



Student Engagement & Mentoring in Technology

Make a Flow Chart of Step-by-Step Process of Network Communication

1. Device Joins a Network

- A device (laptop, phone, etc.) **connects to a network** (Wi-Fi or Ethernet).

2. DHCP Assigns an IP Address

- The device **sends a DHCP request** to get an IP address.
- If the **DHCP server is available**, it assigns:
 - IP Address** (IPv4 or IPv6)
 - Subnet Mask**
 - Gateway (Router)**
 - DNS Server**

(If DHCP Fails → APIPA Kicks In)

- If the **DHCP server is unavailable**, the device assigns itself an **APIPA IP address** (169.254.x.x) and can only communicate with other APIPA devices.

3. Device Needs to Communicate with Another Device

- The user **opens a web browser** and enters `www.google.com`.
- The computer needs to convert this **domain name into an IP address** → **Uses DNS**.

4. DNS Resolves the Domain Name

- The device **contacts the DNS server** to find the **IP address** of `www.google.com`.
- The DNS server responds with the **correct IP address** (e.g., 142.250.190.46).

5. IP Address Determines Destination



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- The device now knows where to send the request and **prepares to send data**.

6. ARP Resolves the MAC Address

- If the destination is **on the same local network**, the device **uses ARP** to find the **MAC address** of the destination device.
- If the destination is **outside the local network (e.g., internet)**, it **sends the request to the default gateway (router)**.

7. TCP/ICMP Ensures Reliable Communication

- **TCP** breaks the data into packets and ensures it arrives correctly.
- If there's a problem, **ICMP** helps report errors (e.g., unreachable destination).
- Tools like **ping (ICMP)** can check if the destination is reachable.

8. Router Uses IP Address to Forward Data

- The router looks at the **destination IP address** and **forwards the packet** toward Google's server.

9. Google's Server Responds

- The **Google server receives the request**, processes it, and **sends a response** back to the device.
- The response follows the same process **in reverse**:
Data is sent back through **routers** → **Device's public IP** → **Local network** → **Device's private IP**.

10. The Web Page Loads

- The user **sees Google's homepage** on their browser, completing the network communication process!
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