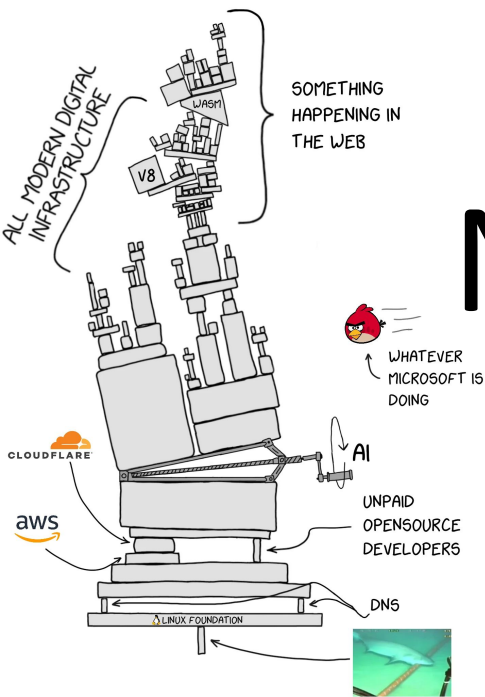


Workshop 3

Networking Basics



Lesson 6

Networking Foundations



What is your address?

157.42.20.132



No, your local address?

127.0.0.1



I mean, your physical
address!

00:A0:C9:4F:73:2E

The Identity of a Machine: IP Addresses

- **IPv4:** The standard format (e.g., 192.168.1.1).

It uses 32-bit addresses. We ran out of these years ago, but we still use them everywhere.

- **IPv6:** The newer, massive format

(e.g., 2001:0db0:811:0000:0000:8a2e:0370:7334).

It uses 128-bit addresses, ensuring every grain of sand on earth could have its own IP address.

Ports & Protocols: The "Doors" of the Internet

The Port Concept: Think of the IP as the building address and the **Port** as the apartment number.

- 192.168.1.10:80 → Requesting a website (HTTP)
- 192.168.1.10:22 → Connecting via Secure Shell (SSH)

The top 25 ports cover a range of essential services:

Web Traffic: HTTP (80), HTTPS (443), and alternate web ports (8080, 8443, 8888) are critical for online applications.

File Transfer and Remote Access: FTP (20, 21), SSH (22), Telnet (23), and TFTP (69) are used for data transfer and remote management.

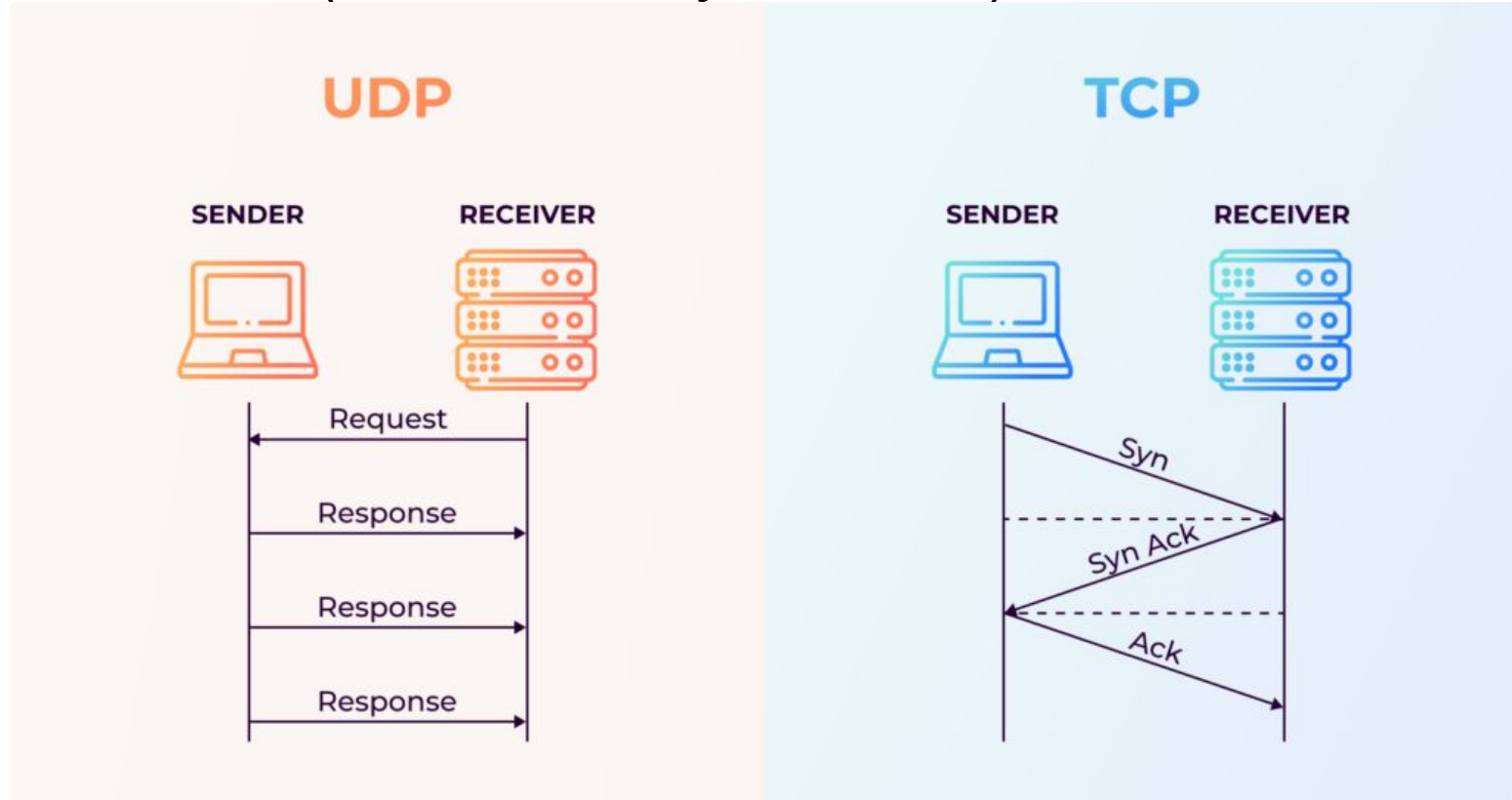
Email Services: SMTP (25), POP3 (110), IMAP (143), and their secure variants (POP3S, IMAPS, SMTPS) are essential for communication.

Directory Services and Legacy Protocols: DNS (53), Kerberos (88), RPC (135), and NetBIOS (137, 138, 139) support internal networking and legacy systems.

Modern Network Services: SMB (445), RDP (3389), and database services (MSSQL on 1433, MySQL on 3306) are widely used for enterprise operations.

Management and Remote Execution: WinRM (5985/5986) facilitates remote administration.

TCP vs. UDP (The "Delivery Method"):



DNS (The Phonebook of the Internet)

DNS (Domain Name System): When you type a URL, your computer asks a DNS server: "What is the IP address for kmitl.ac.th?"

The Resolution: The DNS server gives back the IP, and then your browser starts using the TCP/UDP protocols to fetch the data.

```
(kali@6ccb2675e8d8)~$ dig kmitl.ac.th

;<>> DiG 9.20.23-1-Debian <>> kmitl.ac.th
;; global options: +cmd
;; Got answer:
;; ->HEADER<- opcode: QUERY, status: NOERROR, id: 13982
;; flags: qr rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;kmitl.ac.th.                IN      A

;; ANSWER SECTION:
kmitl.ac.th.                956     IN      A      45.60.32.44
kmitl.ac.th.                956     IN      A      45.60.38.44

;; Query time: 17 msec
;; SERVER: 127.0.0.11#53(127.0.0.11) (UDP)
;; WHEN: Tue Jun 16 09:02:31 UTC 2026
;; MSG SIZE rcvd: 72
```

Practice Tools in Linux for this Section

- `ip addr`: See your local IP and MAC address.
- `dig google.com`: Find the IP of a website (DNS lookup).
- `ss -tuln`: See which ports are currently "listening" for connections.
- `traceroute google.com`: See every router your data passes through.

Lesson 7

Packet Analysis & Troubleshooting

✓
**The Global Internet Is
Being Attacked by Sharks,
Google Confirms**

By Will Oremus



ProgrammerHumor.io