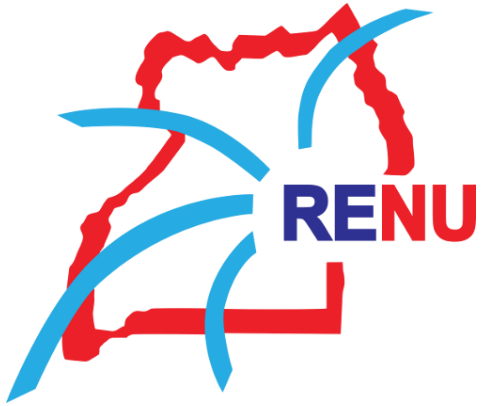


Scalable Network Design for Schools

Introduction to Network Basics – 15th May 2023

By;

Nicholas Brian Anya
nanya@renu.ac.ug

Common Terminologies

Outline

1. What is a network?
2. OSI model overview
3. Terminologies

Objective

To ensure we are using the same terminology.

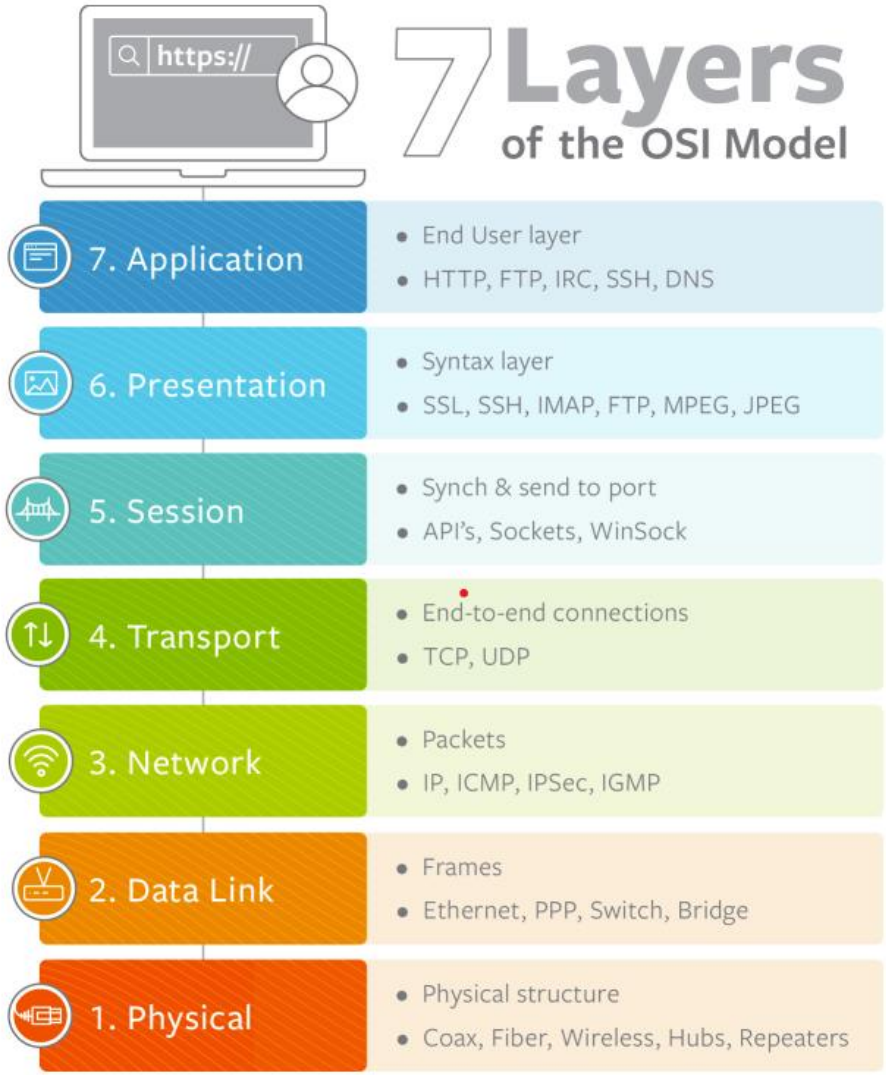
What is a network?

- Motivation
  - Resource sharing
  - Communication
- Definition
  - A system that connects two or more computing devices for transmitting or sharing information.
- Trend Drivers
  - Speed
  - Reliability
  - User experience

Why the OSI reference model?

- Conceptual framework for Networks
  - 7 layers - describing information flow on a network.
  - Each layer relies on the ones below it.
  - Focus – Layers 1, 2, 3.

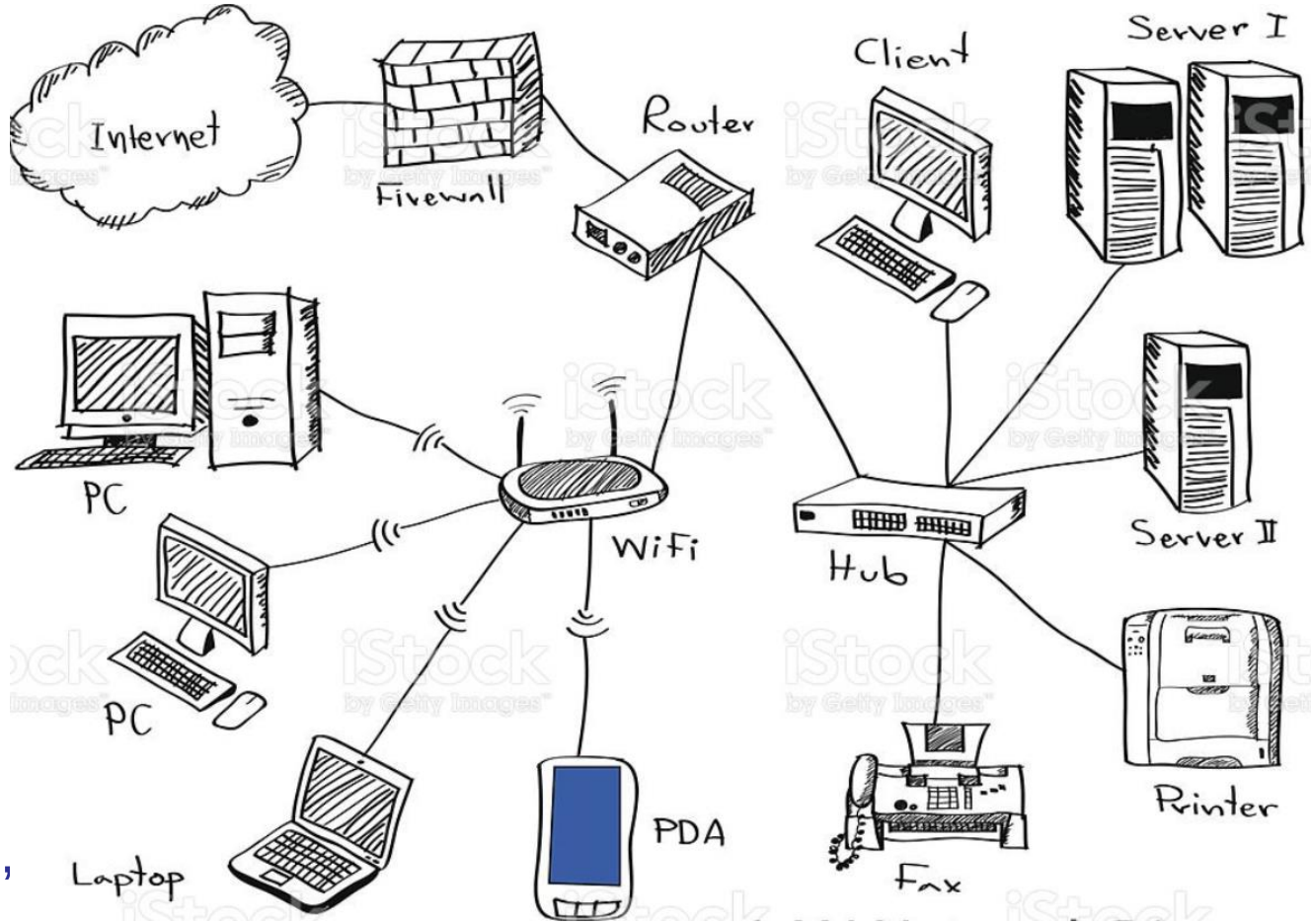
- Universal set of rules
  - Allowing for interoperability between multiple vendor equipment.
  - Makes troubleshooting systematic and easier.



Terminologies

1. Local Area Network (LAN)

- A collection of devices connected together in one physical location.
- Cable or Wireless connections.
- Cable – Serial, Ethernet, Optical Fiber.
- Wireless (WLAN) – Wi-Fi, Microwave links.
- Devices – switches, access points, routers.



Terminologies

2. IP Addresses

- A numerical layer 3 address that identifies a device and the network to which it is connected. eg. V4 - 137.63.189.3/24. V6 – 2c0f:f6d0:2b:13::/64.
- Prefix length - identifies a network address, and number of usable host addresses.
- Can be private or public – concept to be discussed in detail in upcoming sessions.

3. MAC Address - A unique layer 2 address that identifies devices network devices.

- Assigned to Network Interface Card (NIC) – Identifies device + Vendor eg. 28:b8:29:43:29:93.

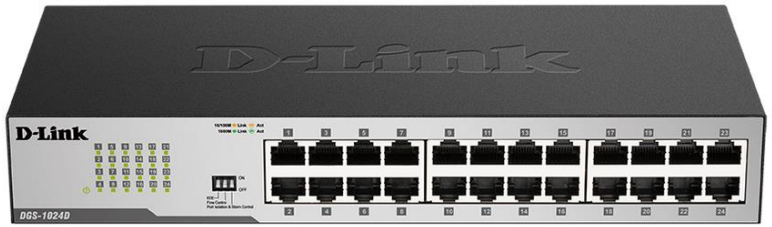
Terminologies - Devices

4. Router

- A layer 3 network device that forwards data packets between computer networks.
- Uses IP addresses.

5. Switch

- Connects devices on a computer network.
- Can be Layer 2 or Layer 3.
- Layer 2 – uses MAC addresses.
- Layer 3 – Has IP functionality such as basic routing.



Terminologies - Devices

6. Access Point

- Creates a WLAN
- Allows Wi-Fi devices to connect to a LAN.
- Typically connected to LAN through ethernet.
- Outdoor or Indoor.
- Layer 2 device.

Terminologies - Devices

7. Ports/Interfaces

- Clearly labeled on devices.
- Console Port – used to access the device through a terminal.
- Ethernet Ports – connecting other network devices through ethernet cables. i.e Fast Ethernet, Gigabit Ethernet.
- SFP Port – slot for SFP module.
- LEDs indicate port state.

8. SFP Module

- Used for optical fiber connections – patch cords.

Terminologies - Media

9. Ethernet cable - Copper cores.

- Standardisations: CAT 6>CAT 5E>CAT 5
- Connector – RJ45 – into ethernet port.

10. Optical patch cord

- Optical fiber core.
- Connectors – LC (Into SFP), SC, and FC
- Types – LC-LC, LC-SC, LC-FC

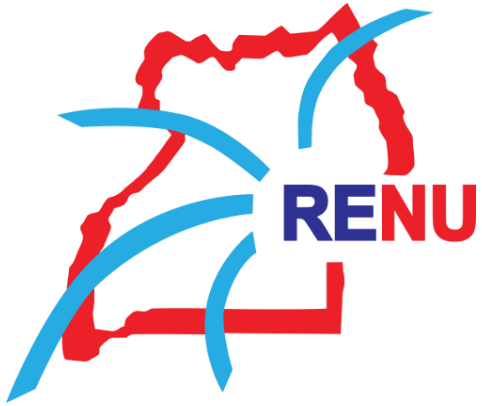
11. Console cable – connects to the console port to access the device.

Terminologies - Performance

10. Bandwidth

- Network bandwidth defines how much data can possibly travel in a network in a period of time.
- Measured in Mbps.
- Analogy - Bandwidth (Water pipe)
    - Data (Water)
    - The bigger the pipe, the more water can flow through in a given amount of time.

11. Latency - Speed at which data travels across the network to its destination.



Thank You