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04/28/2025

- Module 6.0
Implementing Network
services.

TCP/IP model

7 A	Application	} payload
6 P		
5 S		

| 4 Transport ~~session~~ | TCP segment | connection "Reliable" Flow Control |
| | UDP datagram | oriented handshake sequencing |

[5] [4] [3] [2] [1] ⟶ [1][3][6][2][4]
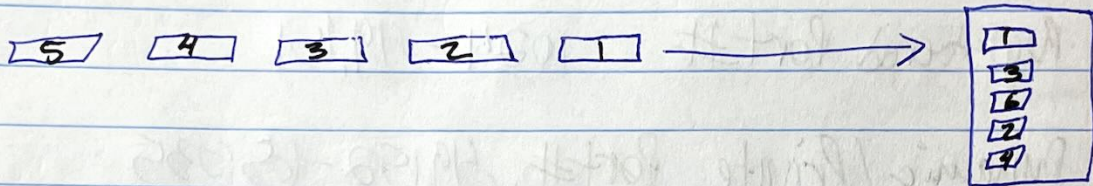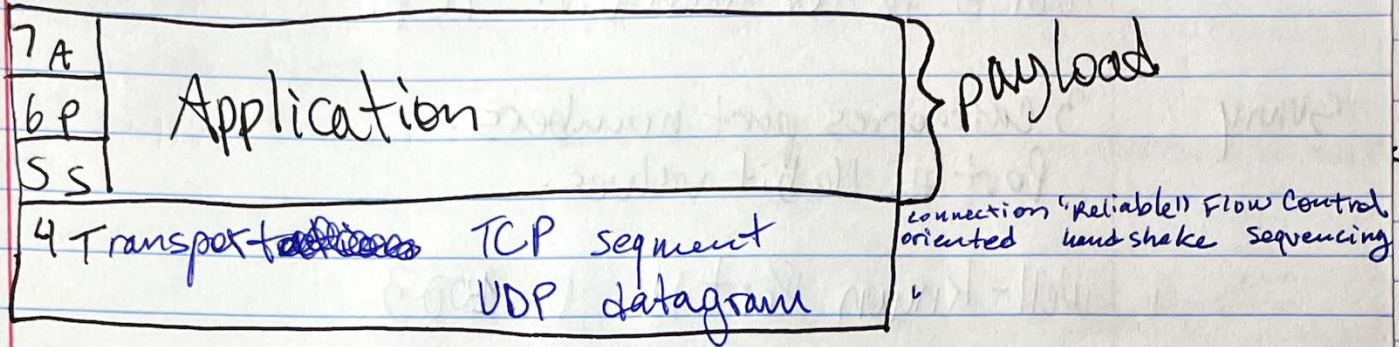
Ports   HTTP 80   FTP 21   DHCP   Telnet 23
        HTTPS 443   SMTP 25   DNS 53
        IMap   POP 110   SSH 22

Port#   1024 - 49151   user, Registered
        49152 65535   Dynamic + Private ports
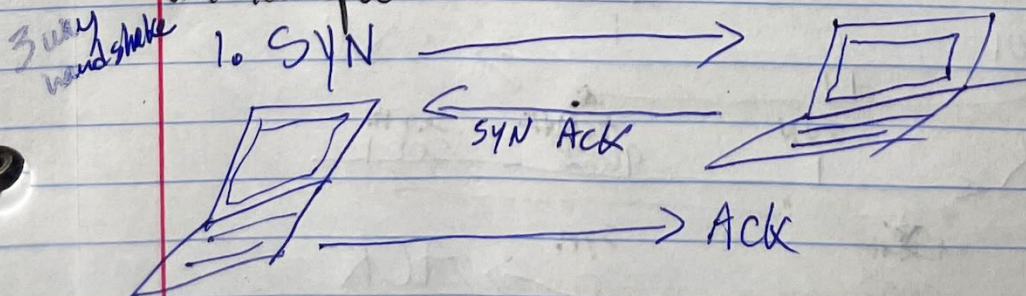   0 - 1023   system, well-Known

youtube   Ports - power certi

Synny → Session, Connection, sockets + ephemeral ports.
Christram
        6.6.6:80 socket.
socket is created w/ IP.# + Port#.
        IP address + Port number = socket.

TCP - transmission Control Protocol
    without TCP the web page will be out of order as
an example.

3 way handshake
    1. SYN ⟶
        ⟵ SYN Ack
        ⟶ Ack

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UDP - User datagram protocol
UDP is faster than ~~tcp~~ TCP.

Sunny

3 categories port numbers.
Port # 16 bit values.

1. Well-known Port # 0 - 1023

2. Registered Port # 1024 - 49,151

3. Dynamic/Private Port # 49152 - 65535
   • used by client programs.

14 well-known port # we need to know.

20 TCP - ~~~~ ftp-data		snmp = ~~~~ 161
21 TCP - ~~~~ ftp		Ldap - 389
22 TCP - SSH		Smb - 445
23 TCP - ~~~~ telnet		MySqL - 3306
25 TCP - ~~~~ smtp		sip - 5060
53 TCP/UDP - DNS		sip - 5061
DHCP Server 67 TCP - ~~~~ dhcp, BootP		h.323 - 1720
DHCP Client 68 TCP -		
69 TCP - TFTP		
80 TCP - HTTP		
110 TCP - POP3		
123 UDP - NTP		
143 TCP - IMAP4		
443 TCP - HTTPS		

source port - udp port of sending host
Destination port - UDP port of destination host
Message length - Size of the UDP packet
Checksum - Ensures validity of the packet.

Seq #	Ack #	SYN #	
9001	0	1	→ SYN
	+1		

SYN-ACK ← SYN 1   Ack# 9002   Seq# 5001

Seq# 9002   Ack# 5002   syn 0 → ACK
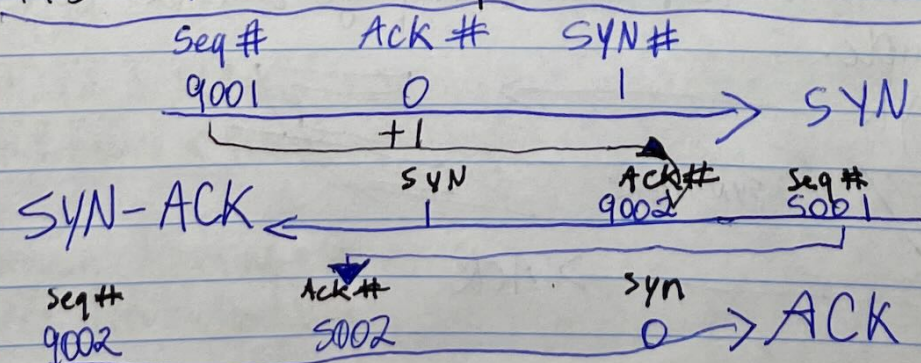
> Netstat   se
  > netstat -n
  > netstat -b   Display which program is used to make the connection.

  > netstat -f.
  > netstat -bf
  > netstat -an
  > netstat ?

```
┌─────────────────────────┐
│  DHCP  port #:          │
│       67 - 68.          │
└─────────────────────────┘
```

Netstat - t N L p a b f fqDN

- N - umbers
- L - isten
- p - rocess
- a - LL
- b - P r o g R A M

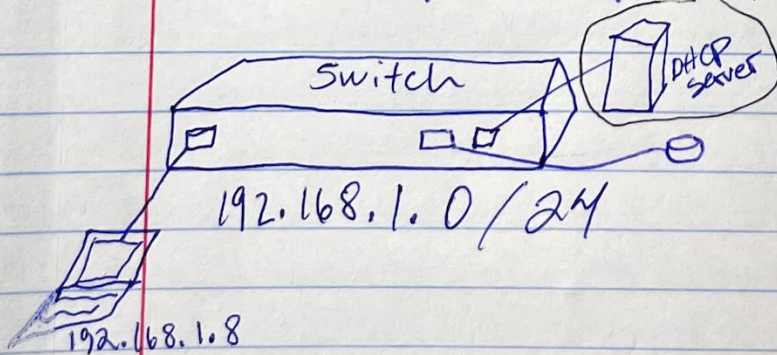youtube DHCP - assigns a computer an IP address, subnet, default gateway, DNS server.

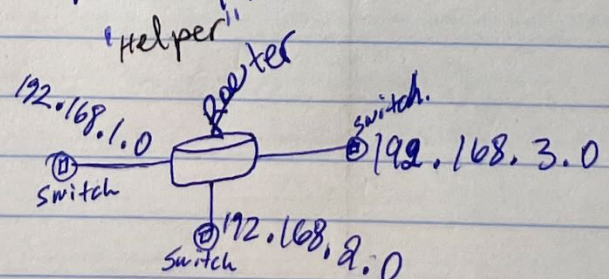DHCP Settings   "SOPE"
Start   10.0.0.1   Range - lease → adjust lease time.
End.   10.0.0.100   reservation = MAC
          Broadcast Domain   exclusion

Switch

192.168.1.0/24   Find MAC address
                        → ipconfig /all
192.168.1.8   "Helper"

TCP handshake   192.168.1.0 Router switch. 192.168.3.0
SYN   (B) Switch
Syn ACK   (B) 192.168.2.0
ACK   Switch

                       Broadcast DO NOT
                       Travel btw network!

                       ip helper enable. cisco.
youtube DHCP relay Agent.   > ipconfig /allcompartments /all

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relay agent = 1

IPv6 = SLAAC

IPv6 . How DHCPv6 works.
APIPA -

Note: remember port #.

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Intro Data bases. on the side.

6, 7, 8 - quizzes, review & Lab by sunday...

* sudo nano /etc/network/interfaces
sudo systemctl restart netwo