



# Networking and Firewalling

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# The Agenda

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- What is networking
- Why we need network engineers
- What is firewalling
- Why we firewall
- Networking in the real world
- Questions

# What is Networking?

## NETWORK ENGINEER



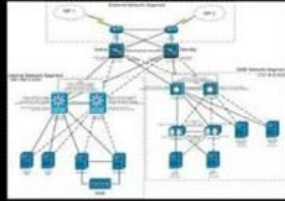
WHAT MY FRIENDS  
THINK I DO



WHAT MY PARENTS  
THINK I DO



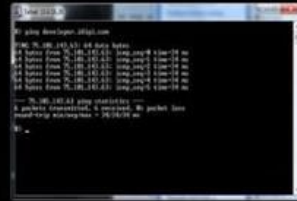
WHAT MY CUSTOMERS  
THINK I DO



WHAT MY BOSS  
THINK I DO



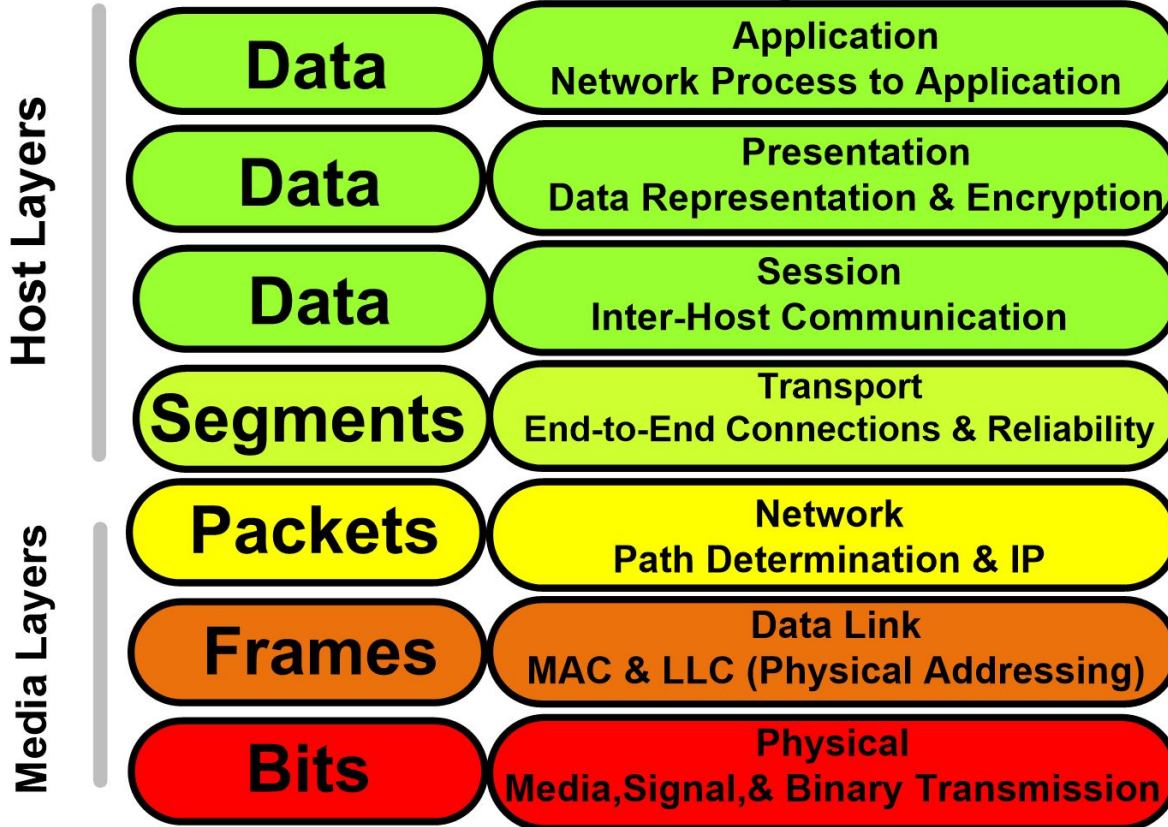
WHAT I THINK I DO



WHAT I REALLY DO  
PING TEST? WTF !

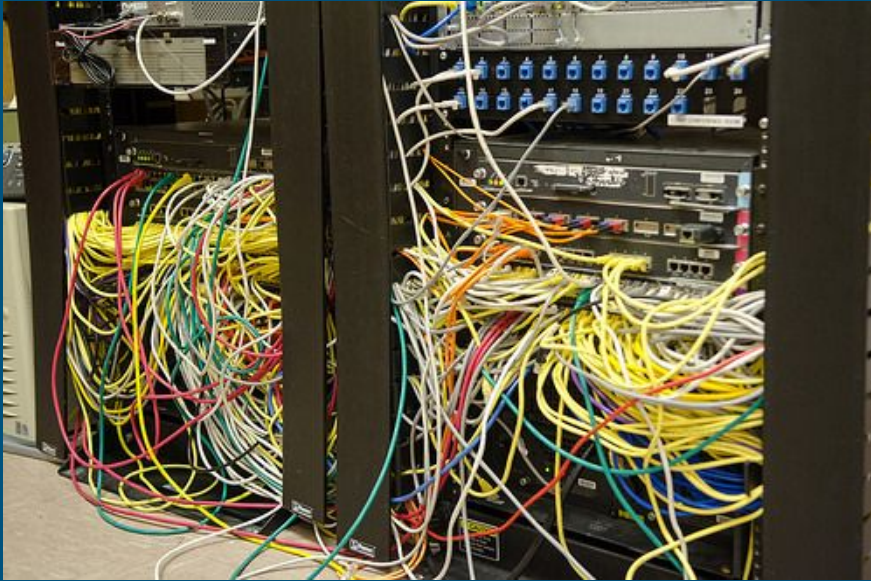
# OSI Model

## Data Layers



# Layer 1 and 2

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C:\WINDOWS\system32\cmd.exe

C:\>ipconfig /all

Windows IP Configuration

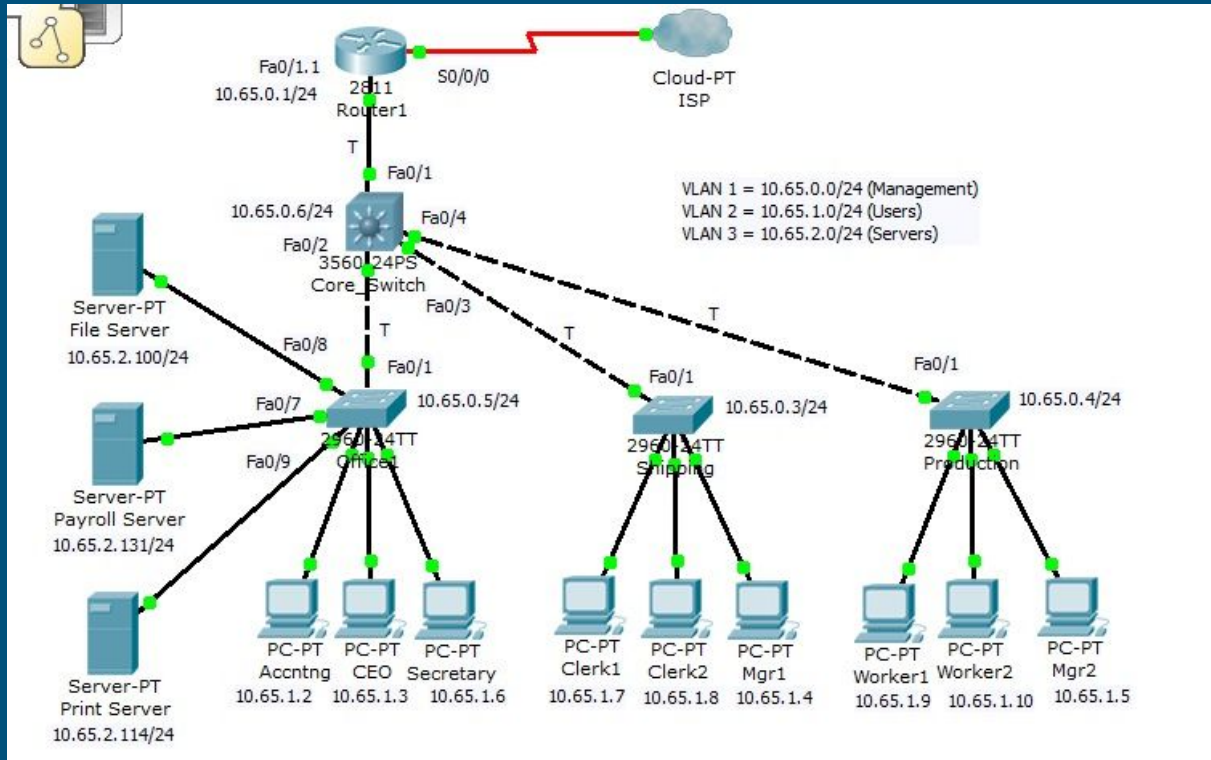
    Host Name . . . . . : computer
    Primary Dns Suffix . . . . . :
    Node Type . . . . . : Unknown
    IP Routing Enabled. . . . . : No
    WINS Proxy Enabled. . . . . : No

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix . . :
    Description . . . . . : Broadcom 440x 10/100 Integrated Cont
roller
    Physical Address. . . . . : 00-C0-9F-A1-9D-40
    Dhcp Enabled. . . . . : No
    IP Address. . . . . : 192.168.1.8
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.1
    DNS Servers . . . . . : 208.67.222.222
                          208.67.220.220

C:\>
```

# LAN, WAN, VLAN, VPN





# Layer 3

192	168	1	0	<p>Network Address</p> <p>Valid IP address Range</p> <p>Broadcast Address</p>
192	168	1	1	
192	168	1	2	
192	168	1	3	
192	168	1	4	
.				
.				
192	168	1	253	
192	168	1	254	
192	168	1	255	

Subnet mask quick reference							
Host Bit length	math	Max hosts	Subnet mask	Mask octet	Binary mask	Mask length	Subnet length
0	$2^0=$	1	255.255.255.255	4	11111111	32	0
1	$2^1=$	2	255.255.255.254	4	11111110	31	1
2	$2^2=$	4	255.255.255.252	4	11111100	30	2
3	$2^3=$	8	255.255.255.248	4	11111000	29	3
4	$2^4=$	16	255.255.255.240	4	11110000	28	4
5	$2^5=$	32	255.255.255.224	4	11100000	27	5
6	$2^6=$	64	255.255.255.192	4	11000000	26	6
7	$2^7=$	128	255.255.255.128	4	10000000	25	7
8	$2^8=$	256	255.255.255.0	3	11111111	24	8
9	$2^9=$	512	255.255.254.0	3	11111110	23	9
10	$2^{10}=$	1024	255.255.252.0	3	11111100	22	10
11	$2^{11}=$	2048	255.255.248.0	3	11111000	21	11
12	$2^{12}=$	4096	255.255.240.0	3	11110000	20	12
13	$2^{13}=$	8192	255.255.224.0	3	11100000	19	13
14	$2^{14}=$	16384	255.255.192.0	3	11000000	18	14
15	$2^{15}=$	32768	255.255.128.0	3	10000000	17	15
16	$2^{16}=$	65536	255.255.0.0	2	11111111	16	16
17	$2^{17}=$	131072	255.254.0.0	2	11111110	15	17
18	$2^{18}=$	262144	255.252.0.0	2	11111100	14	18
19	$2^{19}=$	524288	255.248.0.0	2	11111000	13	19
20	$2^{20}=$	1048576	255.240.0.0	2	11110000	12	20
21	$2^{21}=$	2097152	255.224.0.0	2	11100000	11	21
22	$2^{22}=$	4194304	255.192.0.0	2	11000000	10	22
23	$2^{23}=$	8388608	255.128.0.0	2	10000000	9	23
24	$2^{24}=$	16777216	255.0.0.0	1	11111111	8	24

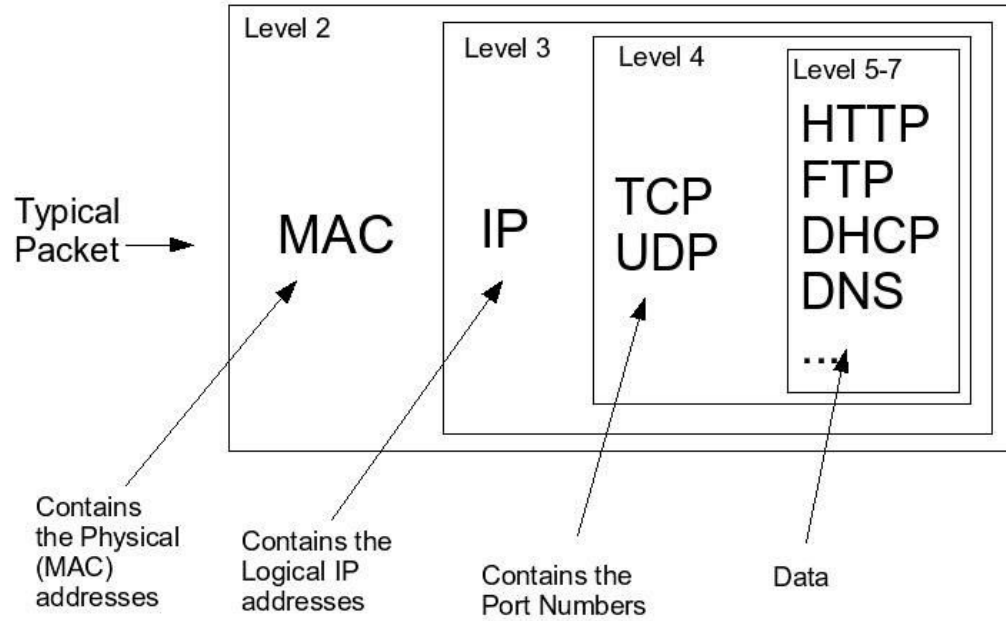
# What is a firewall?

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# Packets



# Other Firewall Jobs

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- DHCP
- DNS Resolver
- Sometimes Routing and NATing

# Switches

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# Routing

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# Questions?

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