

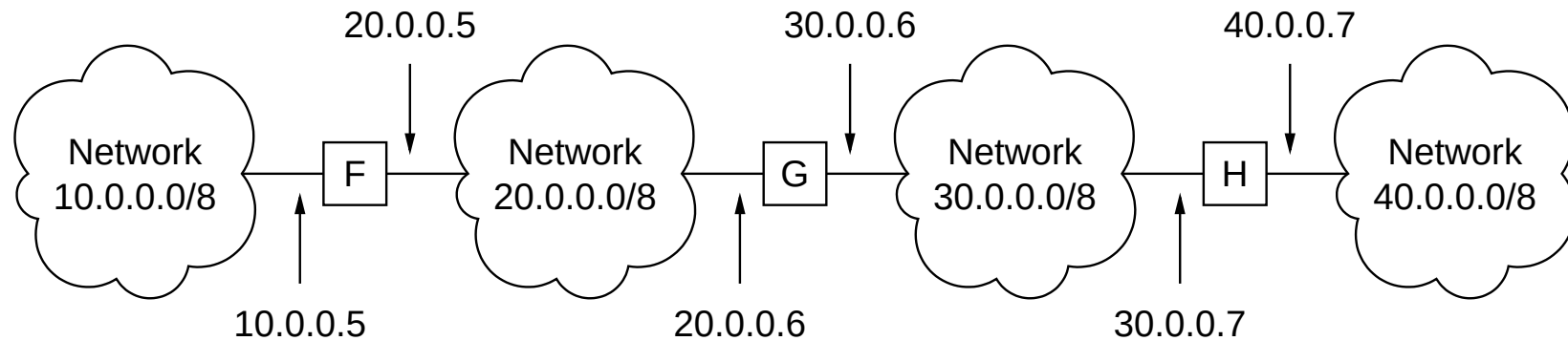
# Routing In An Internet

- We've already discussed the general routing mechanism
  - Host delivers datagrams to directly connected machines
  - Host sends non-local datagrams to next-hop gateway
  - Gateways forward datagrams to other gateways
  - Final gateway delivers datagram directly to destination host

# Efficient Routing

- As we've already seen, routing decisions are based on table lookup
- Routing tables keep only network portion of addresses
  - Size proportional to number of networks, not number of hosts
  - Helps scaling problem
  - Has still proven to be a problem
- Algorithm is efficient and understandable
- Possible to automate routing table updates
  - Use the network to collect the information
  - We'll discuss this in detail later

## Example IP Routing Table (Gateway)



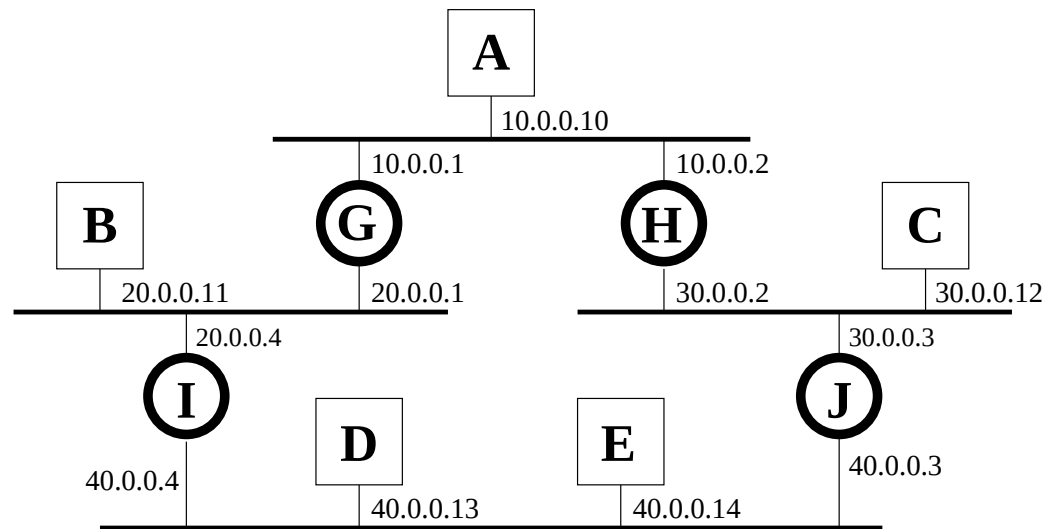
- Routing table for gateway “G”

| To Reach Network | Route To This Address |
|------------------|-----------------------|
| 20.0.0.0/8       | Deliver Direct        |
| 30.0.0.0/8       | Deliver Direct        |
| 10.0.0.0/8       | 20.0.0.5              |
| 40.0.0.0/8       | 30.0.0.7              |

- In practice, a routing table can contain a “default” entry

# Long Routing Example

- Consider network:



- With Routing Tables:

| Net   | A        | B        | C        | D        | E        |
|-------|----------|----------|----------|----------|----------|
| 10./8 | (direct) | 20.0.0.1 | 30.0.0.2 | 40.0.0.4 | 40.0.0.3 |
| 20./8 | 10.0.0.1 | (direct) | 30.0.0.2 | 40.0.0.4 | 40.0.0.3 |
| 30./8 | 10.0.0.2 | 20.0.0.1 | (direct) | 40.0.0.3 | 40.0.0.3 |
| 40./8 | 10.0.0.1 | 20.0.0.4 | 30.0.0.3 | (direct) | (direct) |

| Net   | G        | H        | I        | J        |
|-------|----------|----------|----------|----------|
| 10./8 | (direct) | (direct) | 20.0.0.1 | 30.0.0.2 |
| 20./8 | (direct) | 30.0.0.3 | (direct) | 30.0.0.2 |
| 30./8 | 10.0.0.2 | (direct) | 40.0.0.3 | (direct) |
| 40./8 | 20.0.0.4 | 30.0.0.3 | (direct) | (direct) |