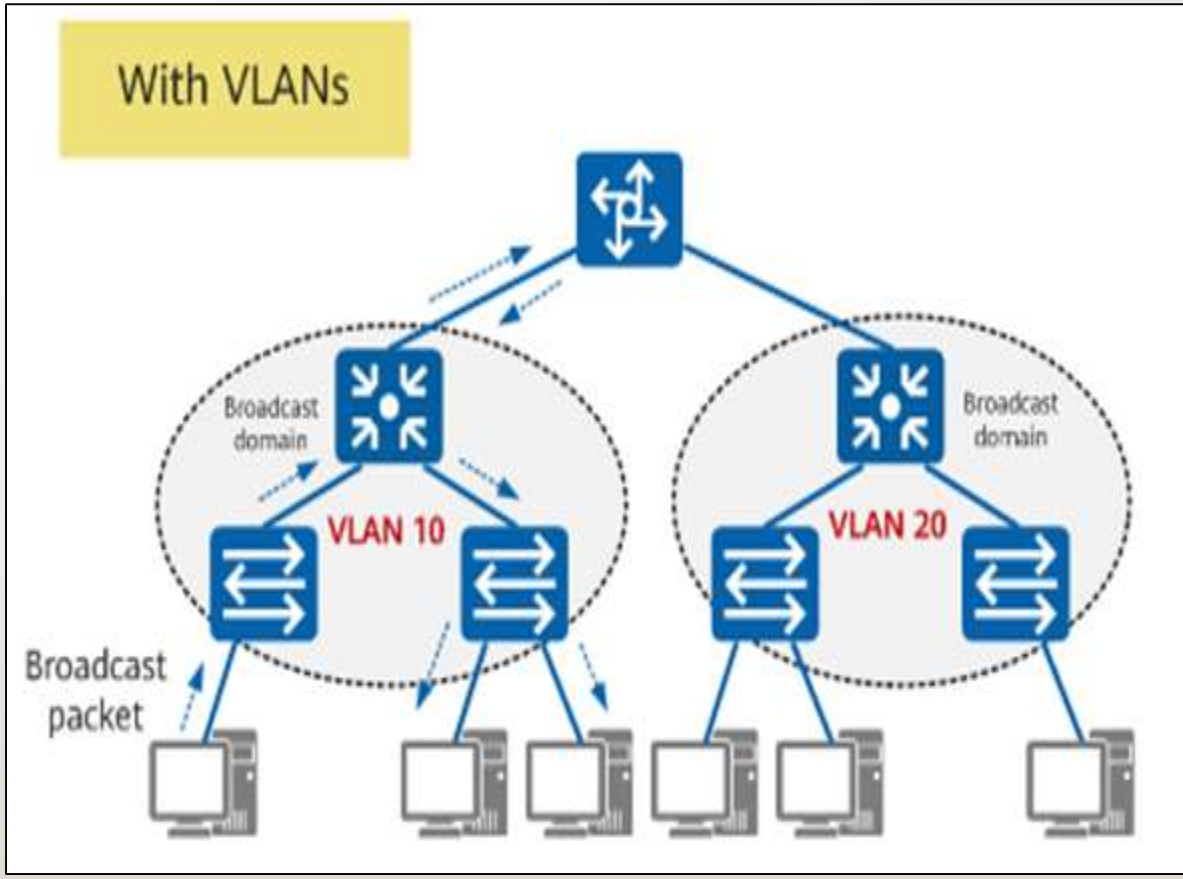
VIRTUAL LOCAL AREA NETWORK (VLAN)

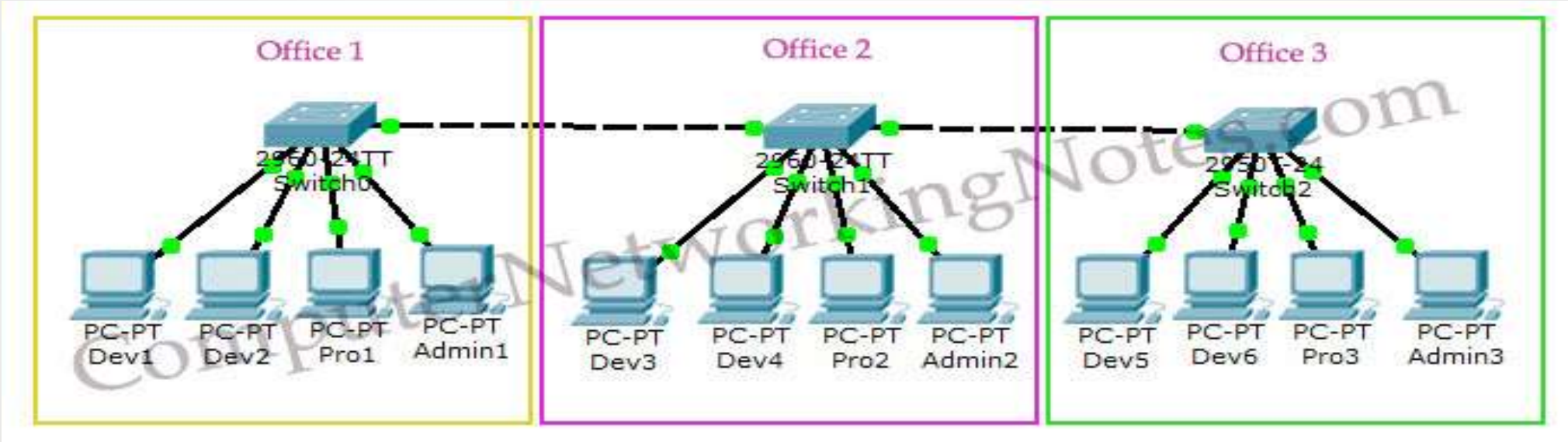
- A **LAN** is a group of devices connected to a single Ethernet network.
- A **broadcast message** is a message that reaches all devices in the network.
- Devices use broadcast messages to perform many essential tasks.
- The more devices you add to a network, the more broadcast messages it will have which in turn **reduce network performance**.

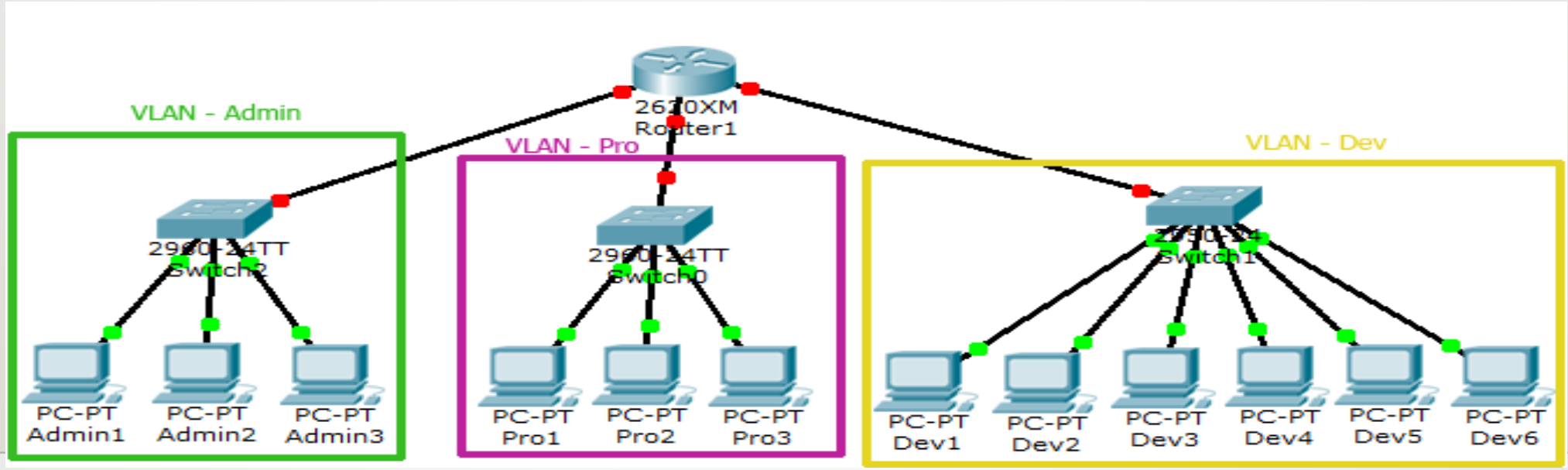


VIRTUAL LOCAL AREA NETWORK (VLAN)

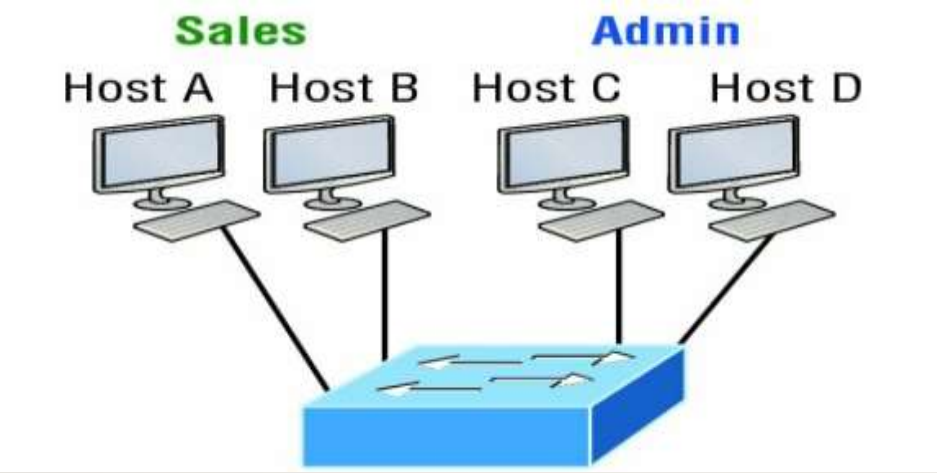
- To improve network performance, **VLANs** are used which create a boundary for broadcast messages.
- A **VLAN (Virtual Local Area Network)** is a logical network construct that allows the segmentation of a physical network into multiple virtual networks.
- In a VLAN, the computers, servers, and other network devices are logically connected regardless of their physical location.
- It is created by grouping devices together based on factors such as department, function, or security requirements.



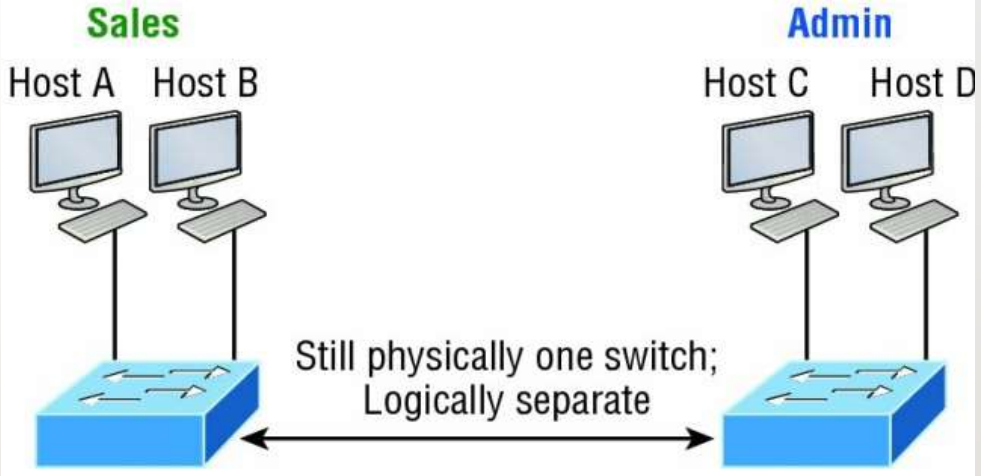




EXAMPLE



One switch, one LAN: Before VLANs, there were no separations between hosts



One switch, two virtual LANs (*logical* separation between hosts): Still physically one switch, but this switch acts as many separate devices.

TYPES OF PORTS IN VLAN

There are two different types of ports in a switched environment.

1. Access Ports
2. Trunk Ports.

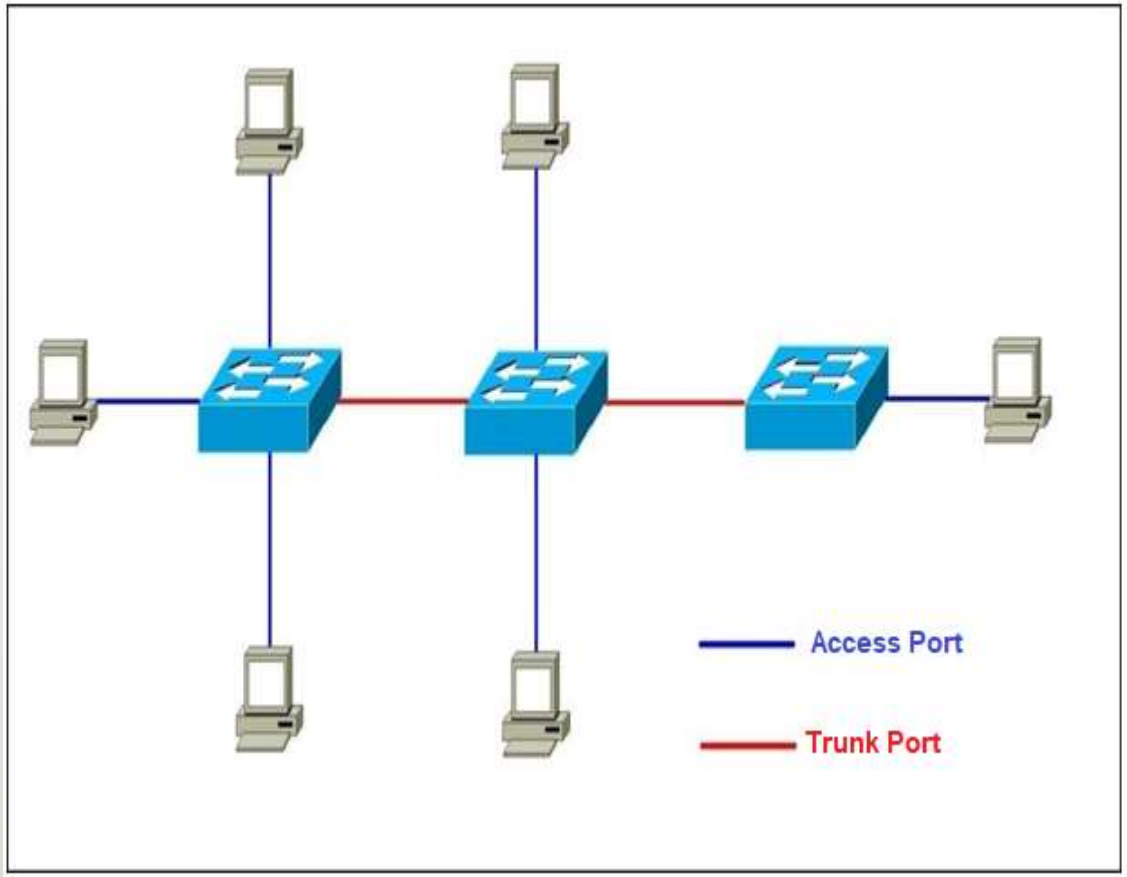
Access Ports

- Access port is a connection on a switch that **transmits data to and from a specific VLAN**.
- It is used to **connect switches to host devices** such as desktops, laptops, printers etc., only available in access link.
- It sends and receives Ethernet frames in **untagged form** from access VLAN.
- It can only be member of single VLAN.
- Access-link devices can't communicate with devices outside their VLAN unless the packet is routed

TYPES OF PORTS IN VLAN CONTD...

Trunk Ports

- Trunk port is a connection on a switch that **transmits data to and from multiple VLANs.**
- It is used to **connect switches to other switches, routers and servers** available in trunk link.
- Frames are marked with unique **identifying tags** when they move between switches so that they can be directed to their designated VLANs.
- It can manage traffic for numerous VLANs at the same time.



REFERENCES FOR FURTHER LEARNING OF THE SESSION

Reference Books:

1. Data Communications and Networking, Behrouz A. Forouzan, 4th Edition, McGraw Hill.
2. Computer Networks, Tanenbaum, 6th Edition, Pearson.

Sites and Web links:

CISCO Academy
NPTEL, Computer Networks and Internet Protocols, Prof. Soumya Kanti Ghosh, Prof. Sandip Chakraborty IIT Kharagpur. (https://nptel.ac.in/courses/106105183)

THANK YOU

Team – Networks Protocols & Security