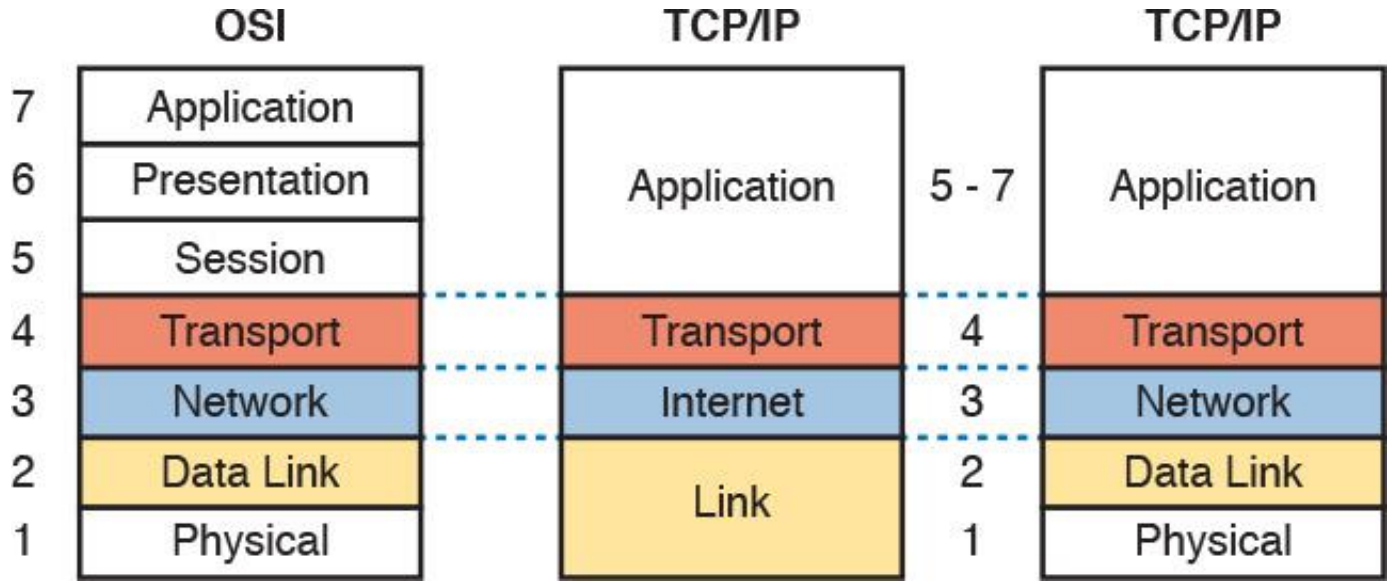
Internold Networks
CCNA Live Webclass (INCLW)

Week 2 of 8

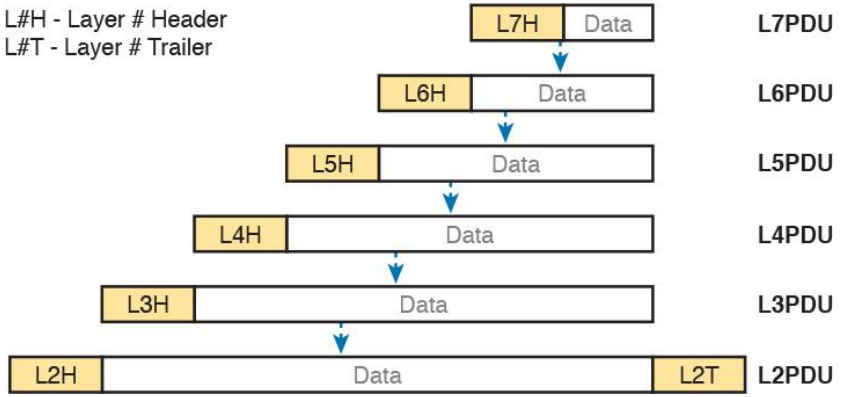
Agenda

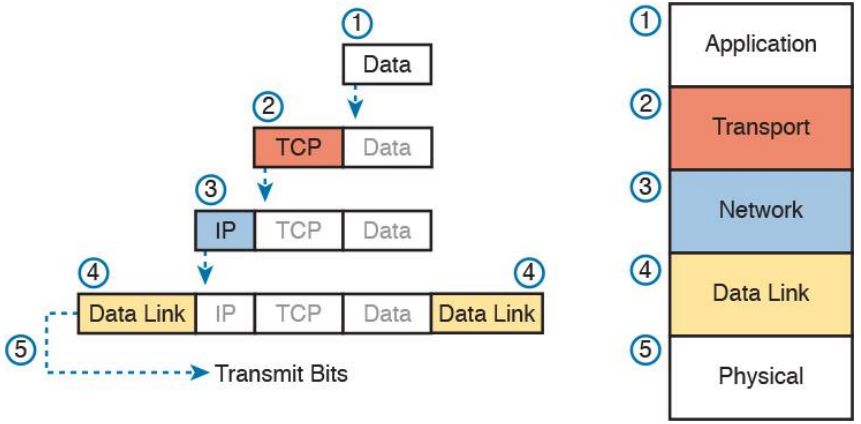
Overview of CCNA Exam
Review and Continuation of Week 1 Topics
Discussion Week 2 Topics
Lab Setup Discussion
CLI Demo
Q&A

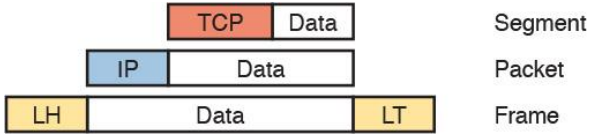
Networking Model Layers



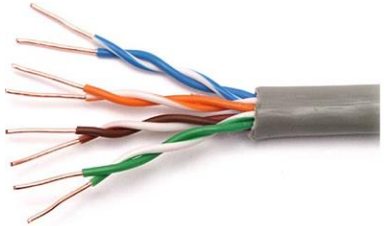
Data Encapsulation



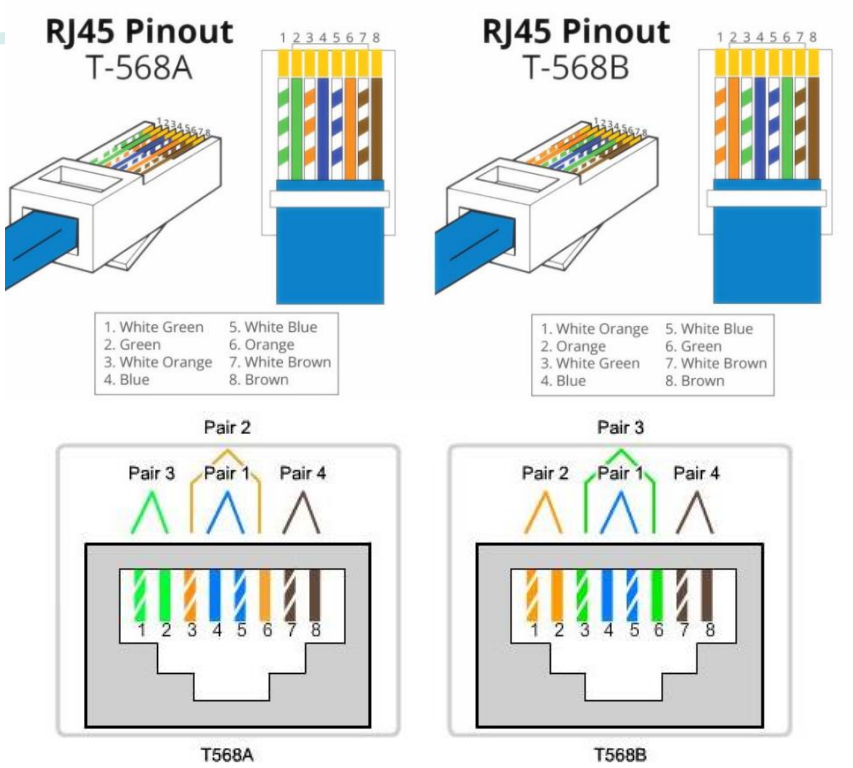


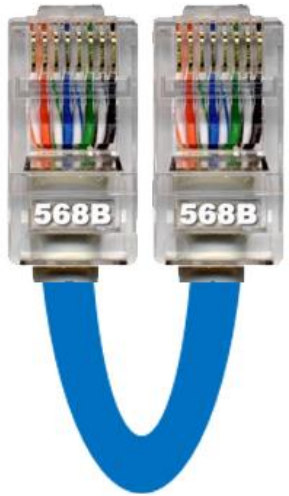


UTP HowTo

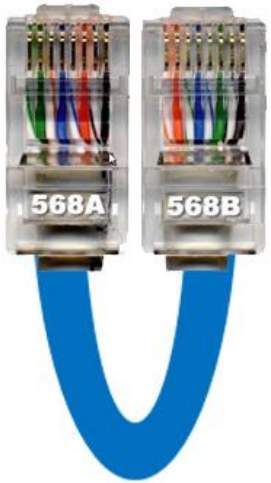


TIA/EIA 568A/B





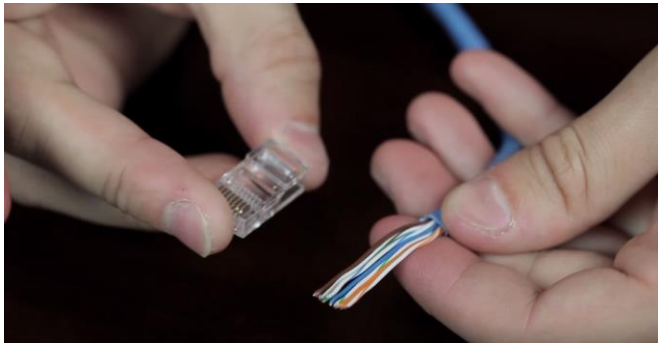
Straight Through Cable



Crossover Cable

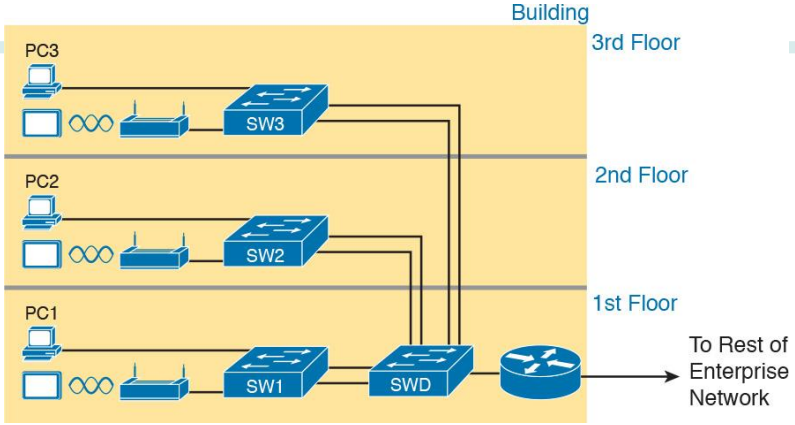
Video UTP HowTo

https://www.youtube.com/watch?v=ORZYBASS9zw



https://www.youtube.com/watch?v=lullzS740wI

In real world ...



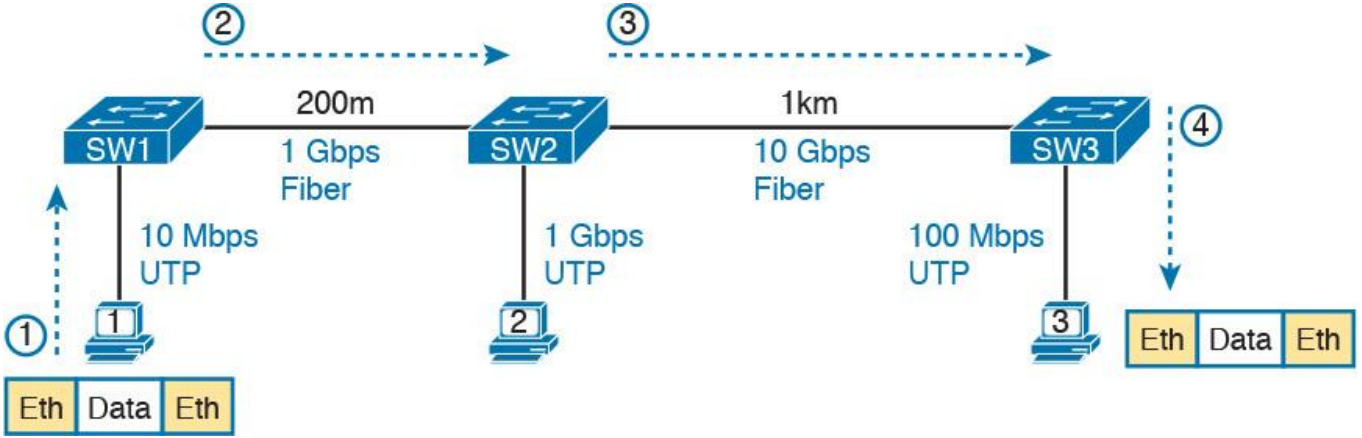
Speed	Common Name	Informal IEEE Standard Name	Formal IEEE Standard Name	Cable Type, Maximum Length
10 Mbps	Ethernet	10BASE-T	802.3	Copper, 100 m
100 Mbps	Fast Ethernet	100BASE-T	802.3u	Copper, 100 m
1000 Mbps	Gigabit Ethernet	1000BASE-LX	802.3z	Fiber, 5000 m
1000 Mbps	Gigabit Ethernet	1000BASE-T	802.3ab	Copper, 100 m
10 Gbps	10 Gig Ethernet	10GBASE-T	802.3an	Copper, 100 m

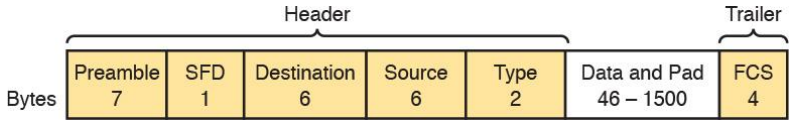
Devices & Cables

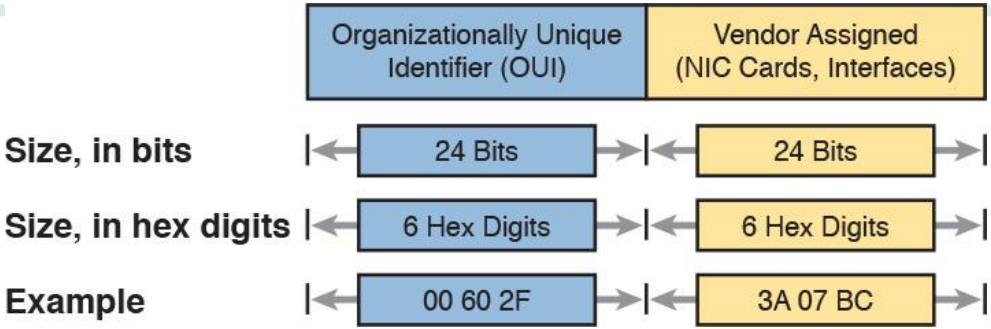
Layer Name	Protocols and Specifications	Devices
Application, presentation, session (Layers 5–7)	Telnet, HTTP, FTP, SMTP, POP3, VoIP, SNMP	Hosts, firewalls
Transport (Layer 4)	TCP, UDP	Hosts, firewalls
Network (Layer 3)	IP	Router
Data link (Layer 2)	Ethernet (IEEE 802.3), HDLC	LAN switch, wireless access point, cable modem, DSL modem
Physical (Layer 1)	RJ-45, Ethernet (IEEE 802.3)	LAN hub, LAN repeater, cables

	Hub	Switch	Router	Workstation
Hub	Crossover	Crossover	Straight	Straight
Switch	Crossover	Crossover	Straight	Straight
Router	Straight	Straight	Crossover	Crossover
Workstation	Straight	Straight	Crossover	Crossover

Data Link Behavior

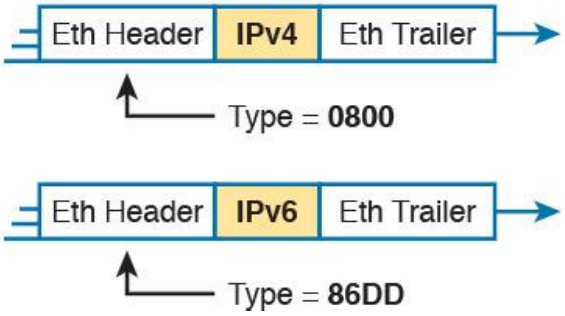




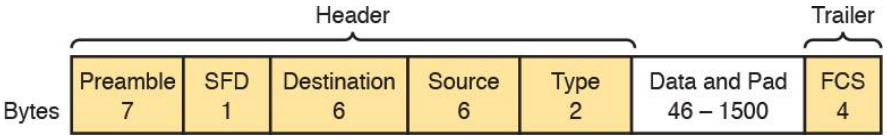


LAN Addressing Term or Feature	Description
MAC	Media Access Control. 802.3 (Ethernet) defines the MAC sublayer of IEEE Ethernet.
Ethernet address, NIC address, LAN address	Other names often used instead of MAC address. These terms describe the 6-byte address of the LAN interface card.
Burned-in address	The 6-byte address assigned by the vendor making the card.
Unicast address	A term for a MAC address that represents a single LAN interface.
Broadcast address	An address that means "all devices that reside on this LAN right now."
Multicast address	On Ethernet, a multicast address implies some subset of all devices currently on the Ethernet LAN.

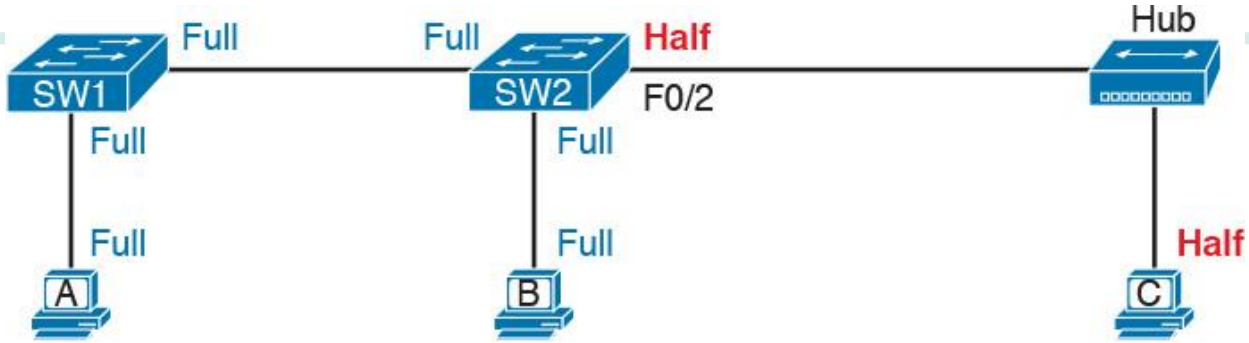
Type & FCS Fields

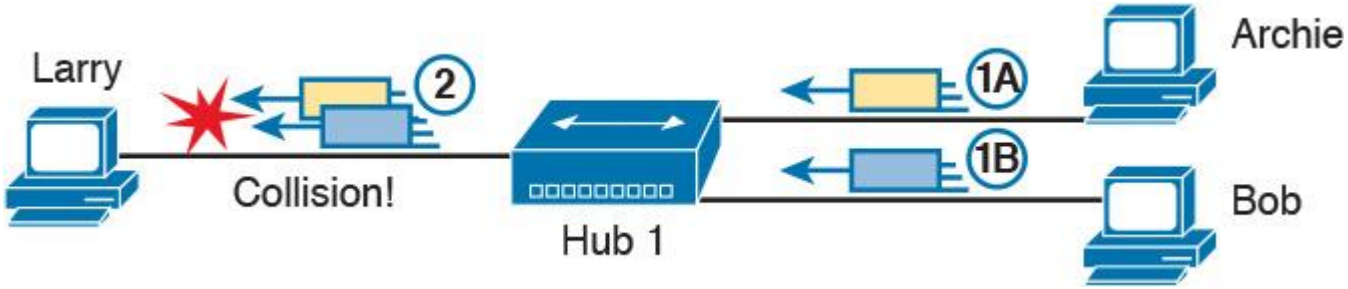


Field	Bytes	Description
Preamble	7	Synchronization.
Start Frame Delimiter (SFD)	1	Signifies that the next byte begins the Destination MAC Address field.
Destination MAC Address	6	Identifies the intended recipient of this frame.
Source MAC Address	6	Identifies the sender of this frame.
Type	2	Defines the type of protocol listed inside the frame; today, most likely identifies IP version 4 (IPv4) or IP version 6 (IPv6).
Data and Pad*	46–1500	Holds data from a higher layer, typically an L3PDU (usually an IPv4 or IPv6 packet). The sender adds padding to meet the minimum length requirement for this field (46 bytes).
Frame Check Sequence (FCS)	4	Provides a method for the receiving NIC to determine whether the frame experienced transmission errors.



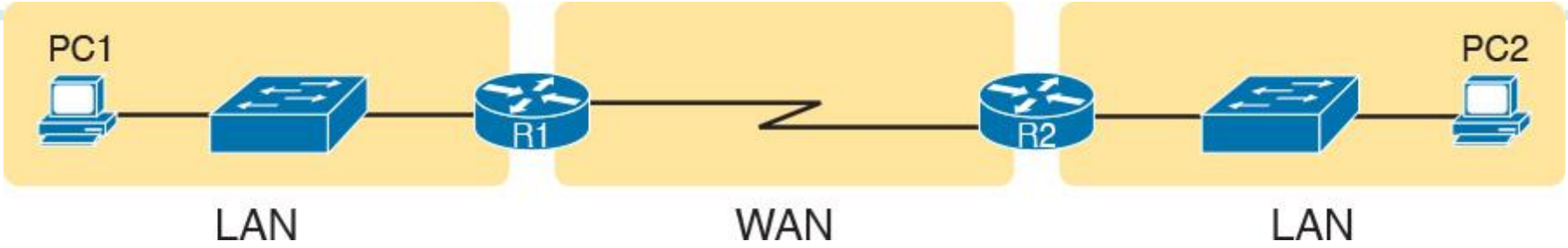
Full-/Half-Duplex & Collision

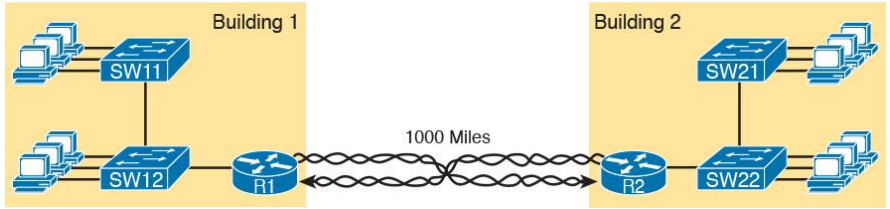


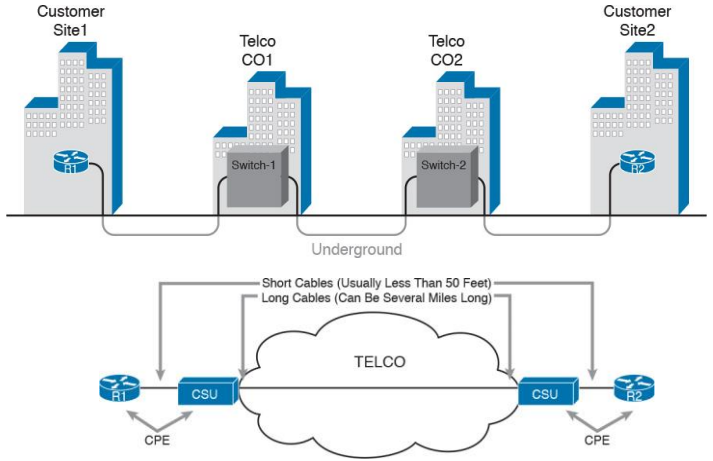


CSMA/CD: Carrier Sense Multiple Access/Collision Detect

WAN Concepts

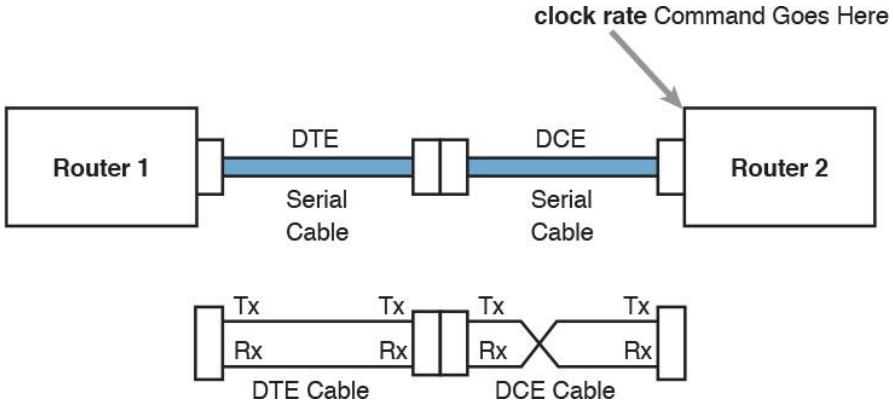




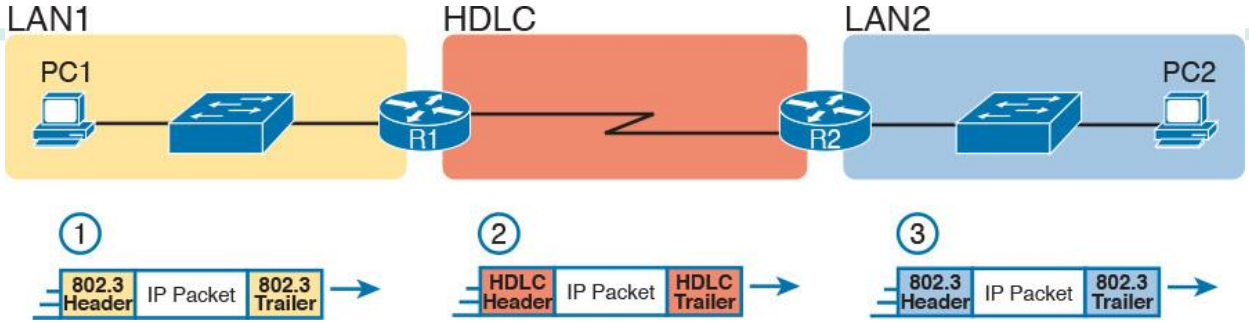


WAN Links

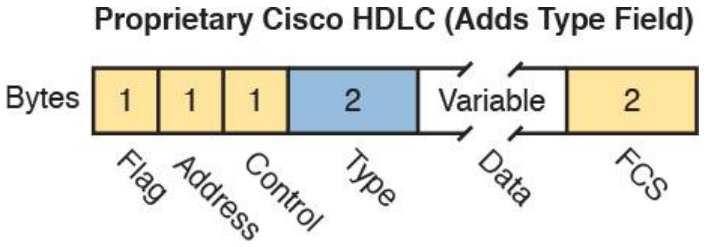
Name	Meaning or Reference
Leased circuit, Circuit	The words *line* and *circuit* are often used as synonyms in telco terminology; *circuit* makes reference to the electrical circuit between the two endpoints.
Serial link, Serial line	The words *link* and *line* are also often used as synonyms. *Serial* in this case refers to the fact that the bits flow serially, and that routers use serial interfaces.
Point-to-point link, Point-to-point line	Refers to the fact that the topology stretches between two points, and two points only. (Some older leased lines allowed more than two devices.)
T1	A specific type of leased line that transmits data at 1.544 megabits per second (1.544 Mbps).
WAN link, Link	Both these terms are very general, with no reference to any specific technology.
Private line	Refers to the fact that the data sent over the line cannot be copied by other telco customers, so the data is private.



HDLC – Leased Lines

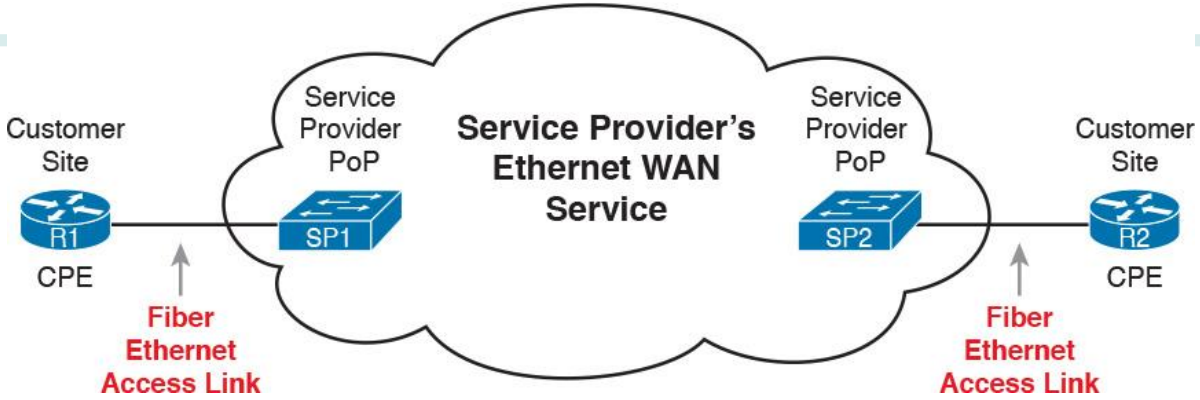


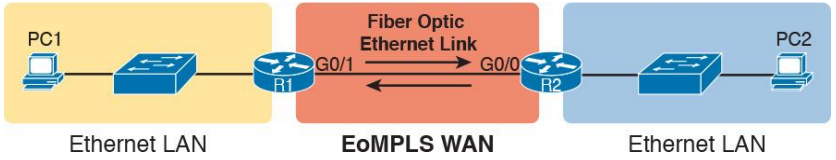
HDLC Field	Ethernet Equivalent	Description
Flag	Preamble, SFD	Lists a recognizable bit pattern so that the receiving nodes realize that a new frame is arriving.
Address	Destination Address	Identifies the destination device.
Control	N/A	Mostly used for purposes no longer in use today for links between routers.
Type	Type	Identifies the type of Layer 3 packet encapsulated inside the frame.
FCS	FCS	A field used by the error detection process. (It is the only trailer field in this table.)

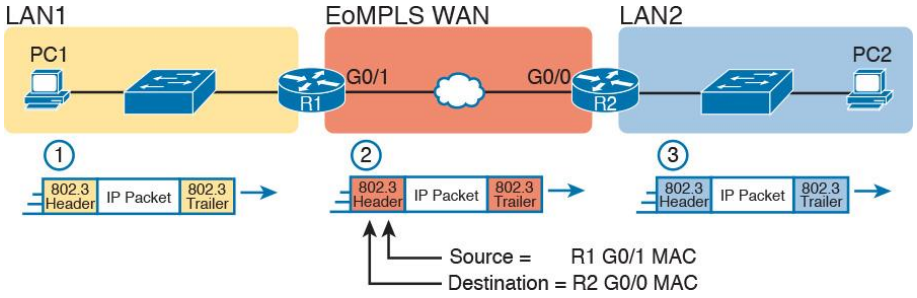


HDLC: High-Level Data Link Control
PPP: Point-to-Point Protocol

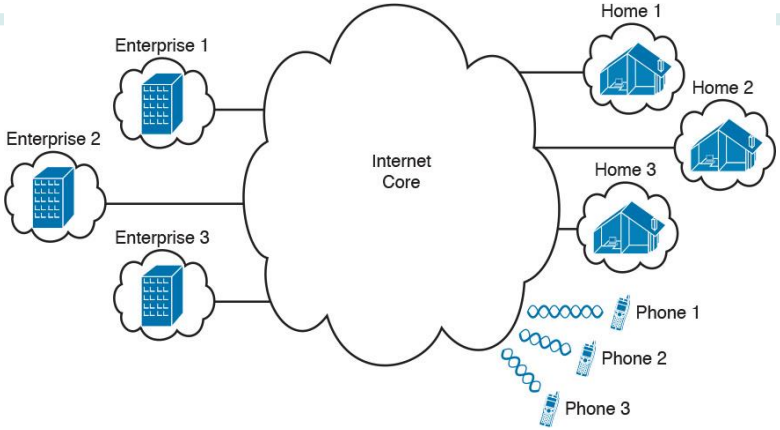
Ethernet WAN

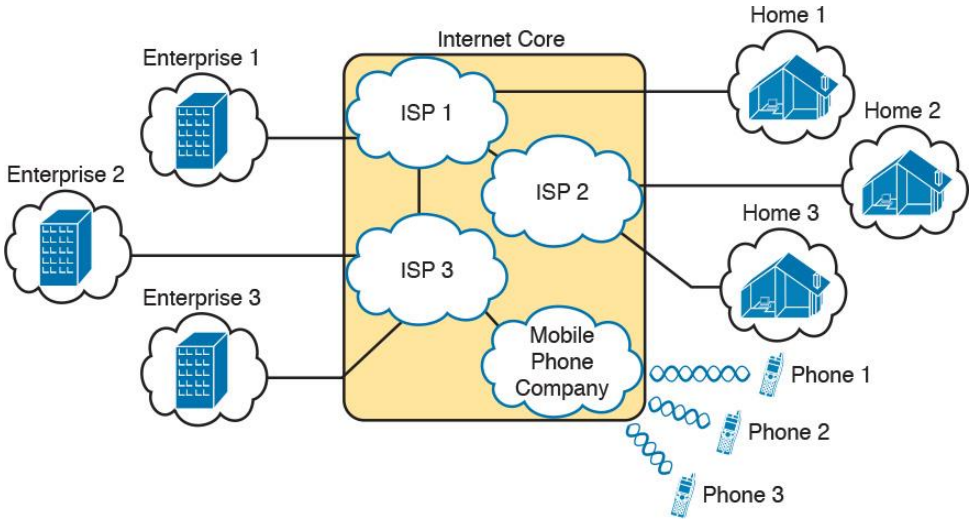




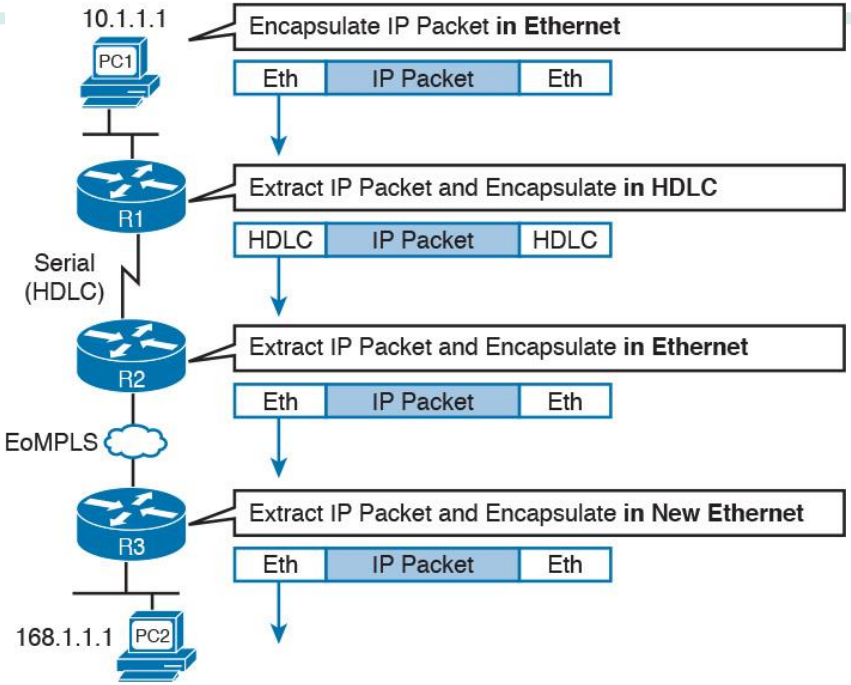


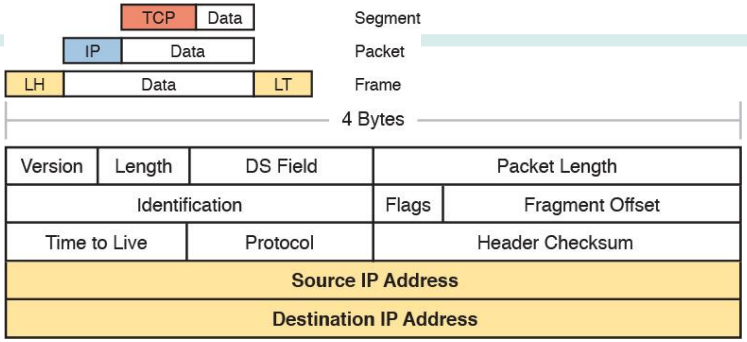
Internet Core





IP Packet



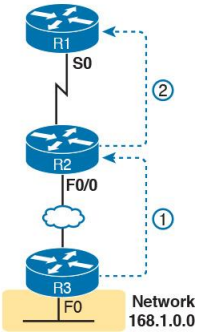


R1 Routing Table

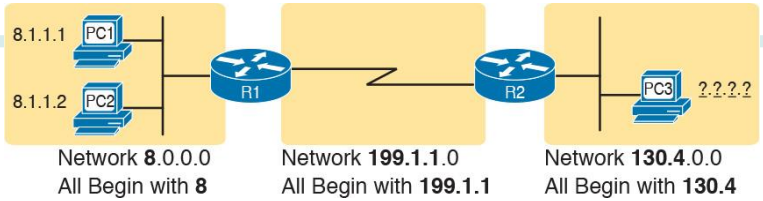
Subnet	Interface	Next Hop
168.1.0.0	Serial0	R2

R2 Routing Table

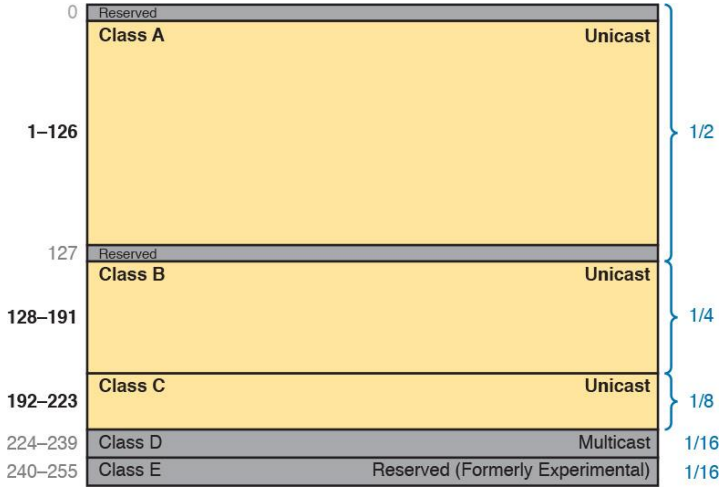
Subnet	Interface	Next Hop
168.1.0.0	F0/0	R3

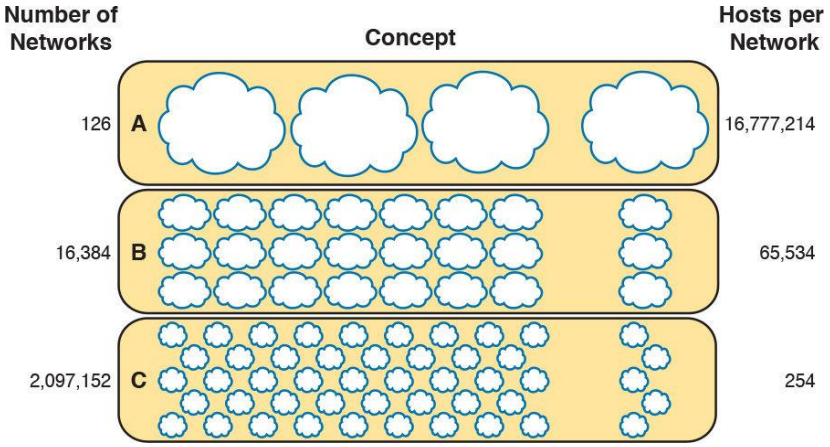


IP Address and Classes

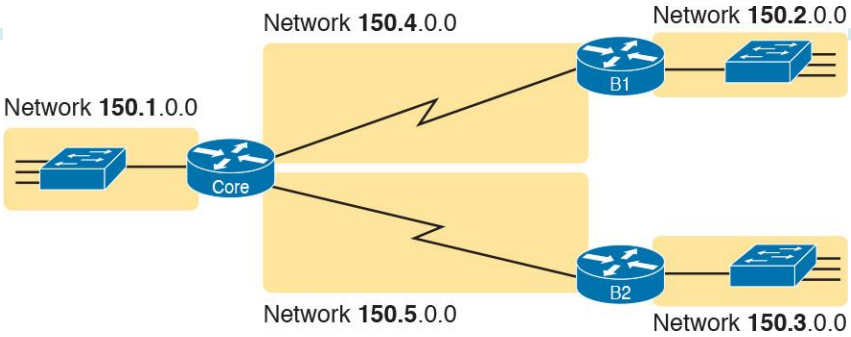


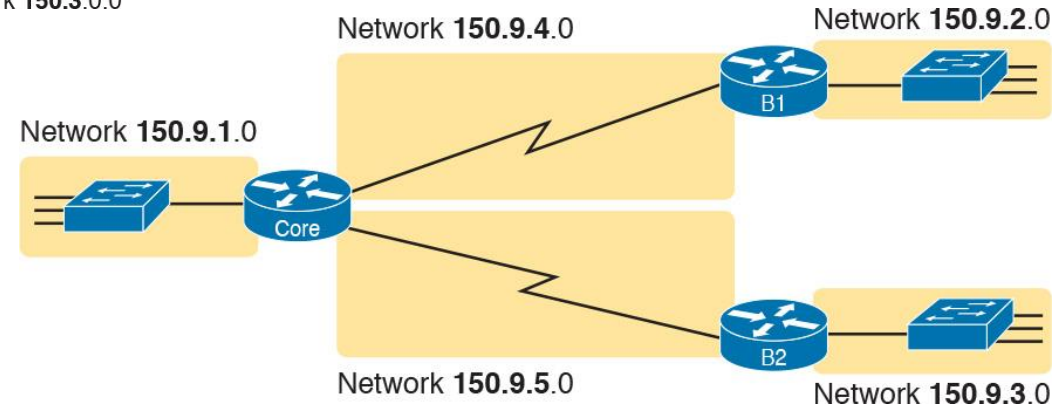
Class	First Octet Range	Valid Network Numbers
A	1 to 126	1.0.0.0 to 126.0.0.0
B	128 to 191	128.0.0.0 to 191.255.0.0
C	192 to 223	192.0.0.0 to 223.255.255.0



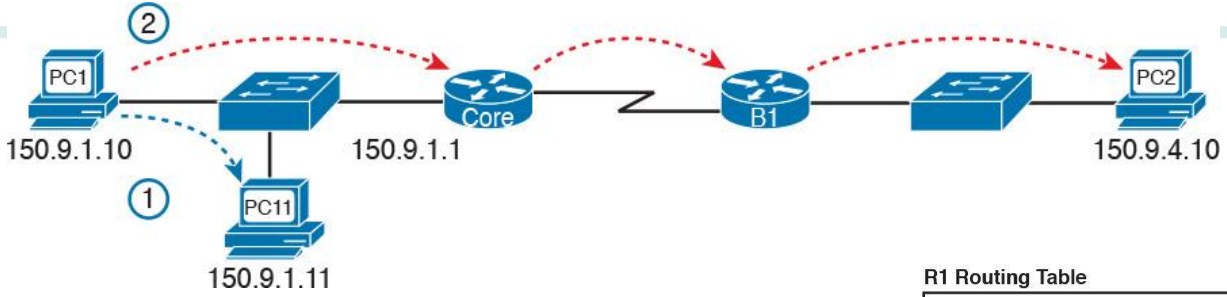


IP Subnetting





Default Gateway and IP Routing



R1 Routing Table

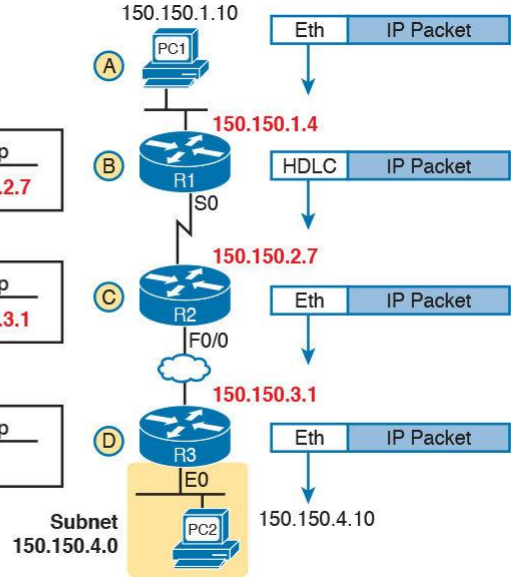
Subnet	Interface	Next Hop
150.150.4.0	Serial0	150.150.2.7

R2 Routing Table

Subnet	Interface	Next Hop
150.150.4.0	FastEth0/0	150.150.3.1

R3 Routing Table

Subnet	Interface	Next Hop
150.150.4.0	Ethernet0	N/A



https://www.internold.com/go/inclw-lab

Setting Up Lab Environment

Note:

Will be activated by 13-Aug/Monday 6pm Manila Time

- INCLW Practice Quizzes
- INCLW Practice Labs

Q & A

Thank you