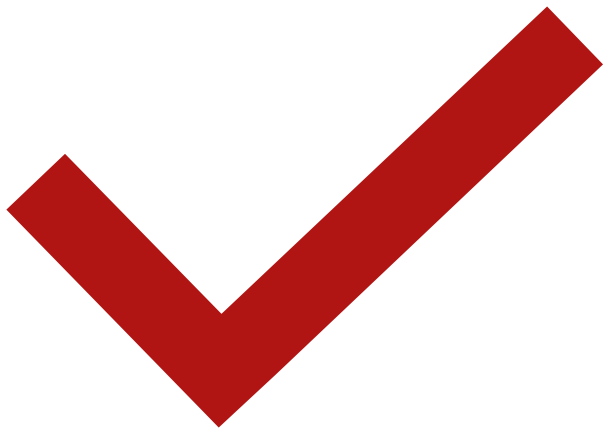
Introduction to Software Business Product management

WEEK 1 DAY 2

LED BY:

EMILY CROSE

OAKLAND UNIVERSITY



Day 1 recap

Contact info

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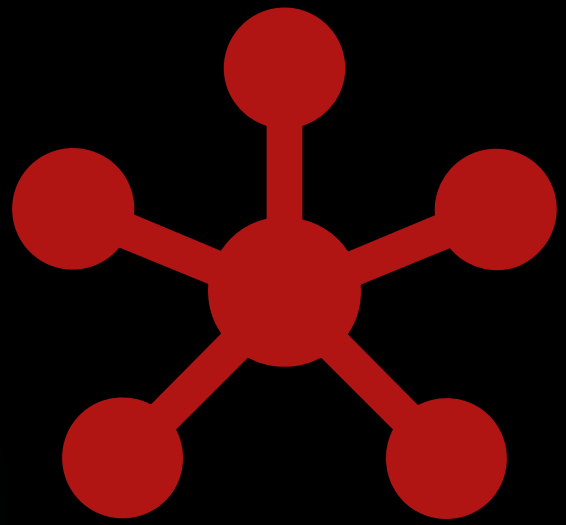
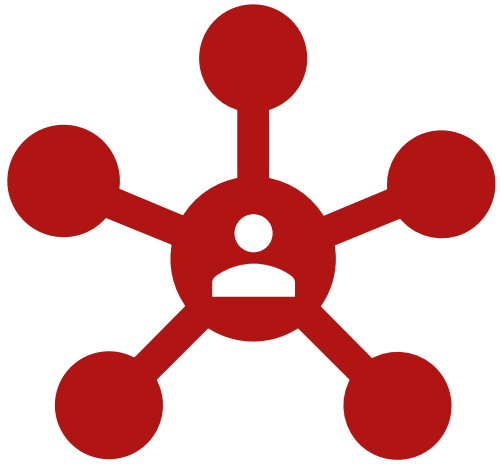
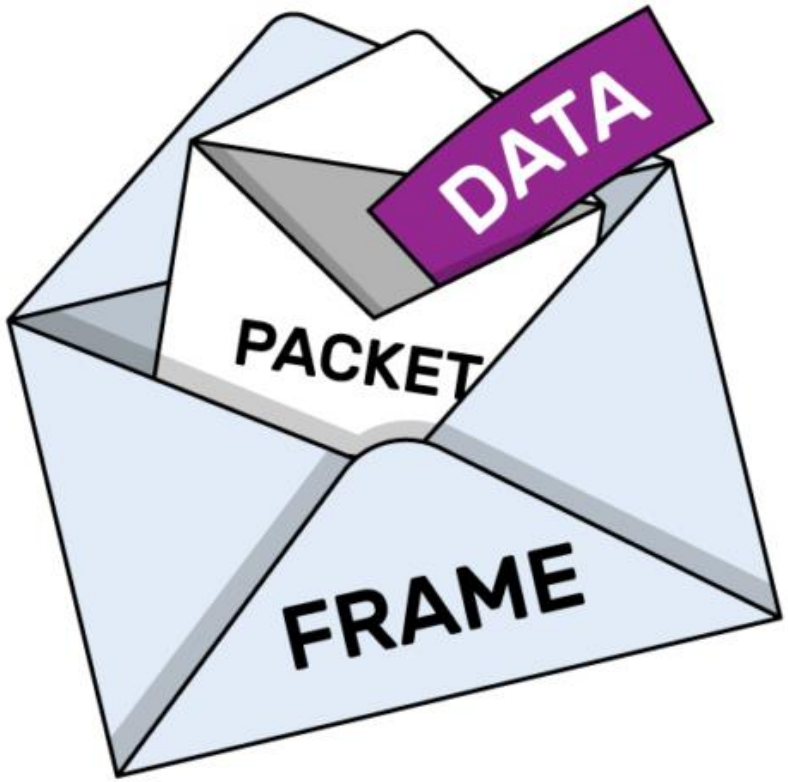
Question or
Clarifications?

Networking





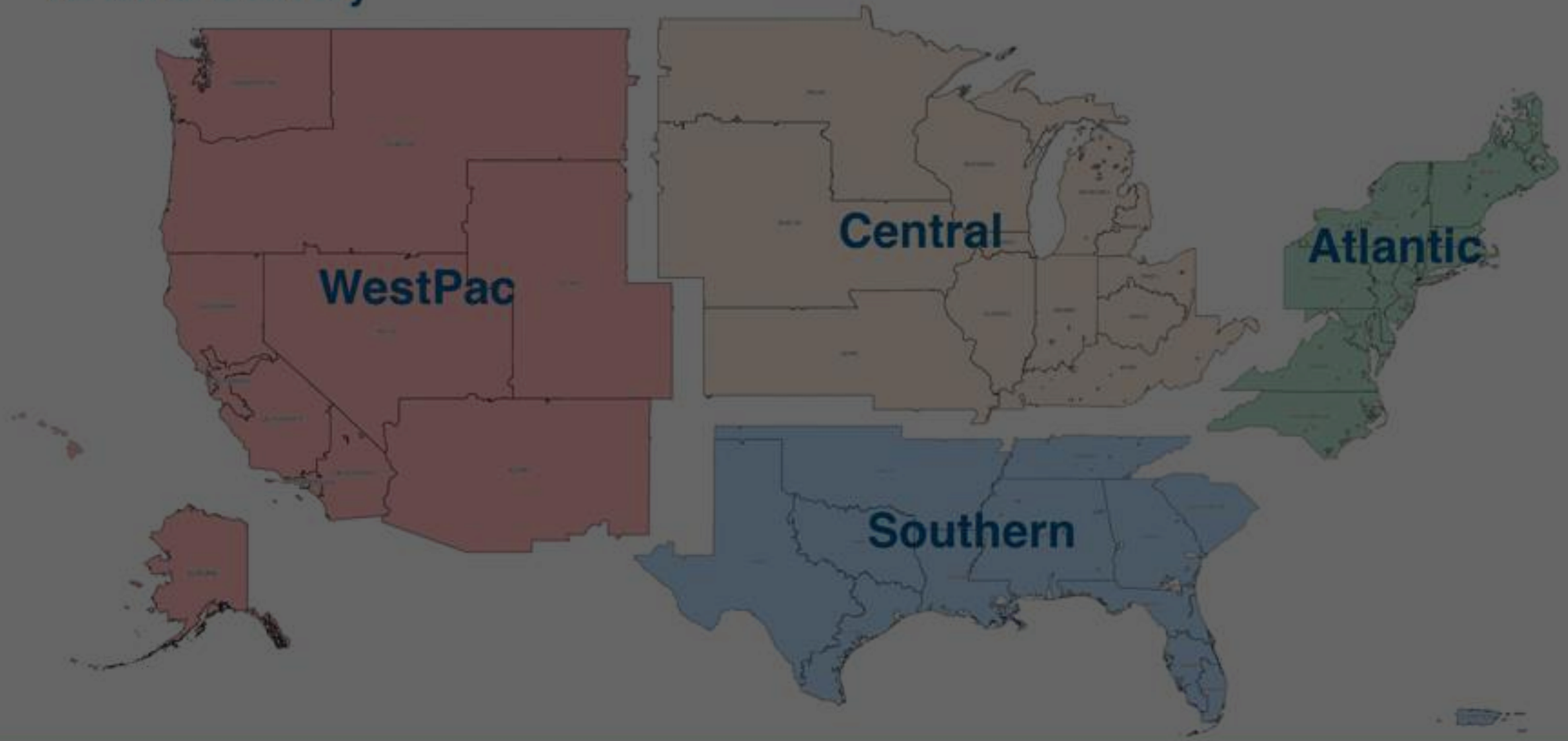
What Does Your Home Network Look Like?



Packets


Source IP Address
IP
Destination IP Address
Data

Retail & Delivery



UNITED STATES POSTAL SERVICE

7 Layers of the OSI Model

Application	• End User layer • HTTP, FTP, IRC, SSH, DNS
Presentation	• Syntax layer • SSL, SSH, IMAP, FTP, MPEG, JPEG
Session	• Synch & send to port • API's, Sockets, WinSock
Transport	• End-to-end connections • TCP, UDP
Network	• Packets • IP, ICMP, IPSec, IGMP
Data Link	• Frames • Ethernet, PPP, Switch, Bridge
Physical	• Physical structure • Coax, Fiber, Wireless, Hubs, Repeaters

Network Transmission

Layer 1- Physical

MEDIA LAYER

Networking Hardware

- Purpose
  - Provides a physical medium for transporting raw information
- Wireless Antenna
- Cat5 (Ethernet) Cables
- Coaxial Cables
- Fiber Optic Cables
- Network Hubs
- Network Repeaters

Layer 2 - Data Link

MEDIA LAYER

Layer 2

- Purpose
  - Provides error-free transfer of data frames from one node to another via the physical layer
- Physical
  - Network Switch
  - Network Bridge
- Logical
  - “Frames”

Layer 3 - Network

MEDIA LAYER

Layer 3

- Purpose
  - Controls the operations of the subnet.
  - Decides which physical path data will take
- Physical
  - Router
- Logical (Protocols)
  - IP
  - ICMP
  - IPSec
  - IGMP

Layer 4 - Transport

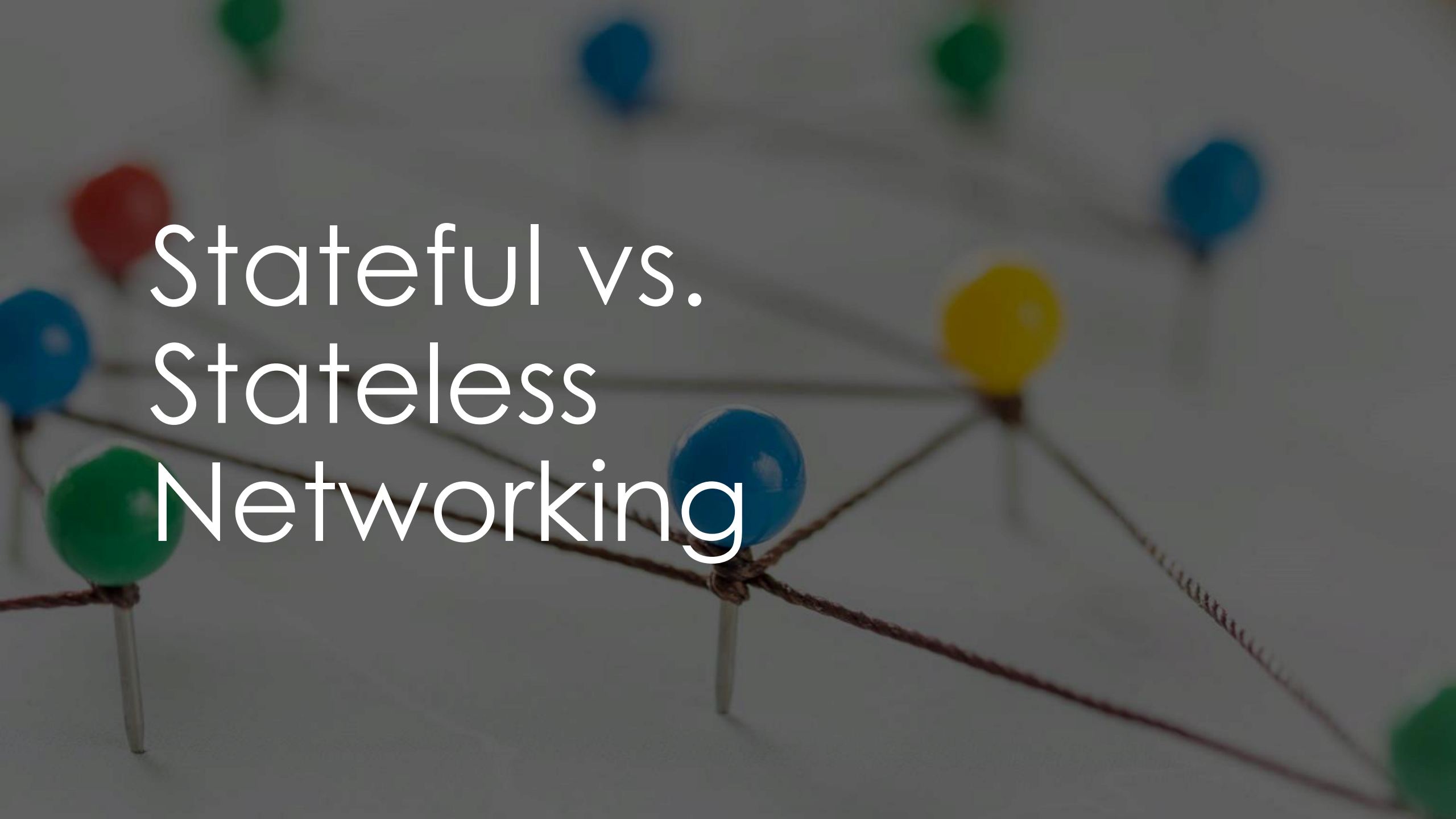
HOST LAYER

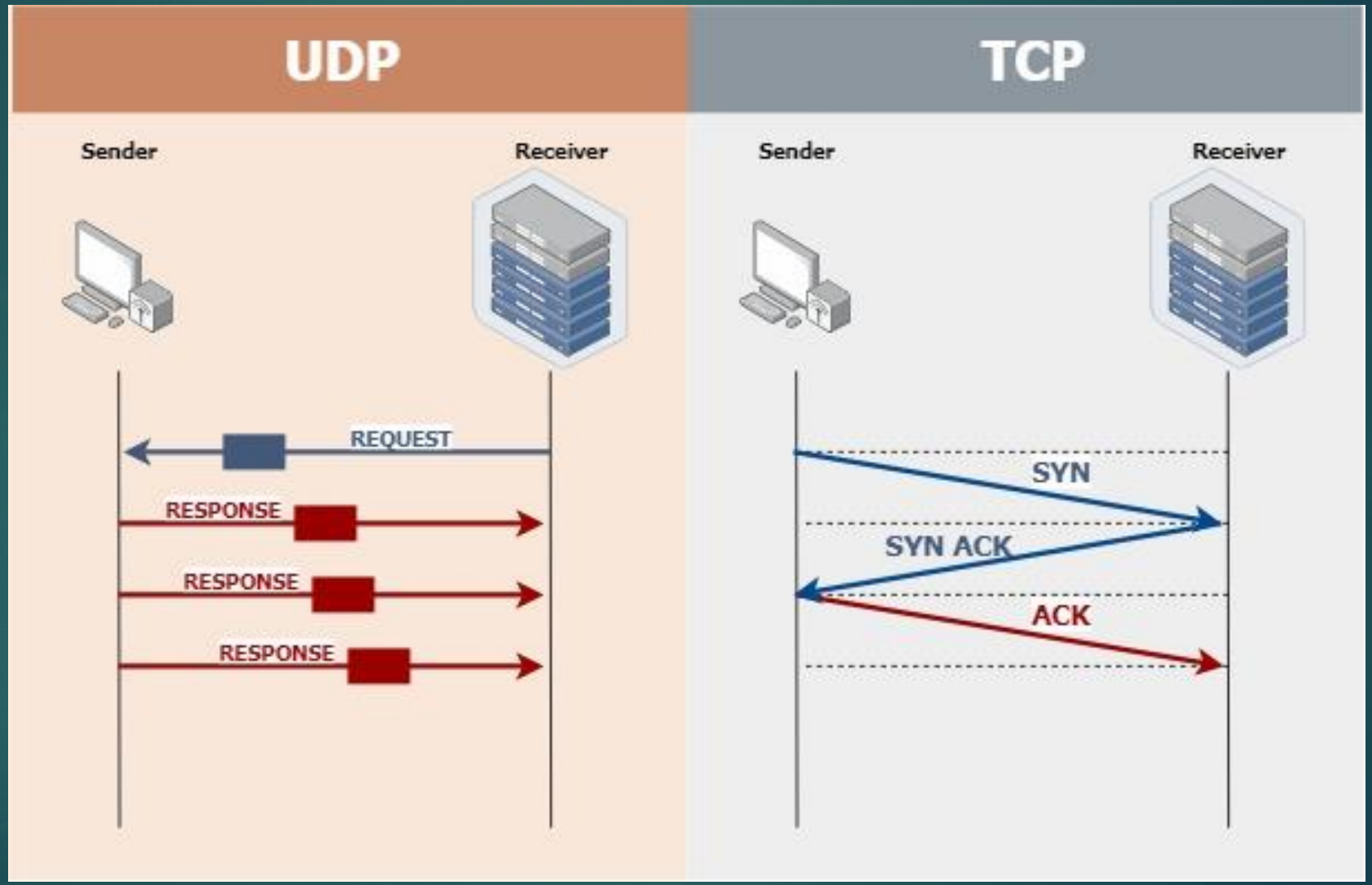
Layer 4

- Purpose
  - Ensures that messages are delivered in sequence without losses, errors or duplications
- Logical
  - TCP
  - UDP


10 minute break

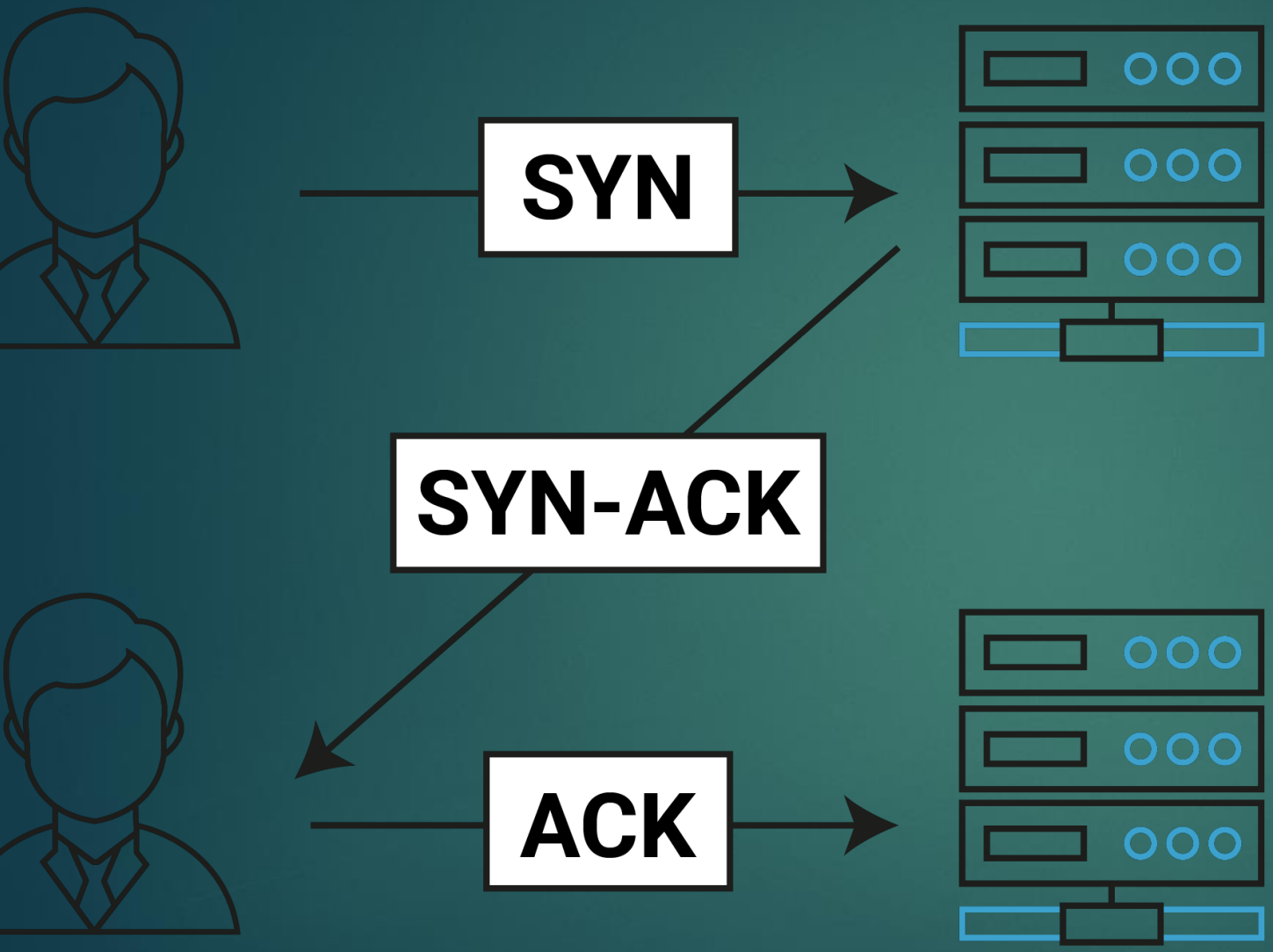
TCP VS. UDP


Stateful vs.
Stateless
Networking


UDP
TCP
Sender
Receiver
REQUEST
RESPONSE
RESPONSE
RESPONSE
Sender
Receiver
SYN
SYN ACK
ACK

TCP Handling

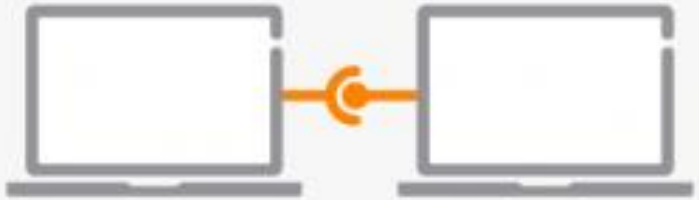
TCP 3-Way Handshake



Explain TCP In A Gif

UDP Handling

TCP



- Slower but more reliable transfers
- Typical Applications:
  - File Transfer Protocol (FTP)
  - Web Browsing
  - Email

unicast

UDP

- Faster but not guaranteed transfers ("best effort")
- Typical Applications:
  - Live Streaming
  - Online Games
  - VoIP

unicast multicast broadcast

Explain UDP In A Gif

Discussion: TCP Apps & UDP Apps

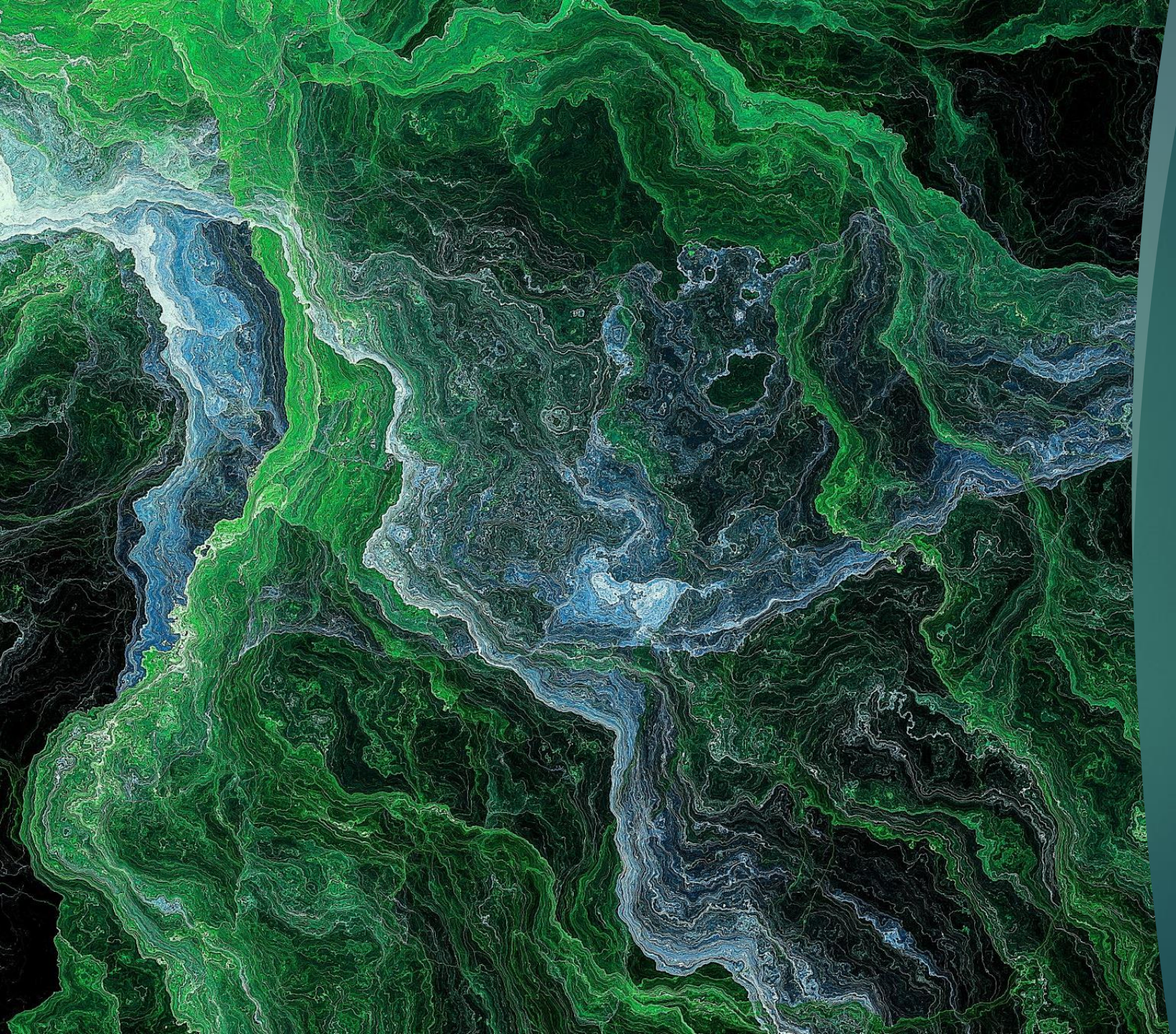
- Moodle
  - TCP or UDP?
- VoIP
  - TCP or UDP?
- YouTube
  - TCP or UDP?
- SWIFT Money Transfers
  - TCP or UDP?

Layer 5 – Session

HOST LAYER

Layer 5

- Purpose
  - Allows the establishment of sessions between processes
- Protocols
  - RPC
  - SQL
  - NFS
  - Netbios



Layer 6 – Presentation

HOST LAYER

Layer 6

- Purpose
  - Formats data bound for the application layer (layer 7)
- Protocols
  - JPG
  - ASCII
  - ANSI
  - GIF
  - WEBP

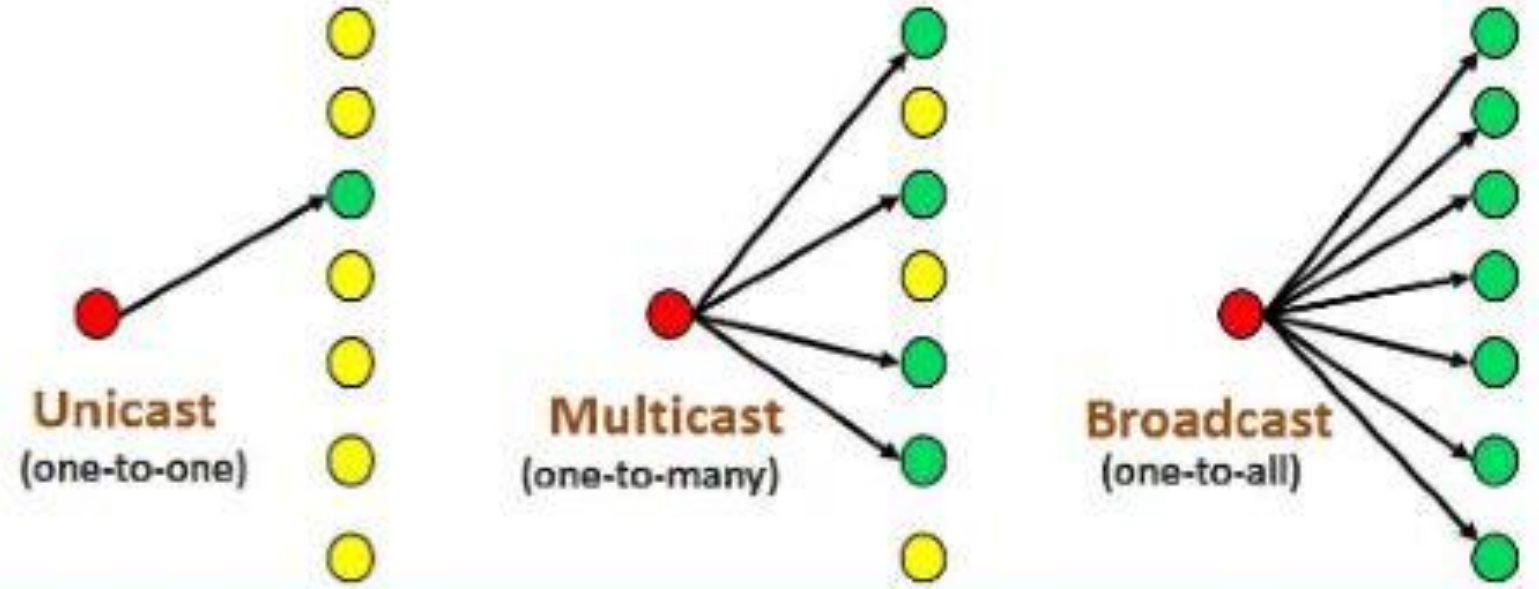
Layer 7 – Application

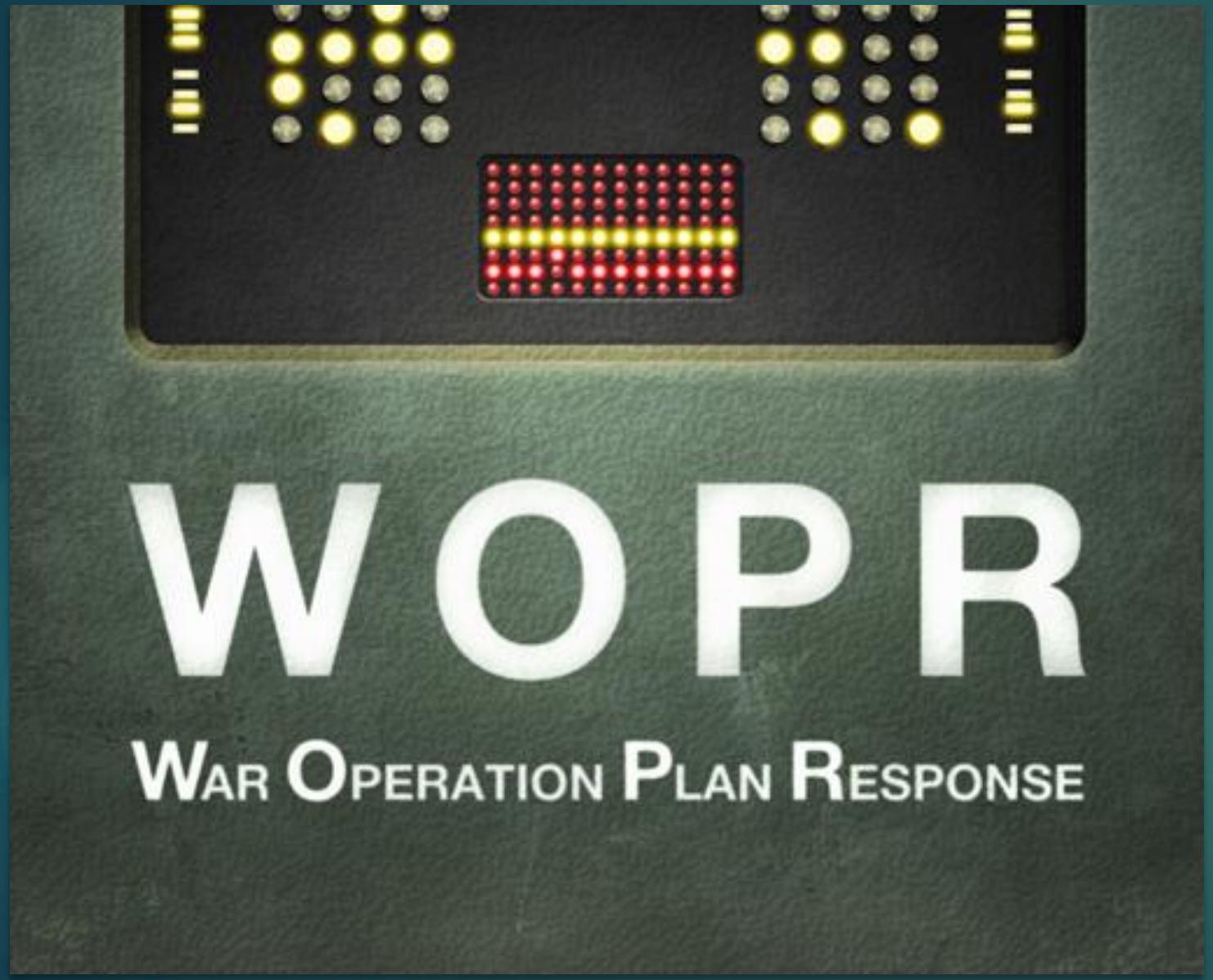
HOST LAYER

Layer 7

- Purpose
  - Interface layers for users to access network resources
- Protocols
  - SMTP
  - HTTP
  - Wiki
  - Microsoft Word

What is
Unicast Multicast Broadcast



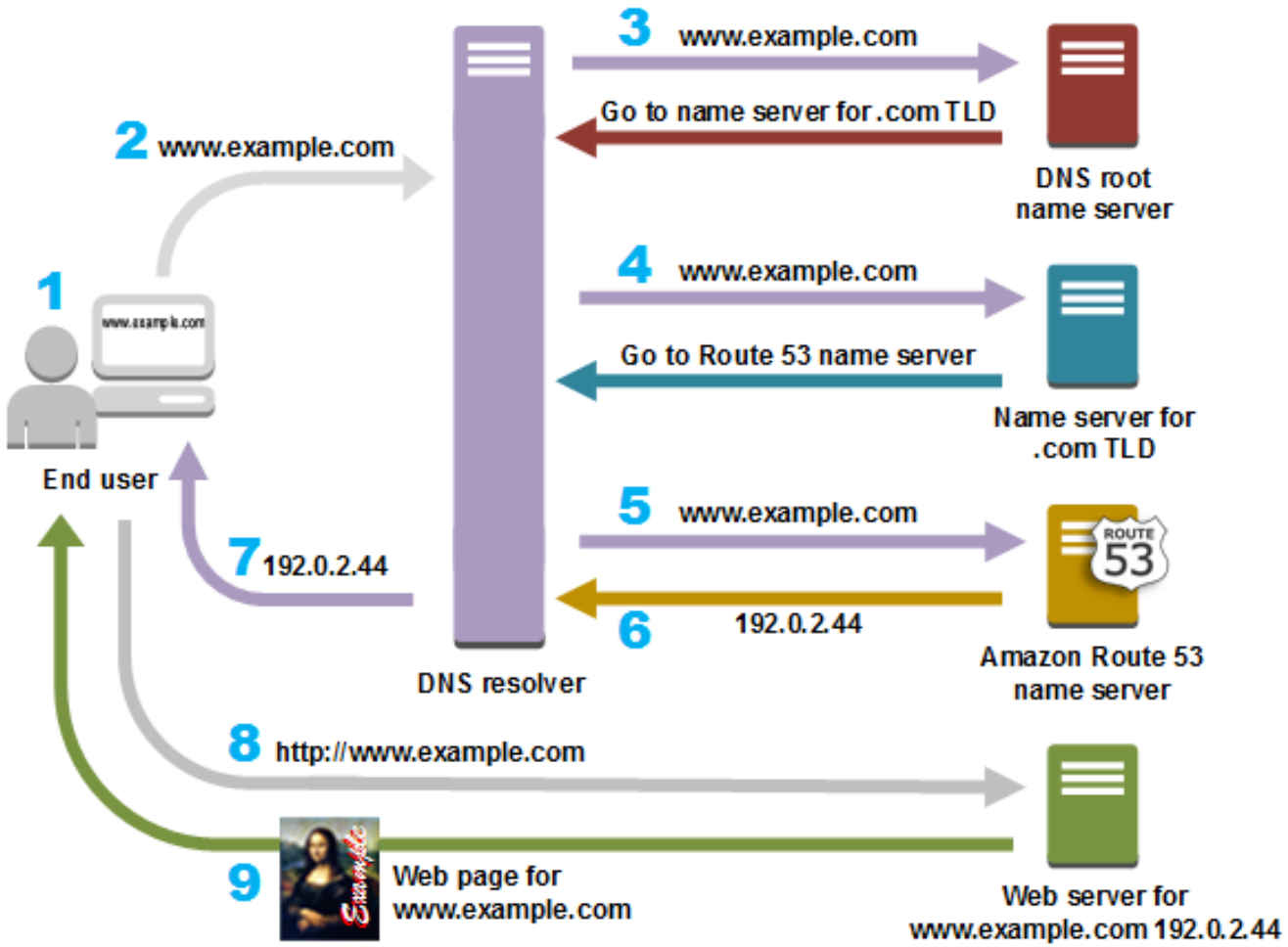


Shall We Play A Game?

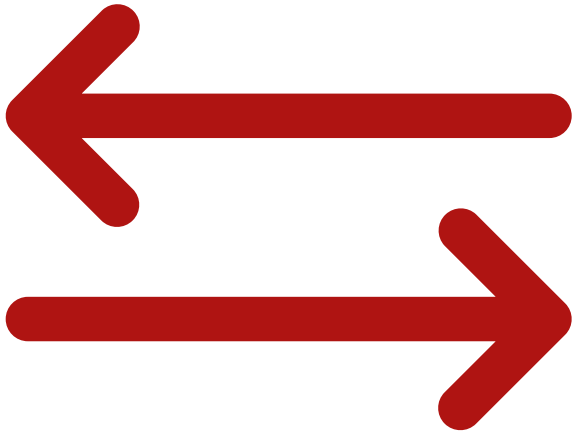
HTTPS://STATIC-LABS.TRYHACKME.CLOUD/SITES/OSI-MODEL-GAME/

Name Resolution

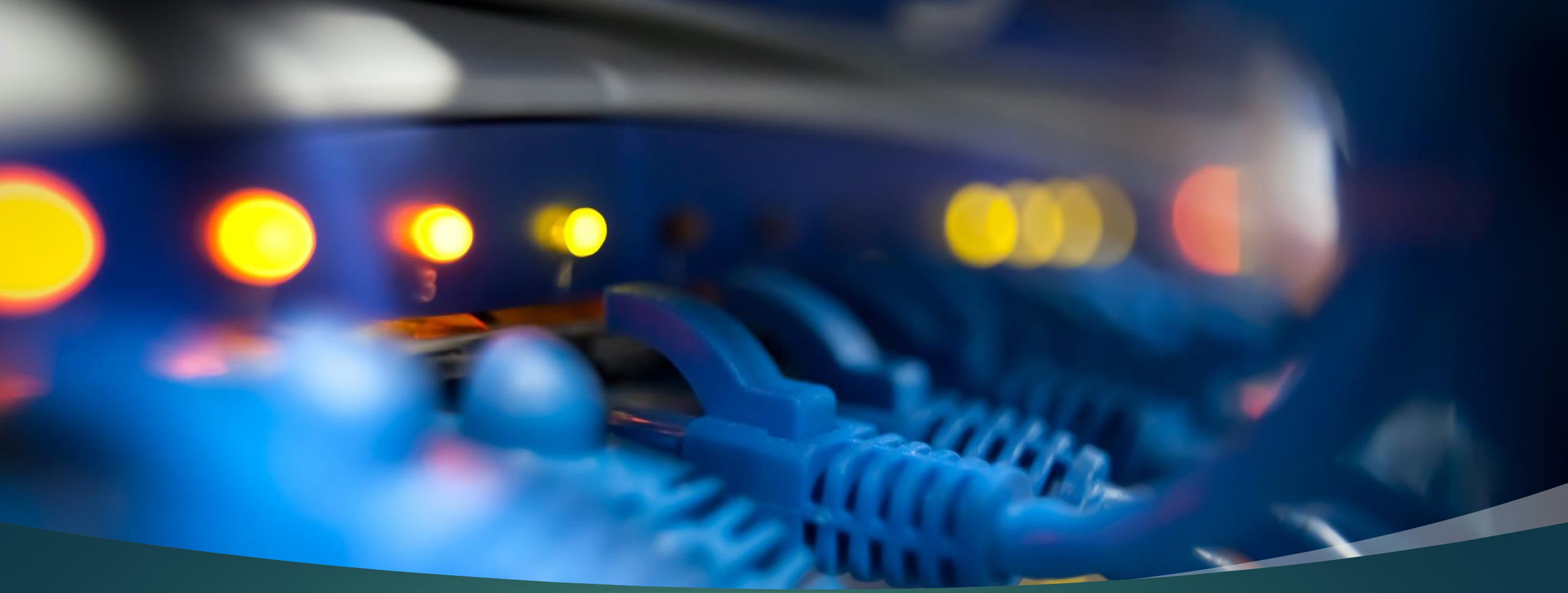
DNS


1
End user
2 www.example.com
DNS resolver
3 www.example.com
Go to name server for .com TLD
DNS root name server
4 www.example.com
Go to Route 53 name server
Name server for .com TLD
5 www.example.com
6 192.0.2.44
ROUTE 53
Amazon Route 53 name server
7 192.0.2.44
8 http://www.example.com
9 Web page for www.example.com
Web server for www.example.com 192.0.2.44

DNS: TCP or UDP?

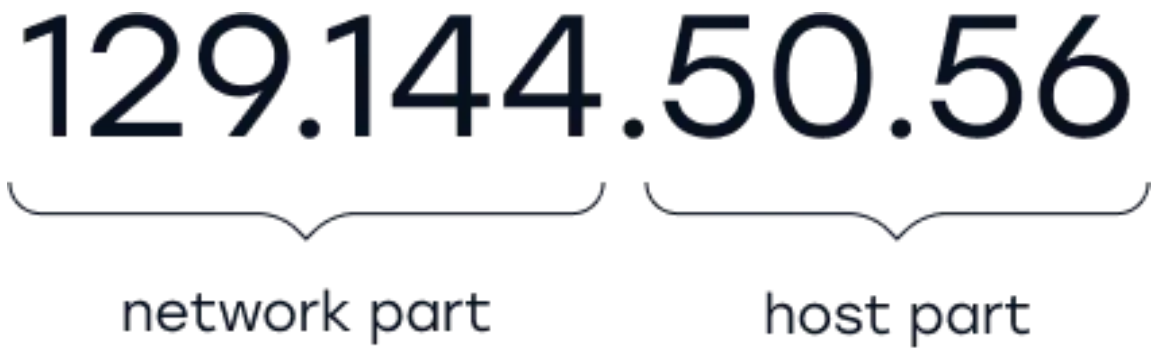


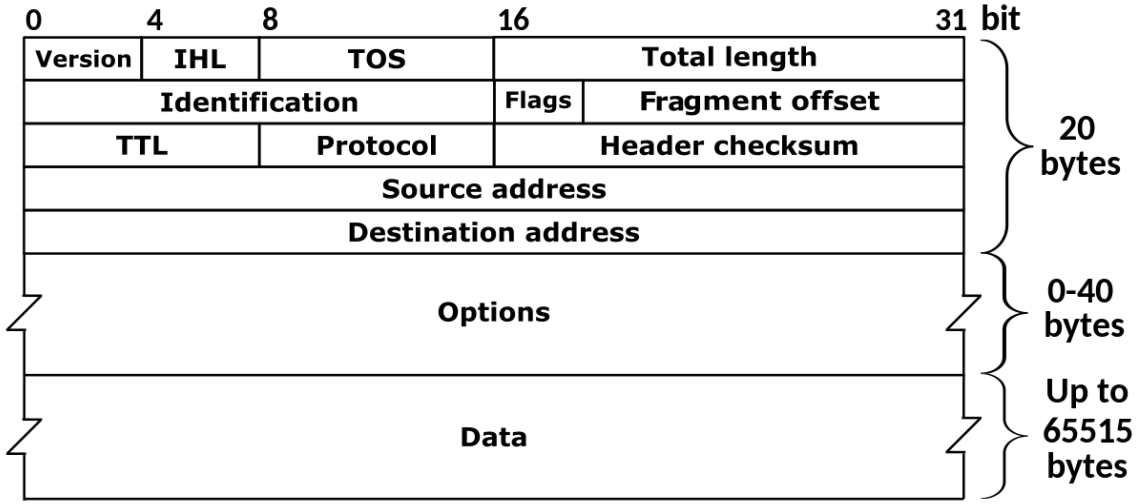
Problem: How Do We Move Information?

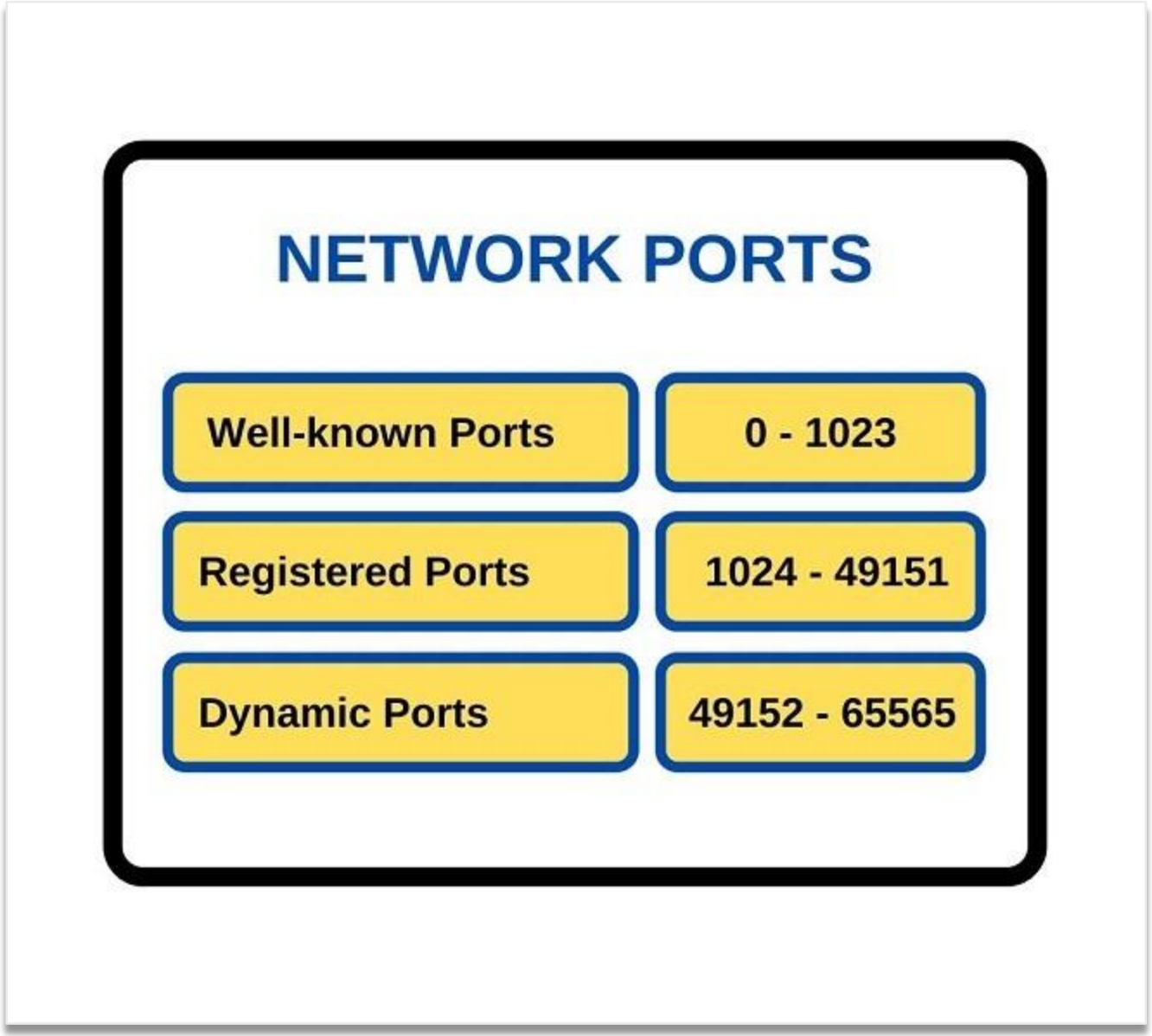


LANs and WANs

Network Operation







Network Ports

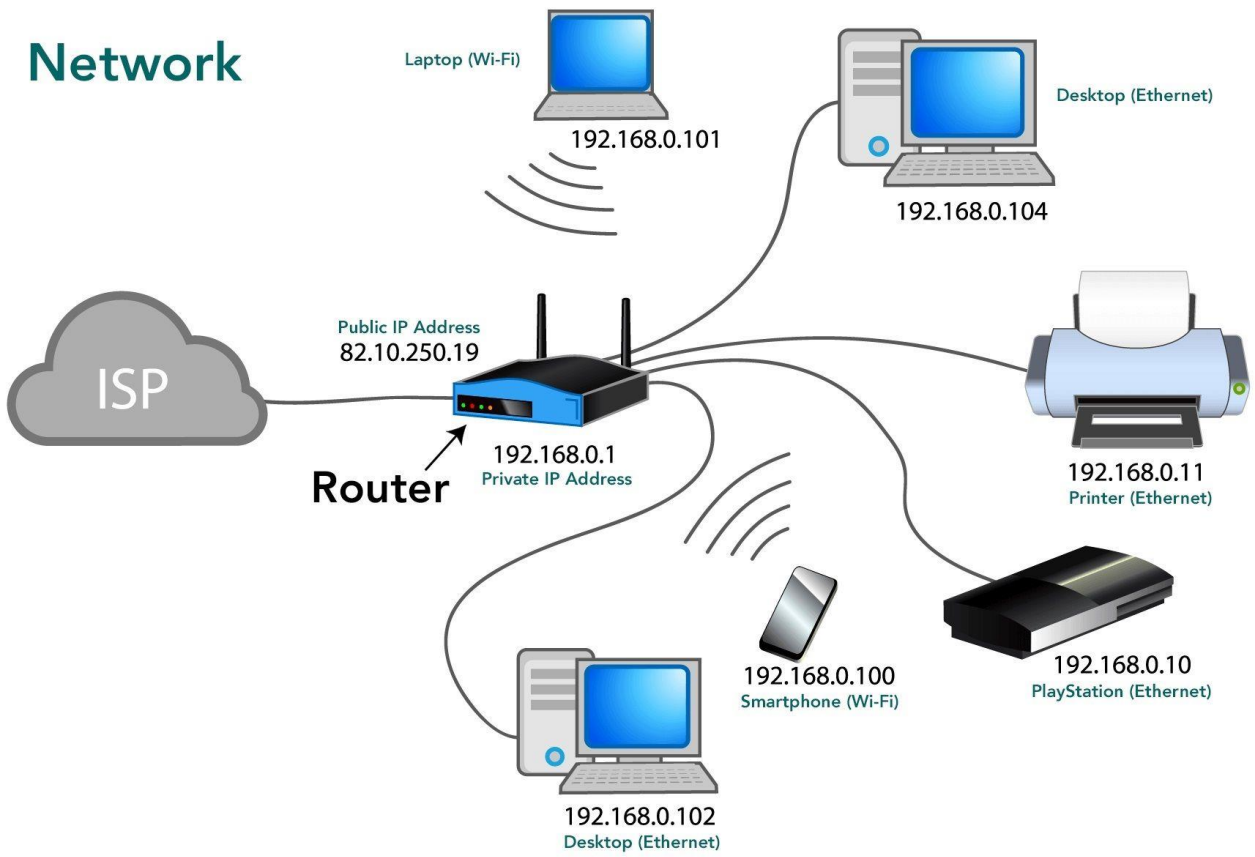
Common Ports

Port #	Application Layer Protocol	Type	Description
20	FTP	TCP	File Transfer Protocol - data
21	FTP	TCP	File Transfer Protocol - control
22	SSH	TCP/UDP	Secure Shell for secure login
23	Telnet	TCP	Unencrypted login
25	SMTP	TCP	Simple Mail Transfer Protocol
53	DNS	TCP/UDP	Domain Name Server
67/68	DHCP	UDP	Dynamic Host
80	HTTP	TCP	HyperText Transfer Protocol
123	NTP	UDP	Network Time Protocol
161,162	SNMP	TCP/UDP	Simple Network Management Protocol
389	LDAP	TCP/UDP	Lightweight Directory Authentication Protocol
443	HTTPS	TCP/UDP	HTTP with Secure Socket Layer

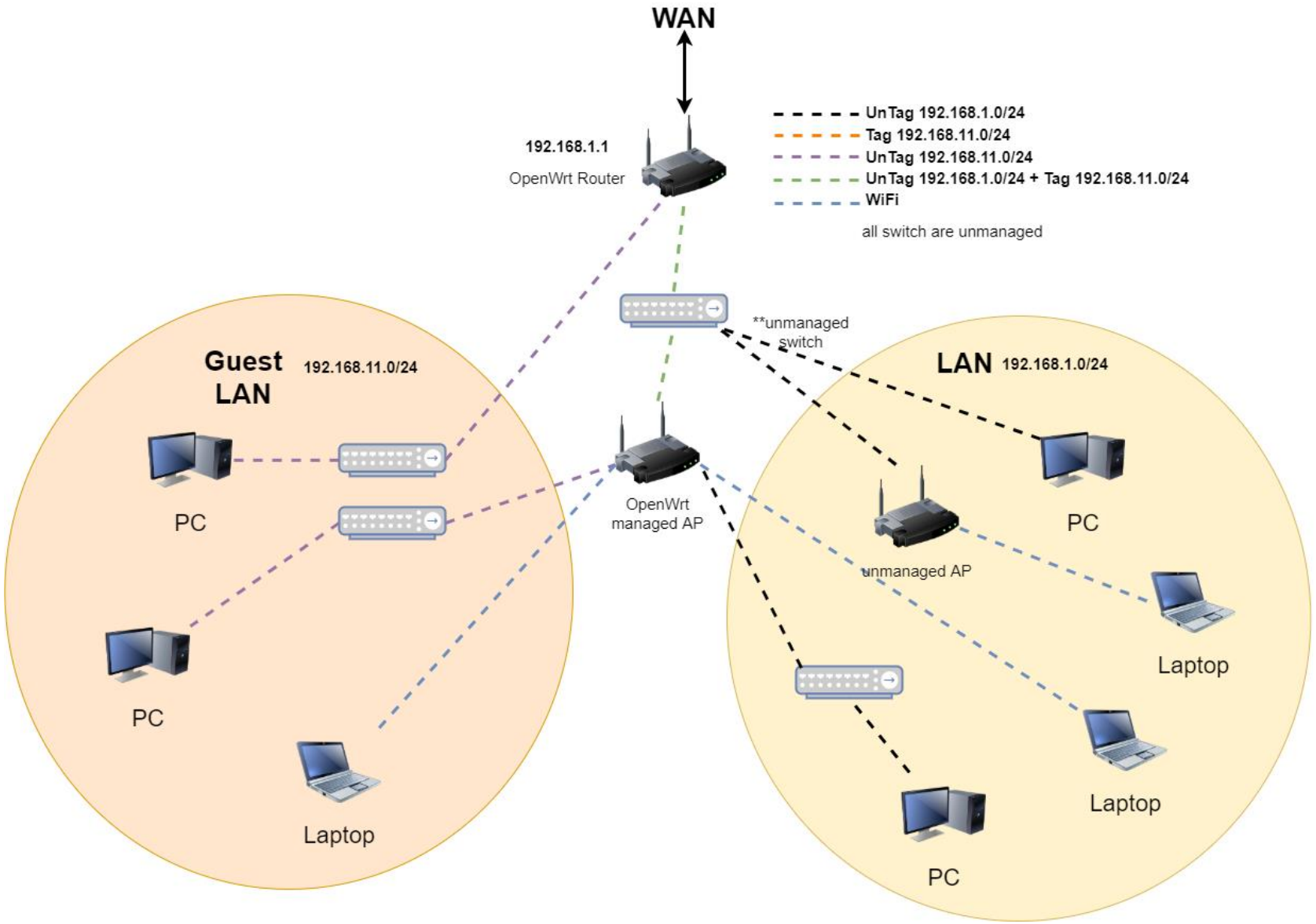
10 minute break

Local Area Network (LAN)

- Allows connection to other nearby network-connected systems
- You probably use some of these devices!
  - Amazon firestick
  - Google Chromecast
  - AppleTV
- More protective of local information?

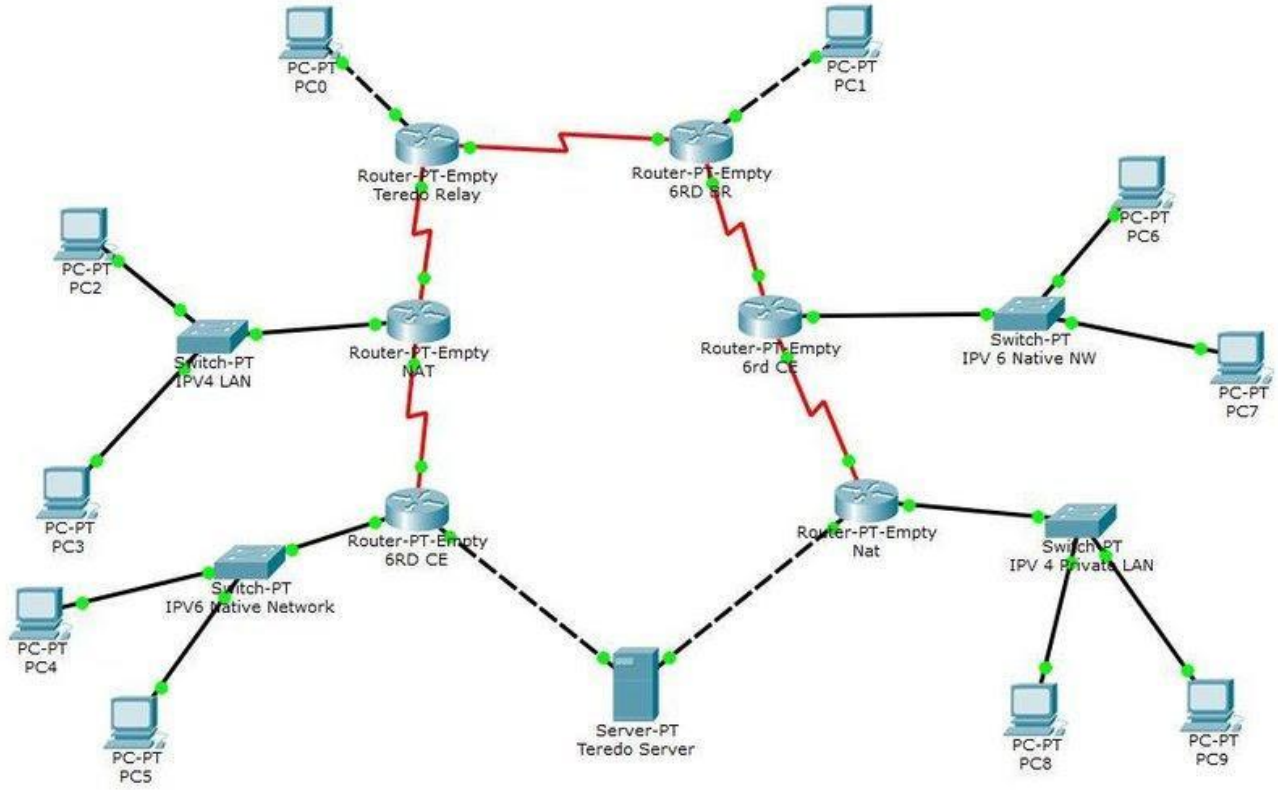


Basic Network Topology

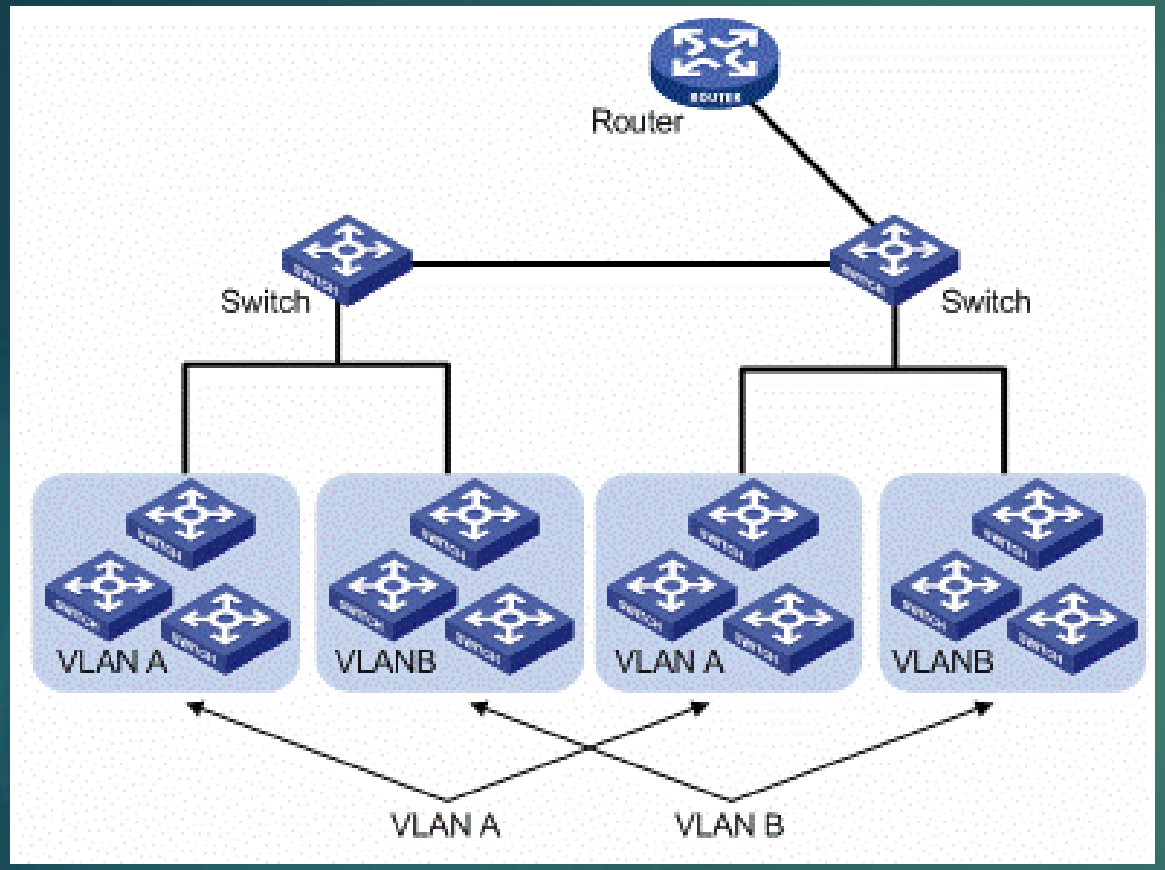

WAN
192.168.1.1
OpenWrt Router
UnTag 192.168.1.0/24
Tag 192.168.11.0/24
UnTag 192.168.11.0/24
UnTag 192.168.1.0/24 + Tag 192.168.11.0/24
WiFi
all switch are unmanaged
**unmanaged switch
Guest LAN 192.168.11.0/24
PC
PC
Laptop
OpenWrt managed AP
LAN 192.168.1.0/24
PC
unmanaged AP
Laptop
Laptop
PC

Wide Area Network (WAN)

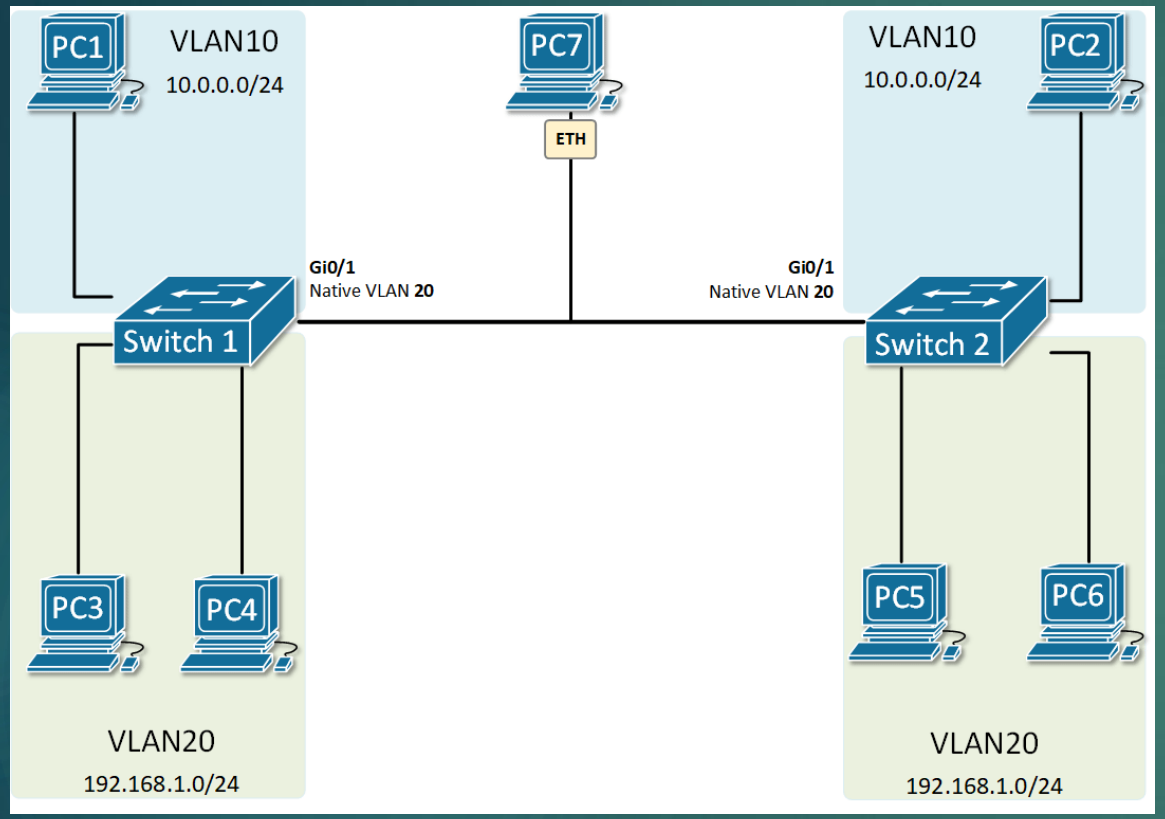
- Allows connection to remote hosts
- Websites
- Remote backups/repositories
- VPNs enable access to remote LANs



Complex Network Topology



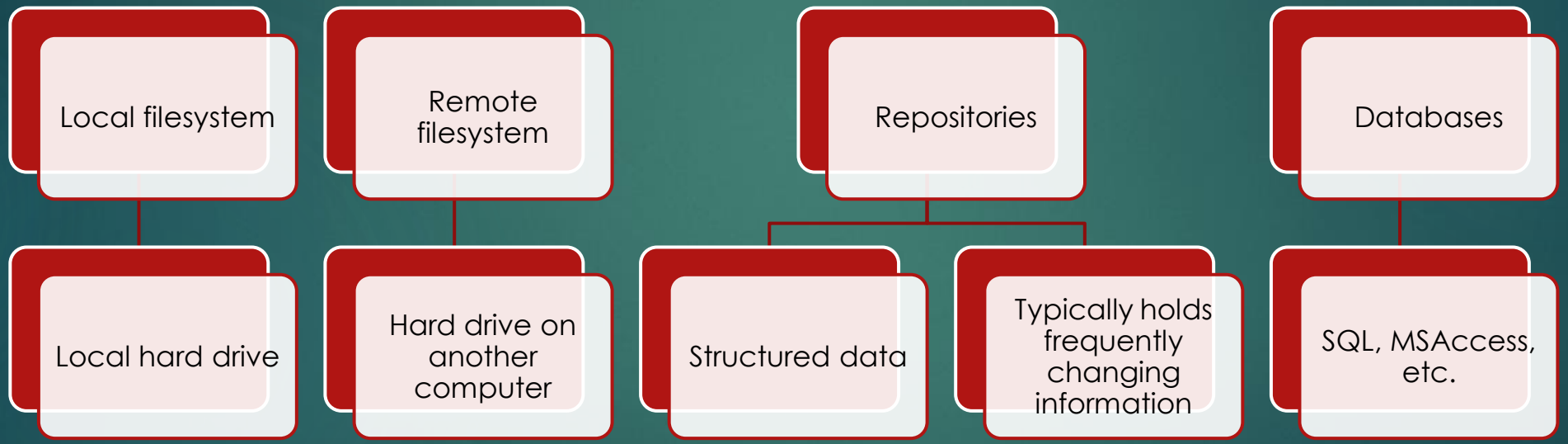
LANs and VLANs



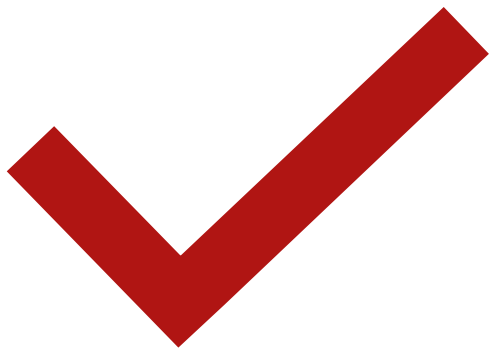
Trunk Native VLAN

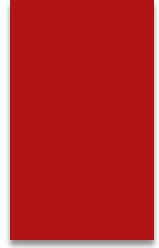
How Do Apps Access Information?

Local & Remote Information



Software Underpins All Of This!





Day 2 Recap

Question or Clarifications?

Day 3 Preview

Instructor Contact Info

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