

WEEK 1:

HUBS

- Hubs operate at layer 1, and only operate at half duplex (Only one device can transmit at a time)
- Hubs Create collision domains
- Hubs are known as dumb devices since they broadcast to all devices connected to it.
- Hubs allow device to communicate using Mac-Addresses.

SWITCHES

- Switches are networking hardware devices that replaced hubs, and operate a layer 2, by using Mac-Address and devices connect to switch by using physical ports.
- Switches are able to break-up and divide collision domains, allow more host to connect to a network physically
- Switches DO NOT CREATE NEW BROADCAST DOMAINS
- Switches Unlike hubs do not create collision domains.

ROUTER

- Router are hardware networking devices that operate at layer 3, and are able to perform many functions such as:
 1. Packet switching - Forwarding packets across a network
 2. Packet filtering - Able to filter packets by using a set of pre-defined rules
 3. Internetwork communication - this means that it allows communications between 2 different networks.
 4. Path Selection - this is the path that is decided to send data across a network
- Each Router interface is a Broadcast Domain
- Routers break up Broadcast domains and create WAN

BROADCAST DOMAIN

- Broadcast domain is your local lan.

- Your broadcast domain defines the devices that you can broadcast to on your network

LAN CONGESTION

- Can be caused by 4 different factors
 1. Broadcast Storm - too many devices broadcasting at same time
 2. Low Bandwidth
 3. Too many hosts
 4. Multi-cast - broadcasting out to network

Reference Models

- A reference model is a blue print for how communications should take place across a network
- This blueprint defines the set of rules that everyone must follow to have a successful communication on a specified network.

EXAMPLE:

1. OSI Model
2. DD Model
3. TCP/IP model

OSI-Model

- The OSI Model is a reference model that provide a set of rules and guidelines for a developer to be able to develop applications that run on a network
- Has 7 layers

Layer	Description	PDU	Protocols
Application	Provides User Interface, File, print, Message, and Application Services	APDU (MSG)	Http, Https, SSH, TELNET
Presentation	Handles processes such as encryption	PPDU	ENCRYPTION Compression Translation
Session	Keeps application data Seperate	SPDU	Dialog Control
Transport	<ul style="list-style-type: none"> - Provides Reliable delivery, - End to End protocol 	Segment	UDP - Unreliable TCP - Reliable
Network	<ul style="list-style-type: none"> - Provides Logical Addressing - Allows Routers to route for path determina 	Packet	IP Use Routing Tables to determine a metric called cost. “Cost” ← Is the

	tion.		Number of hops a packet will take when traveling across the network or network(s)
Data-Link	Combines Packets into bytes then into Frames, allows access to media by using MAC(MEDIA ACCESS CONTROL)	Frame/Bytes	Logical Link Control (LLC) Media Access Control (MAC)
Physical		Bits	

TCP/IP Model

PDU

- Protocol Data unit, is simply a piece of data or a segment with a header.

