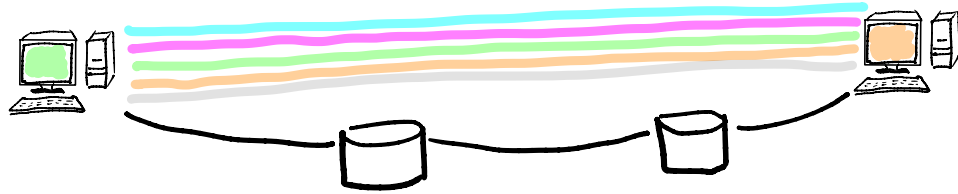
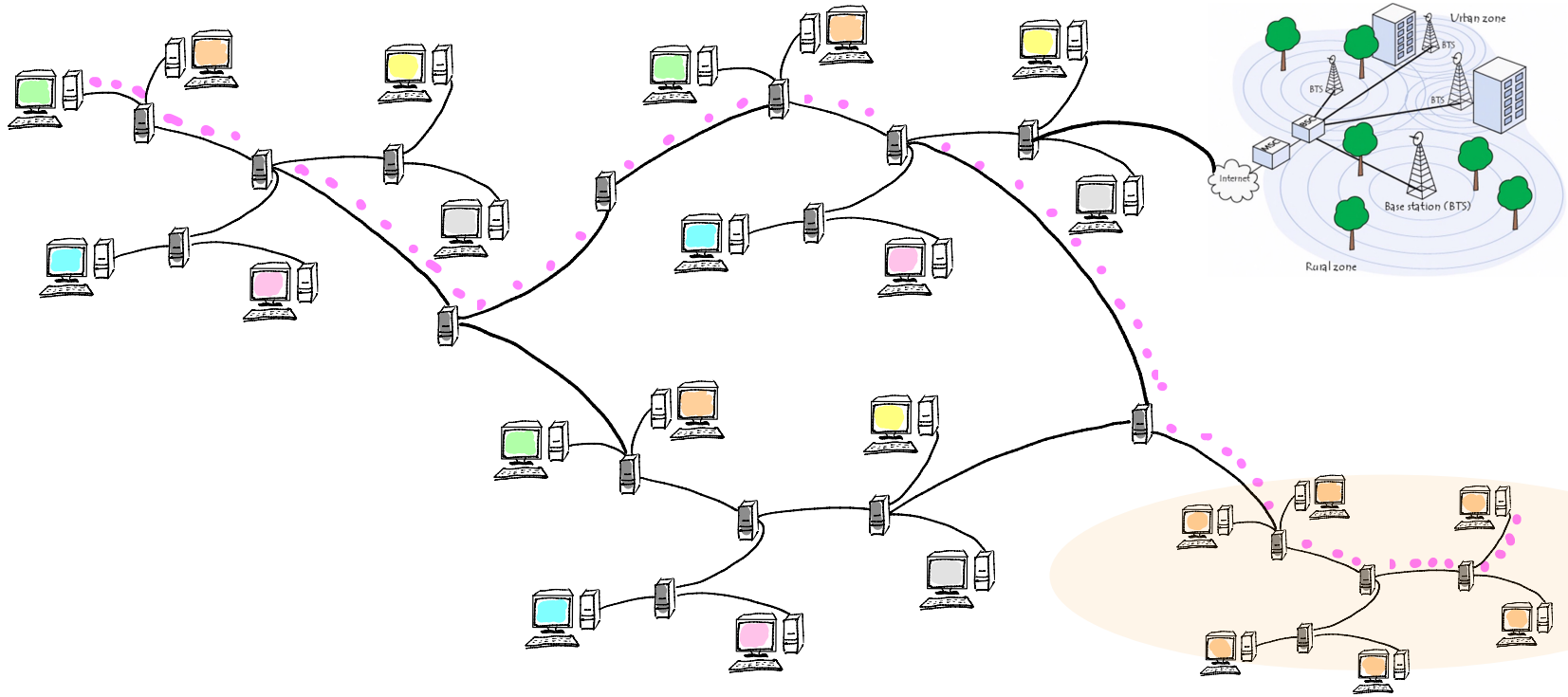


Internet ^(2/2)

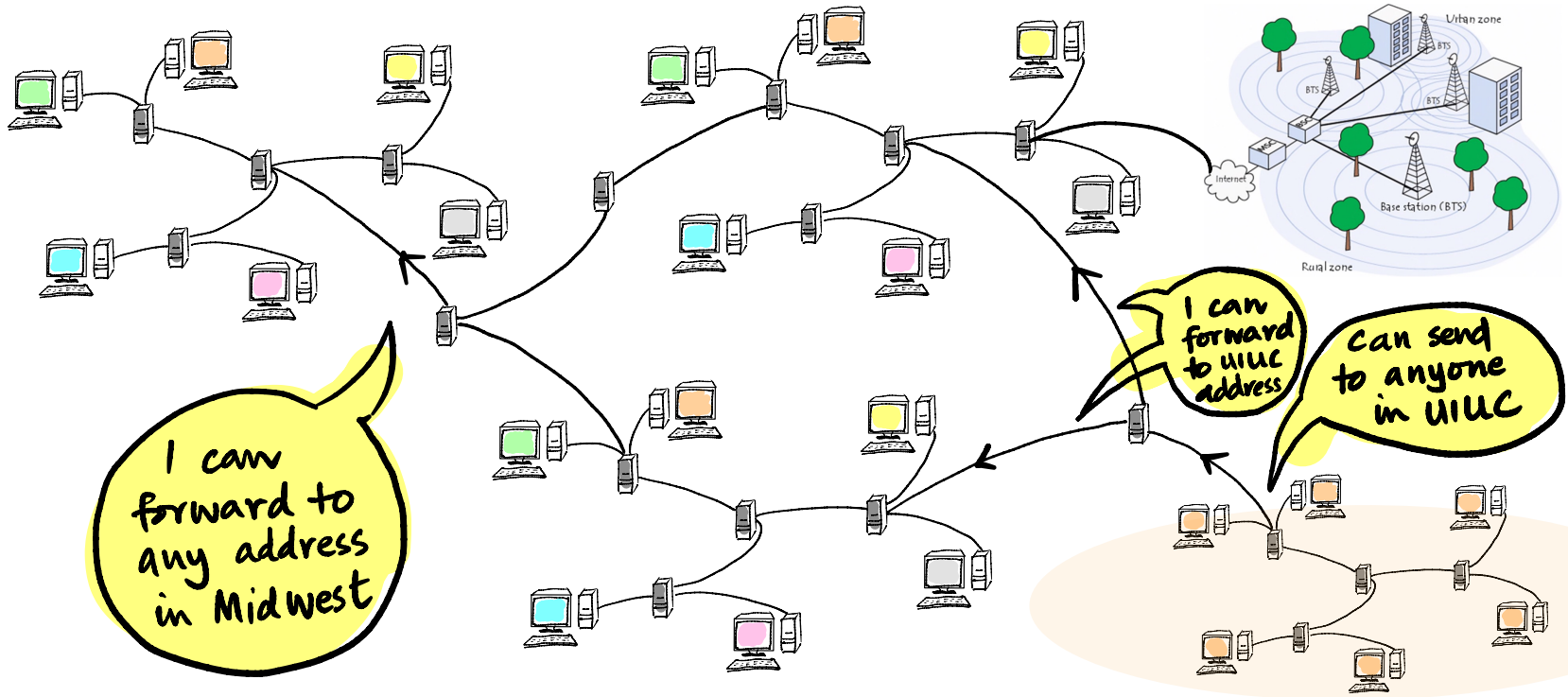


Infrastructure Ready !! Now communicate ... but wait ! To whom ? which address ?



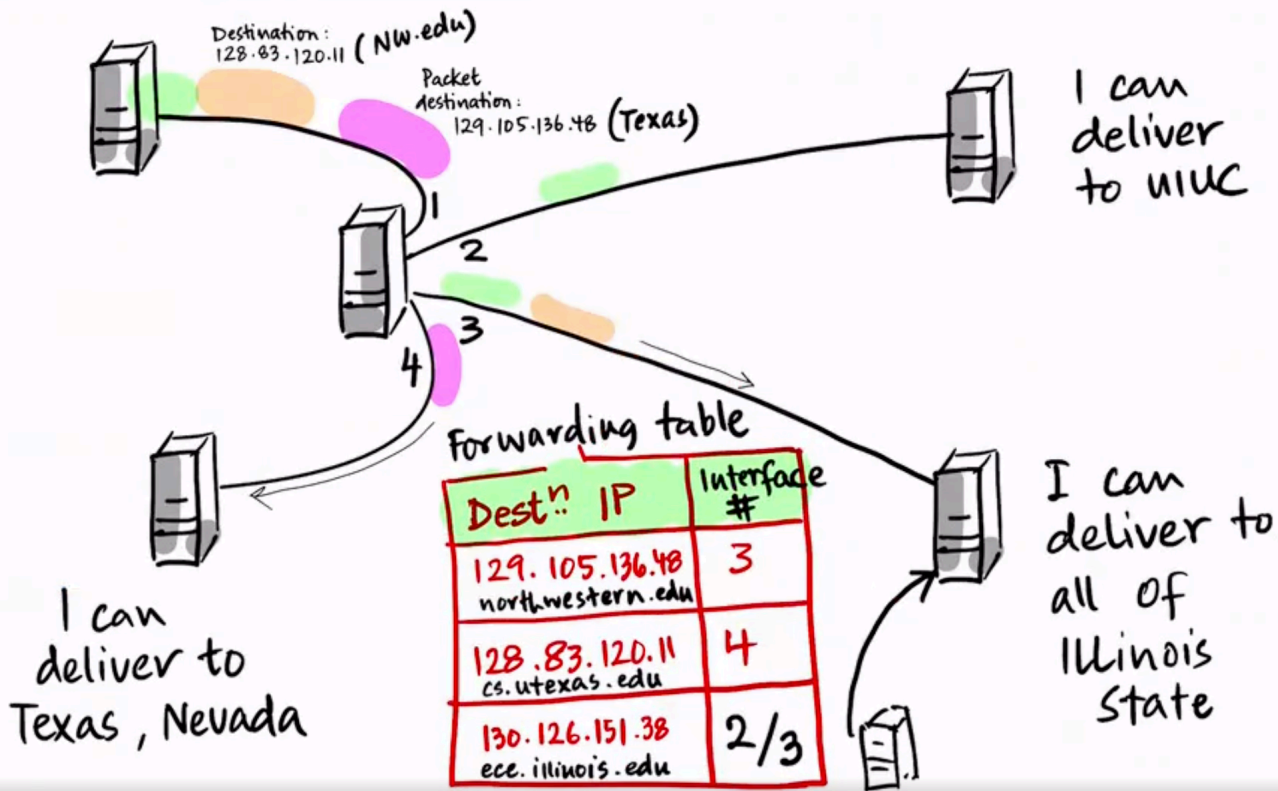
IP address : ece.illinois
130.126.151.38

Advertising : Who can deliver to which address

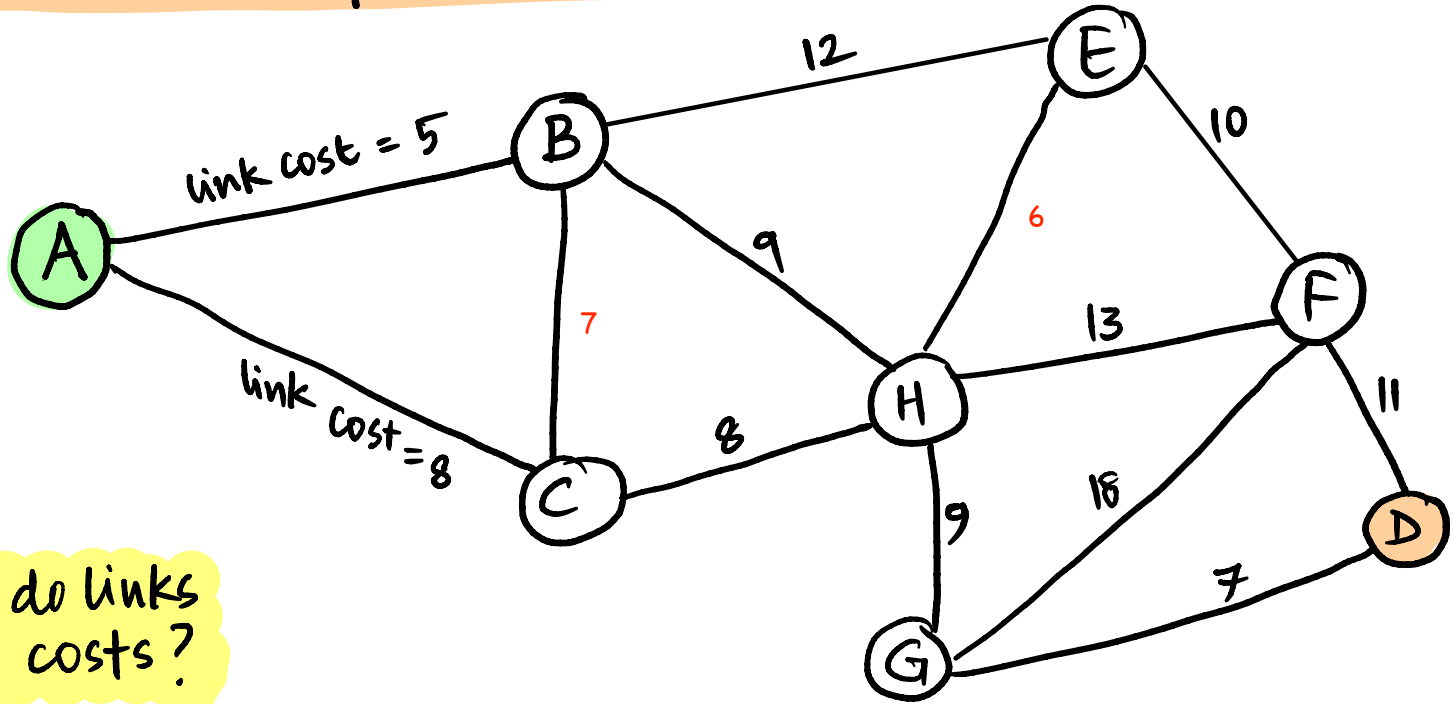


As if Routers are gossiping to figure out who can forward to whom.

Forwarding packets based on Destination Address



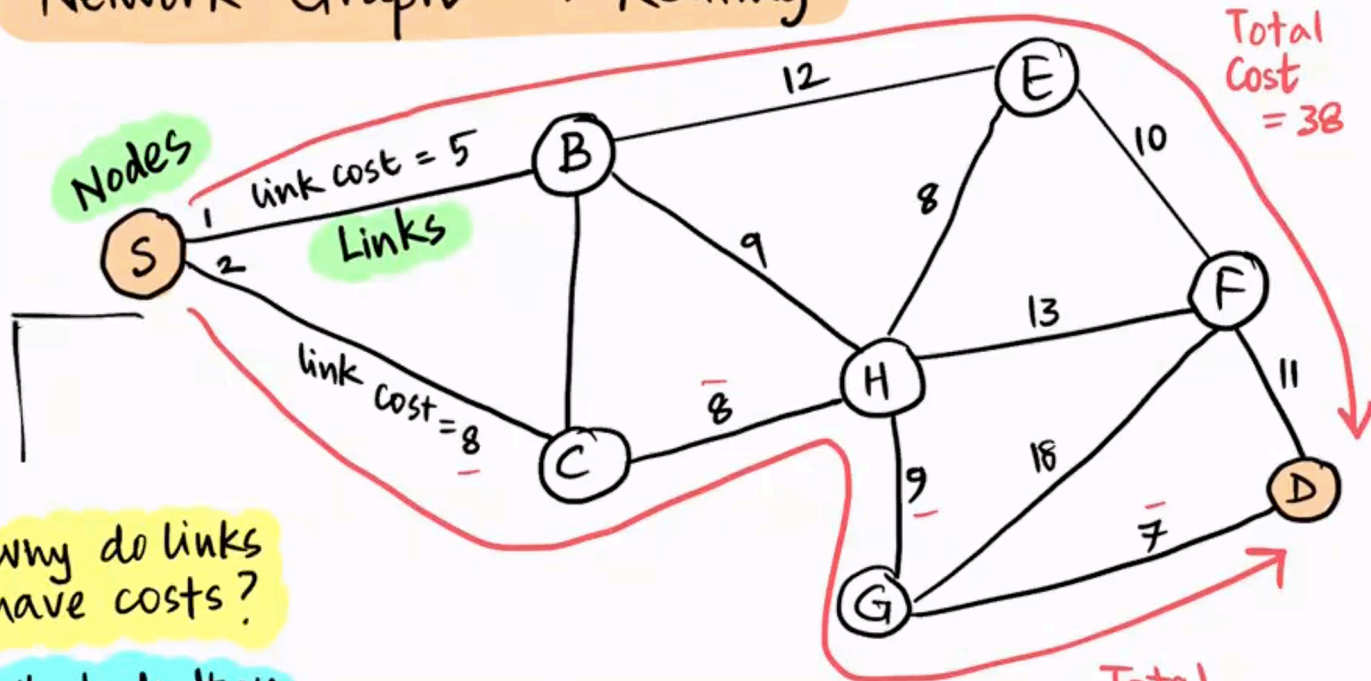
Network Graph \rightarrow Routing



Why do links have costs?

What do they depend on?

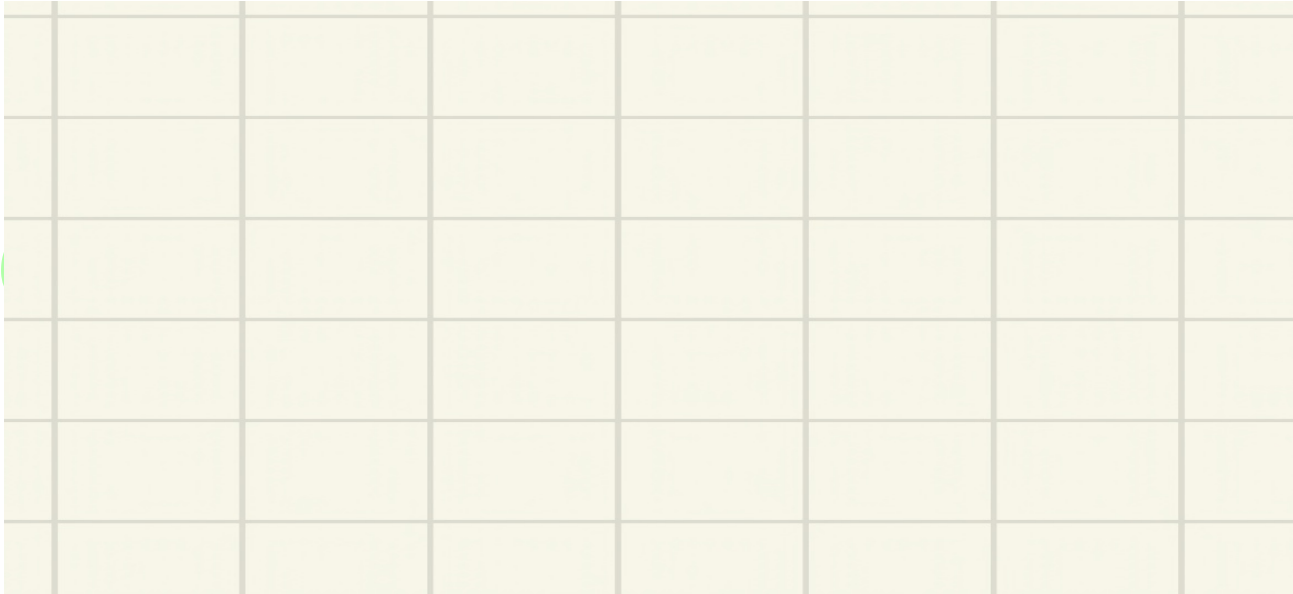
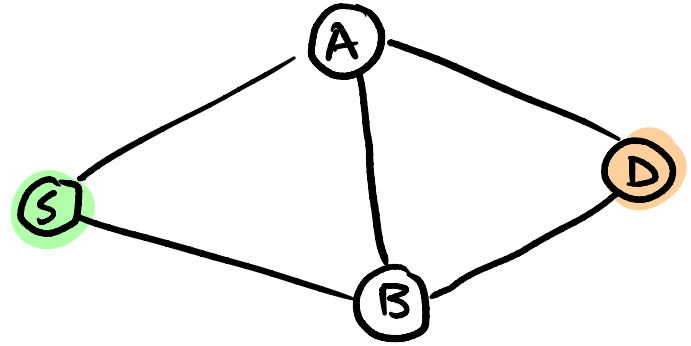
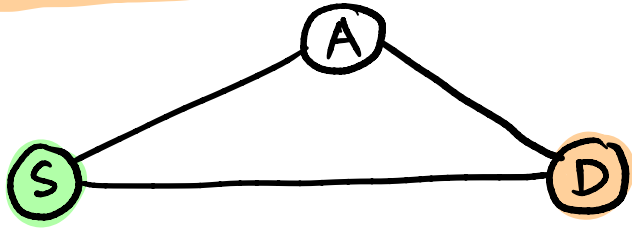
Network Graph \rightarrow Routing



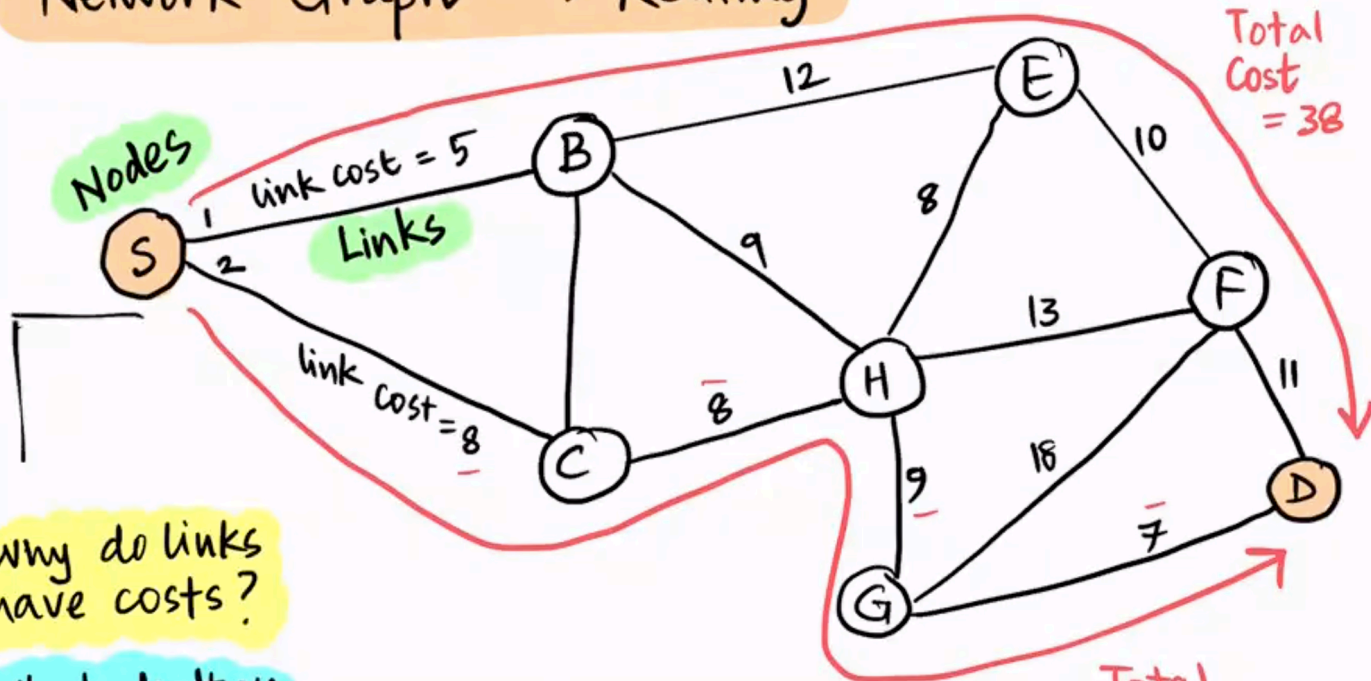
Why do links have costs?

What do they depend on?

Let's Route

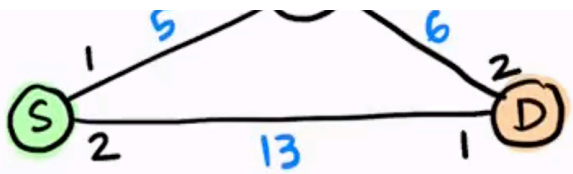


Network Graph → Routing

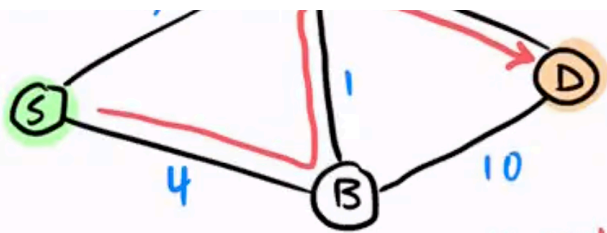


Why do links have costs?

What do they depend on?

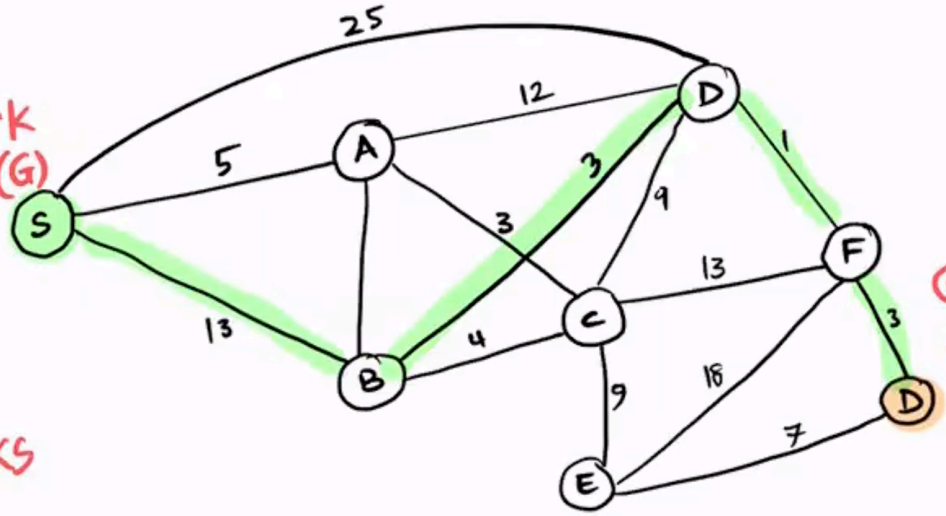


Least cost path $\Rightarrow S \rightarrow A \rightarrow D$

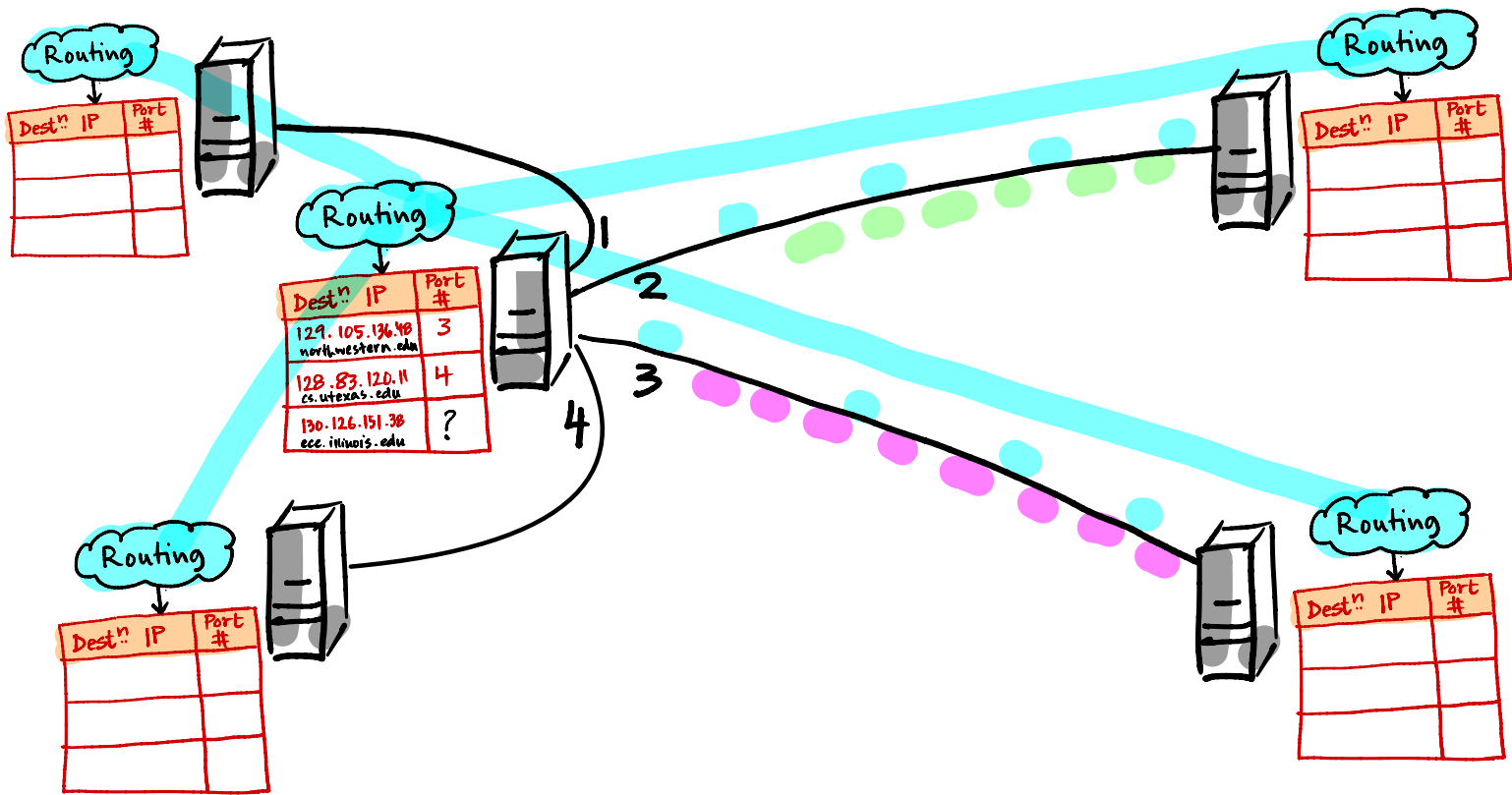


Least cost path
 $S \rightarrow B \rightarrow A \rightarrow D$

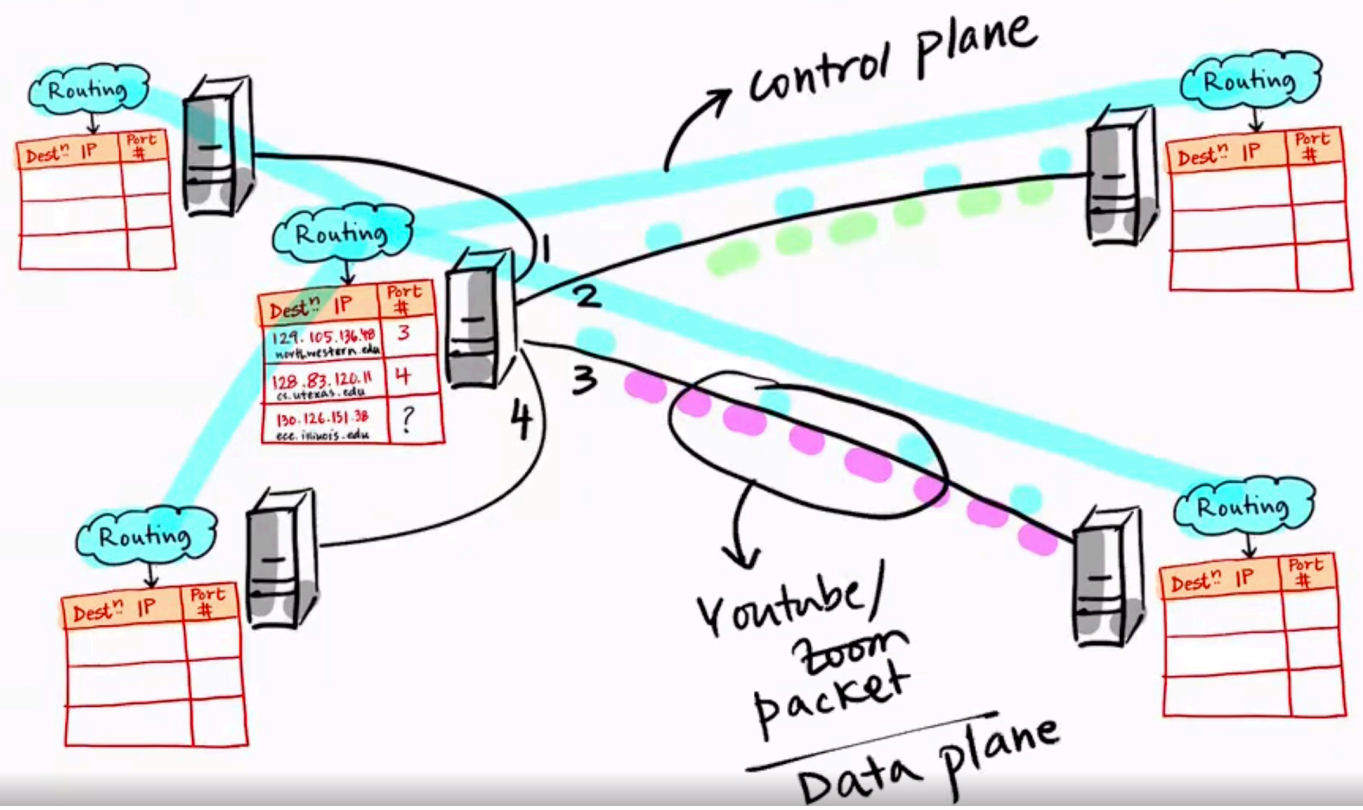
Network Graph (G)
 ↓
 Node + Links



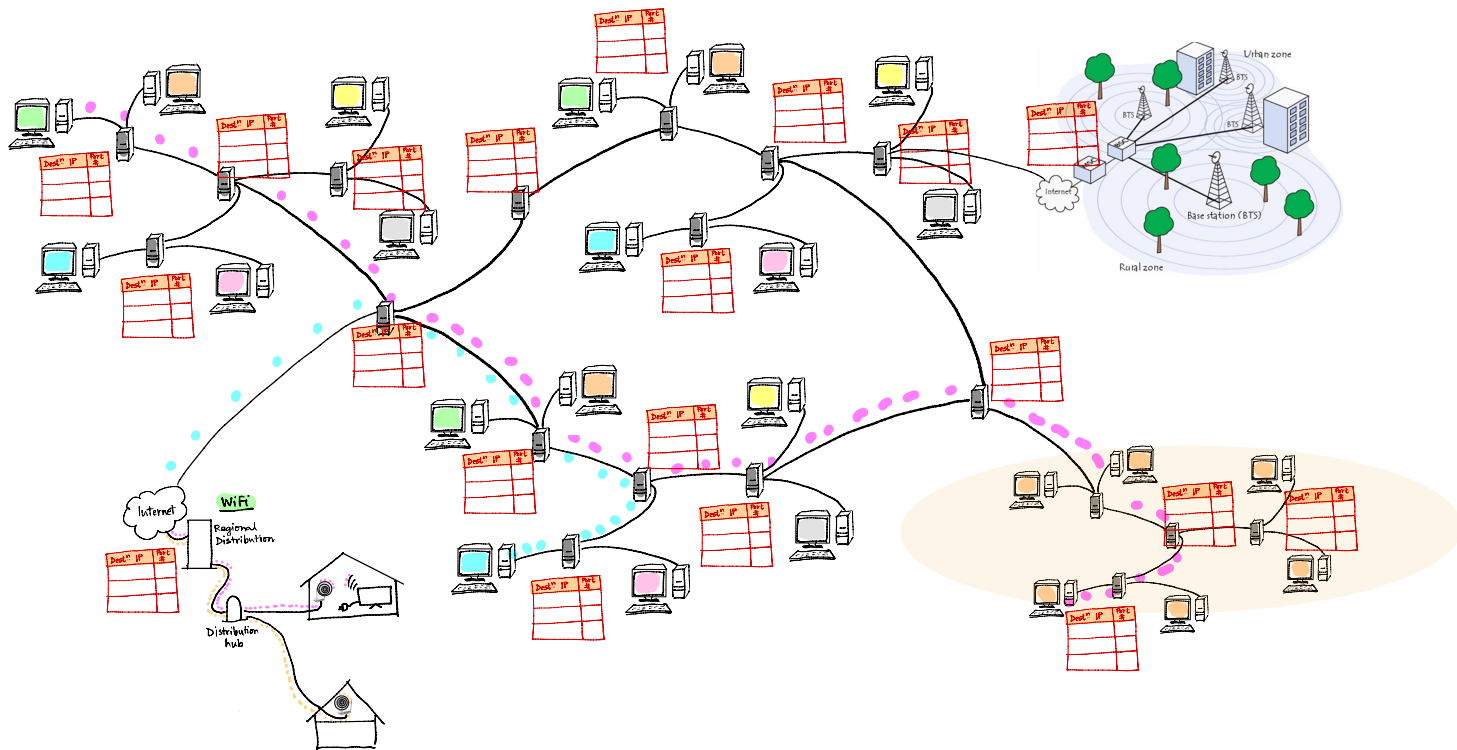
IP Address based Routing : Control plane, Data plane.



IP Address based Routing : Control plane, Data plane.

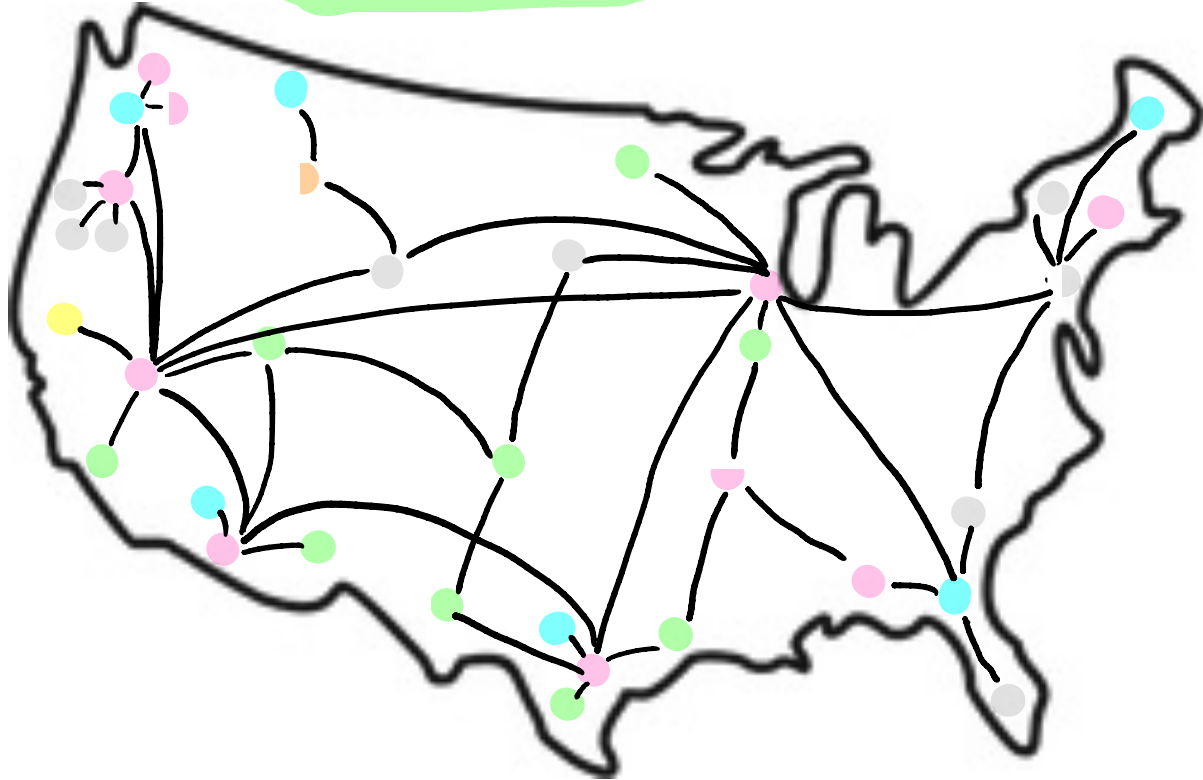


Zoom Out



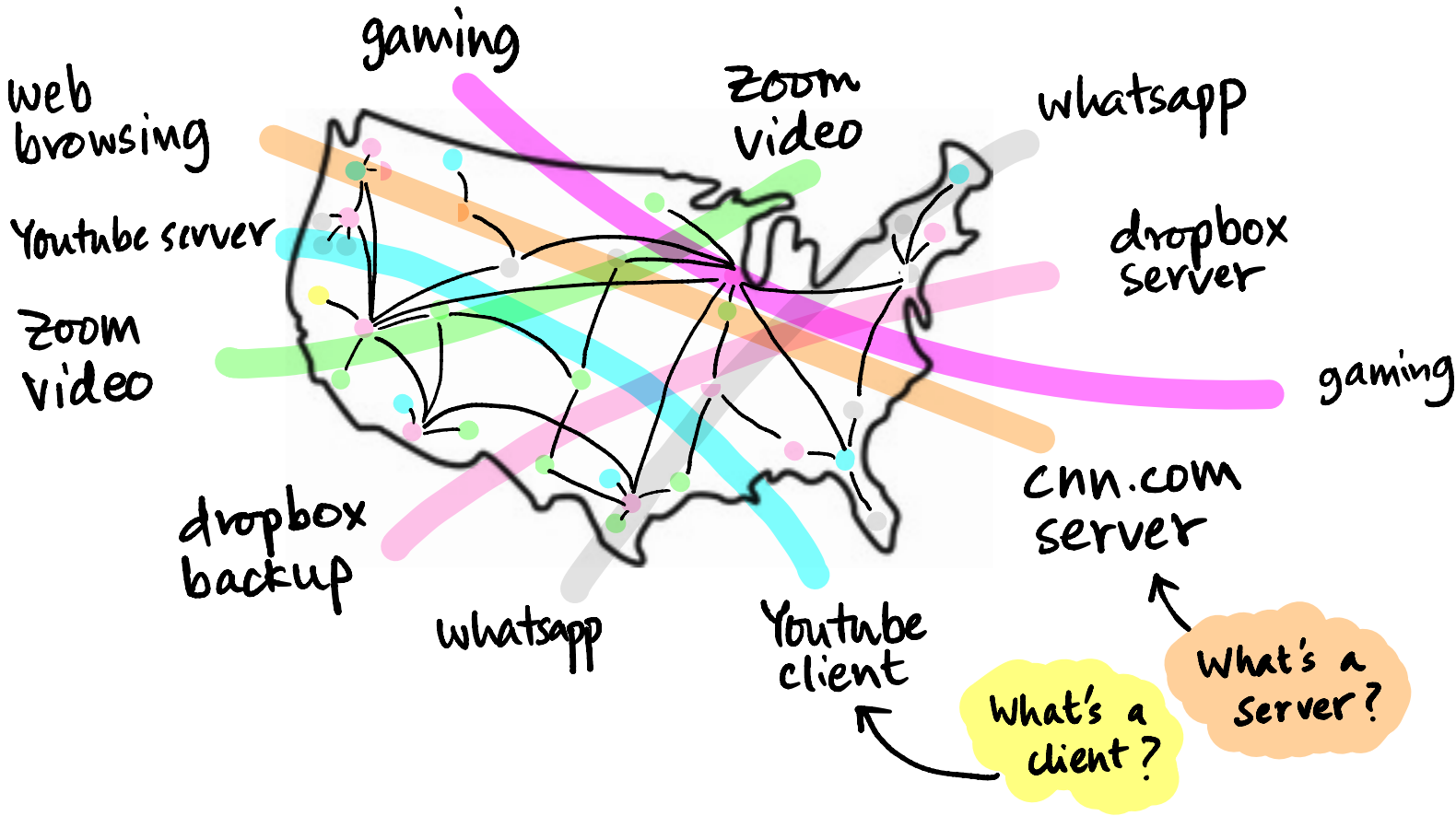
The airports are ready, and flights can link them

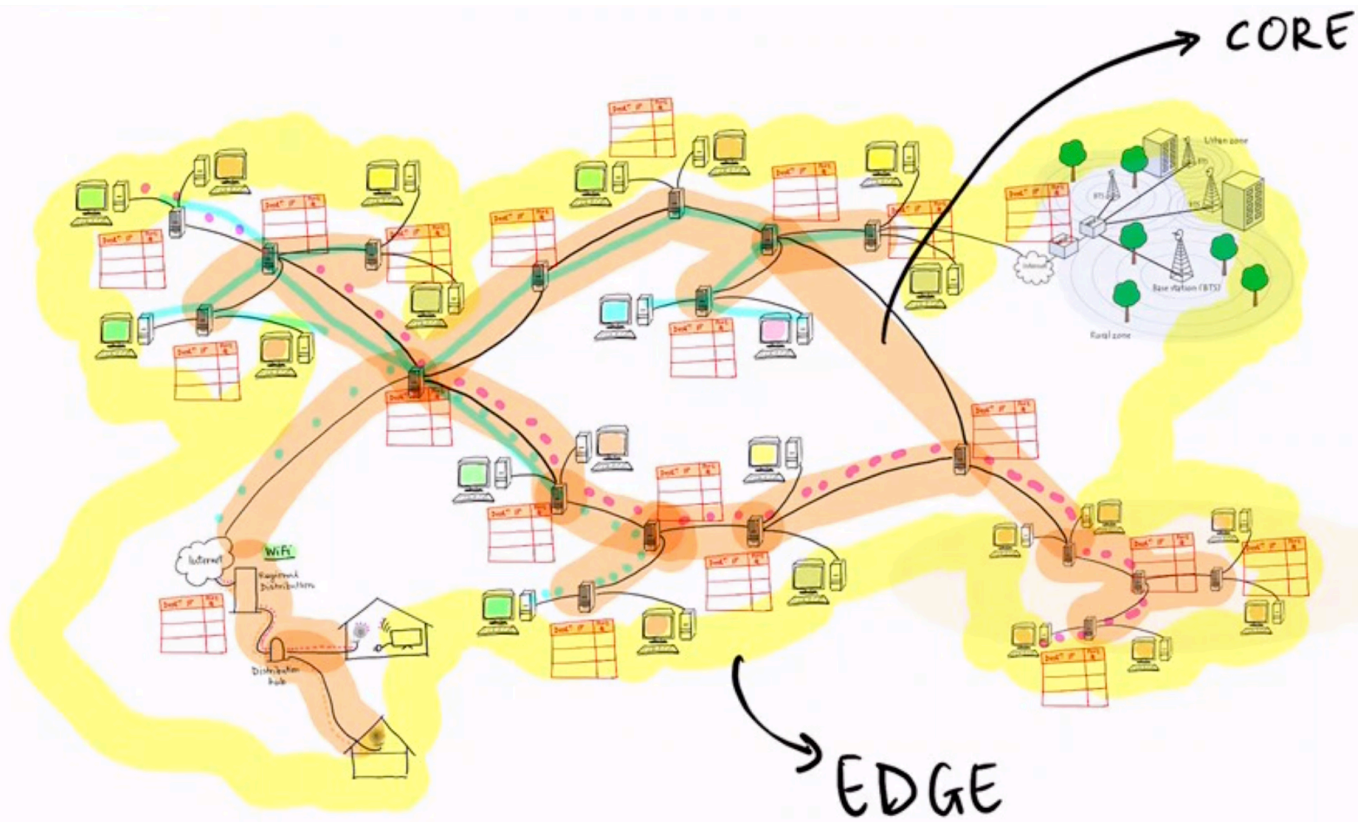
Now what?



Applications

running on the "edge"



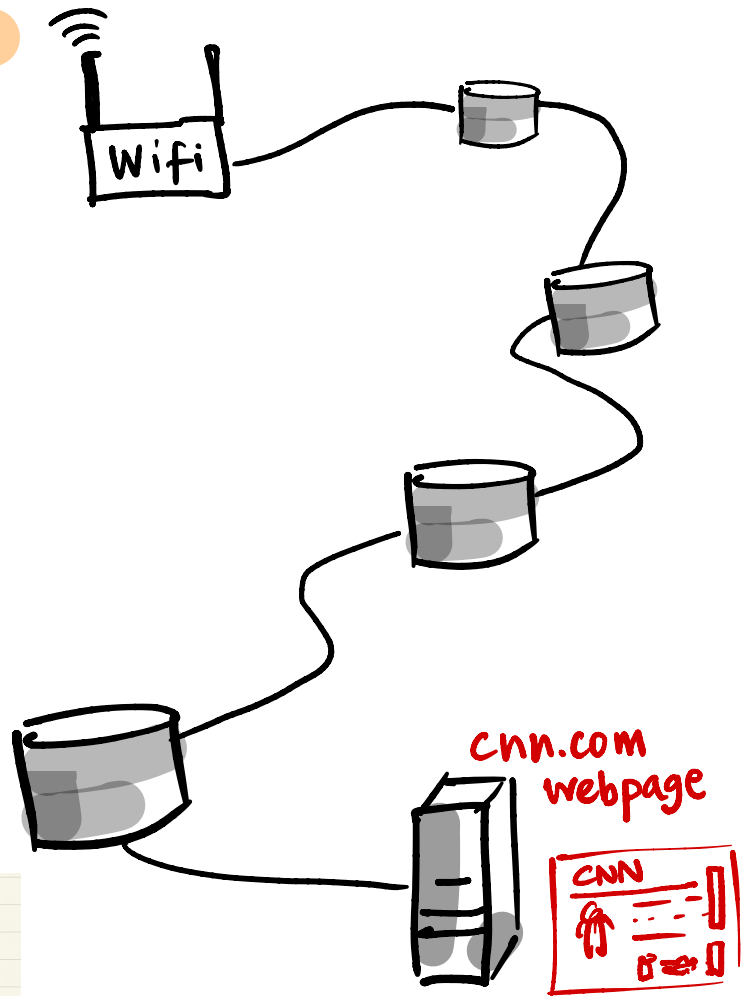


Web Browsing application



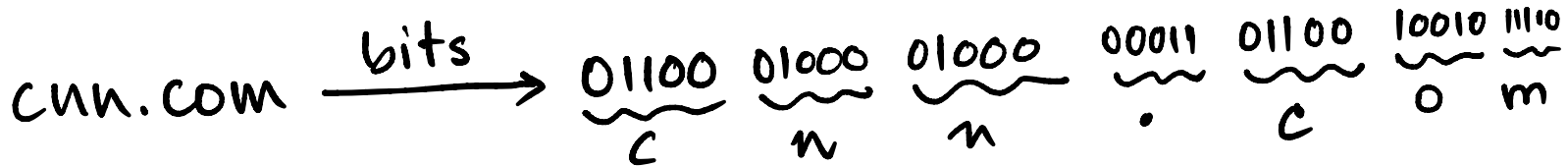
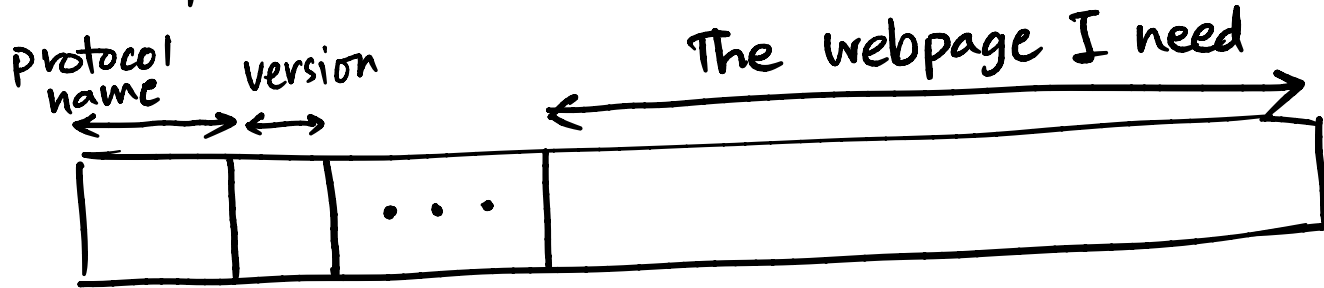
Software inside laptop

step 1: Create a data packet



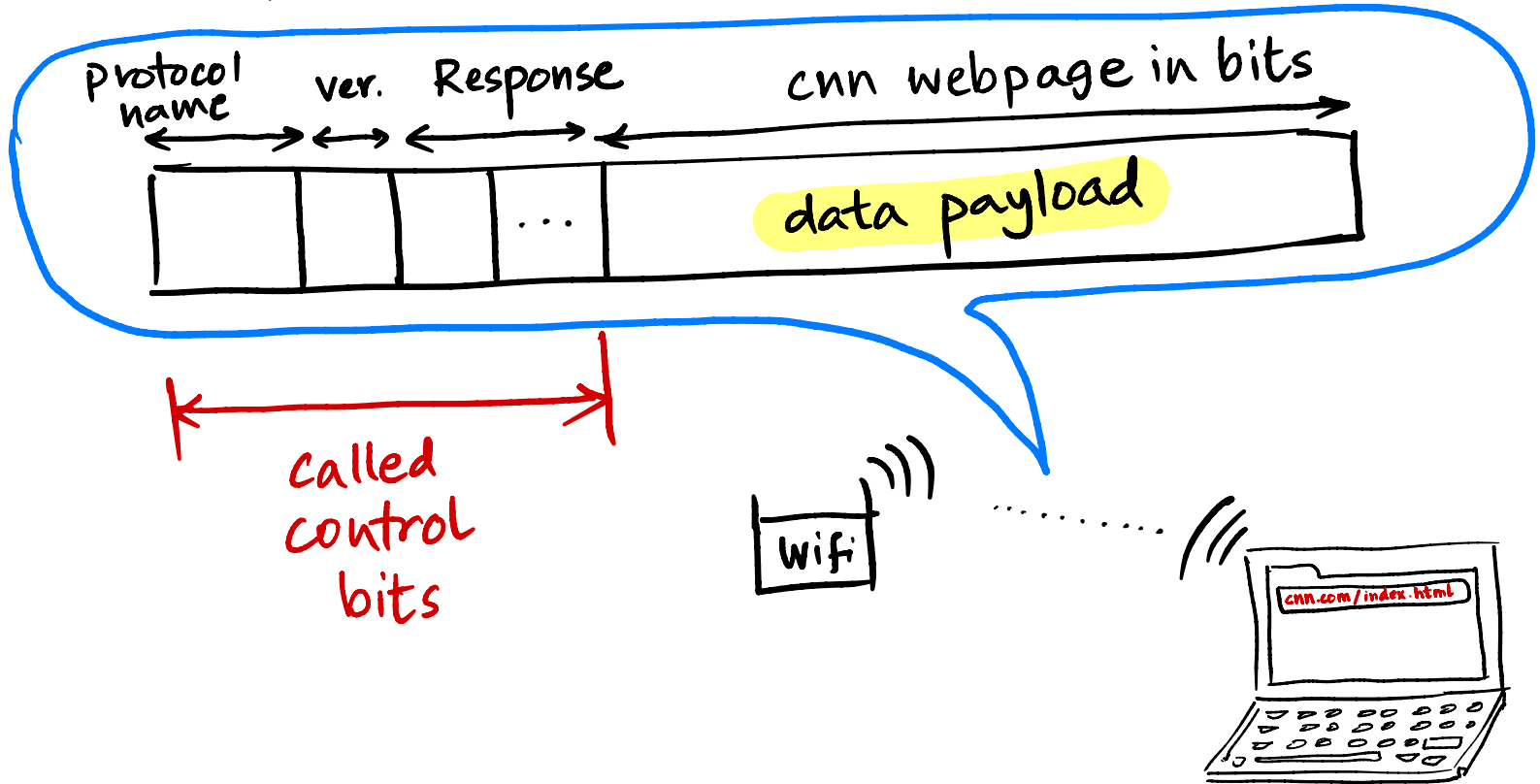
Protocols : HTTP

Data packet : sequence of bits

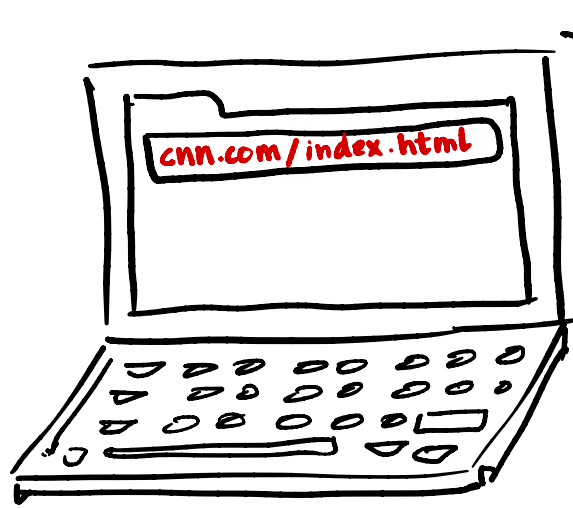


Protocols : HTTP

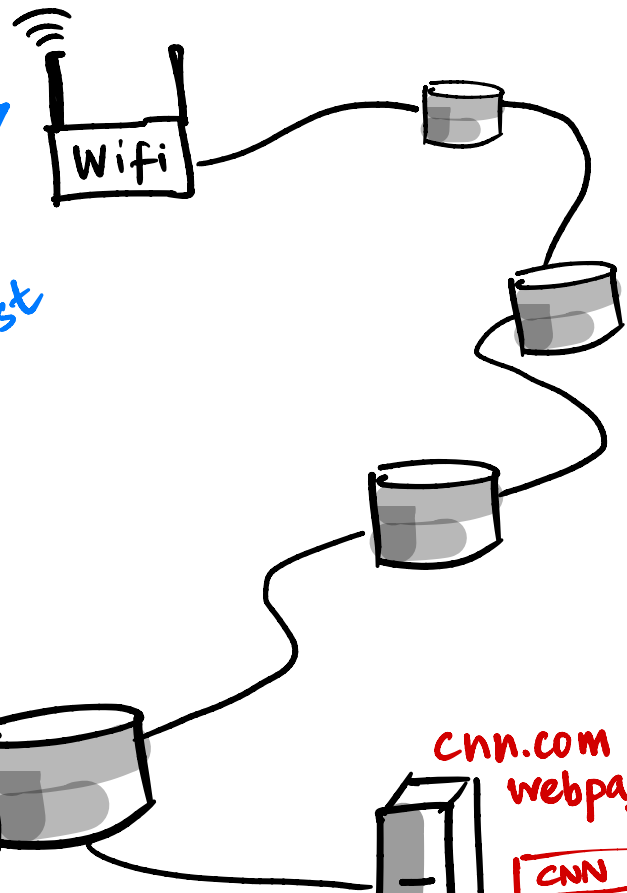
When packet comes back from cnn.com server



Web Browsing application



cnm.com request



Software inside laptop

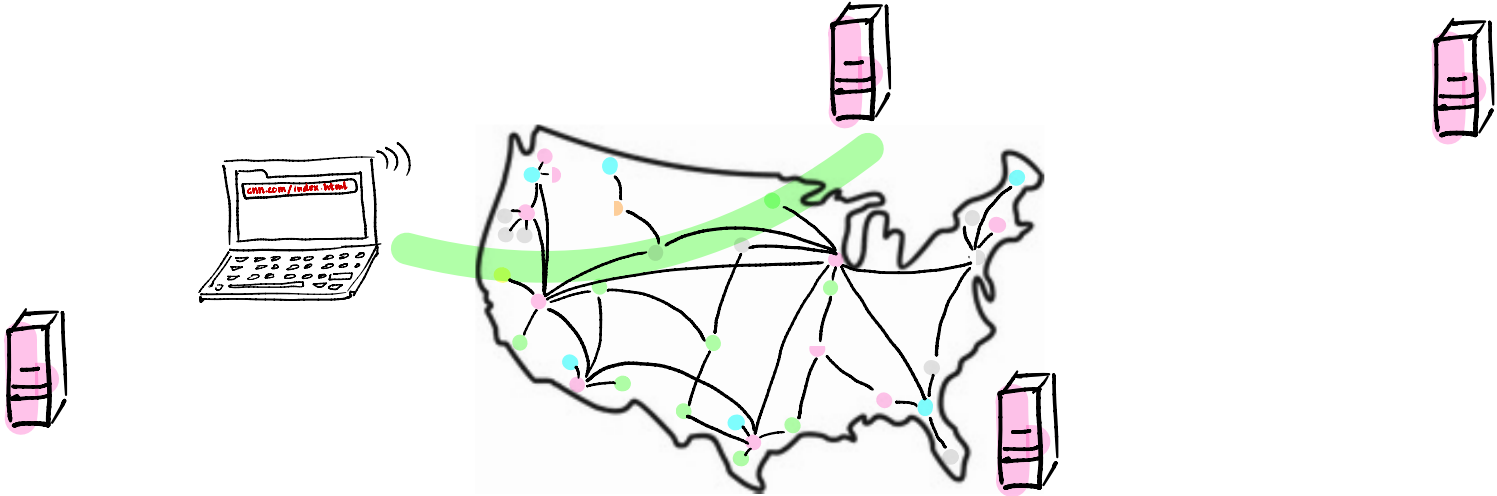
Step 1: Create a data packet

Step 2: But what is the destination address?

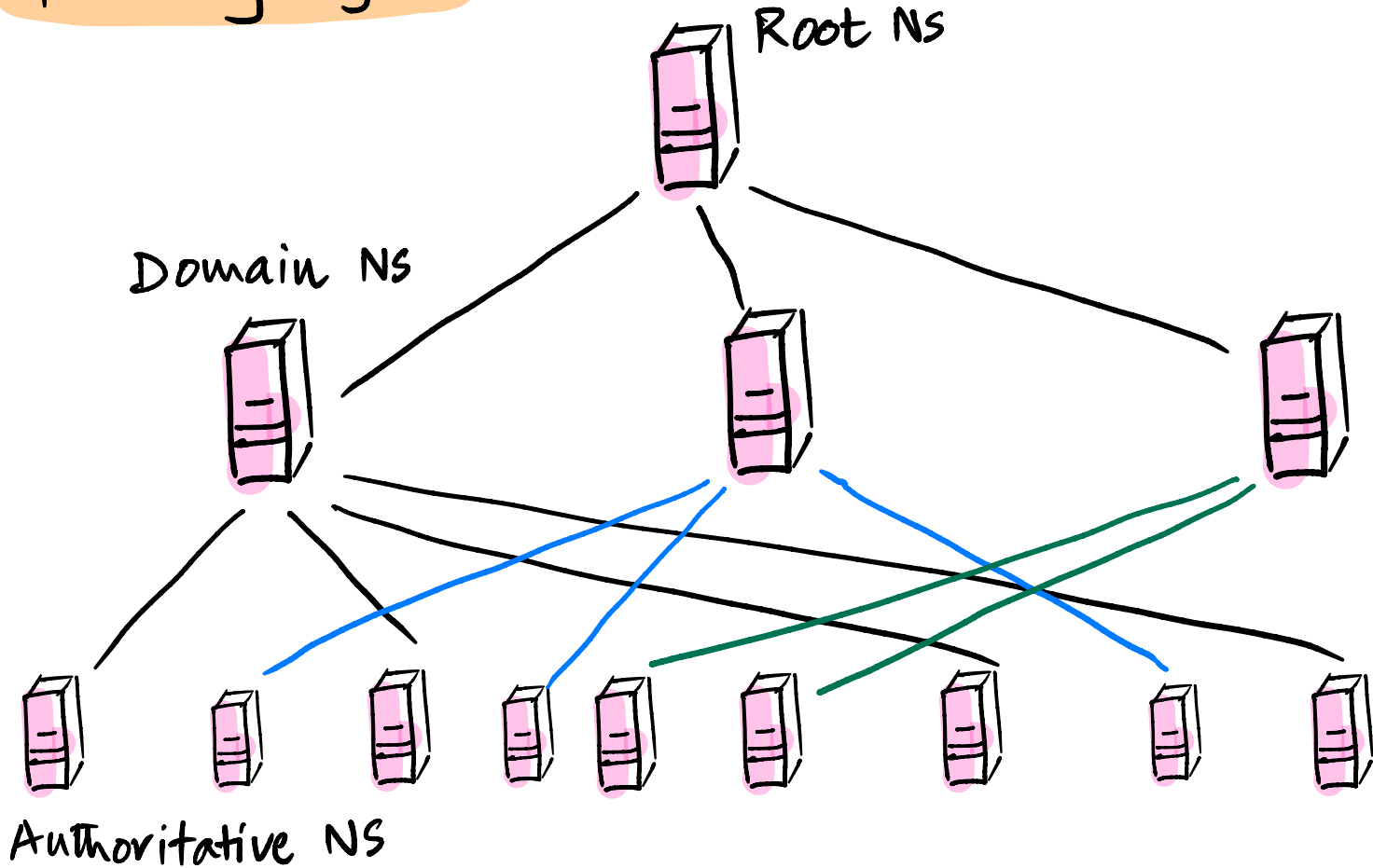


Domain Name Service (DNS)

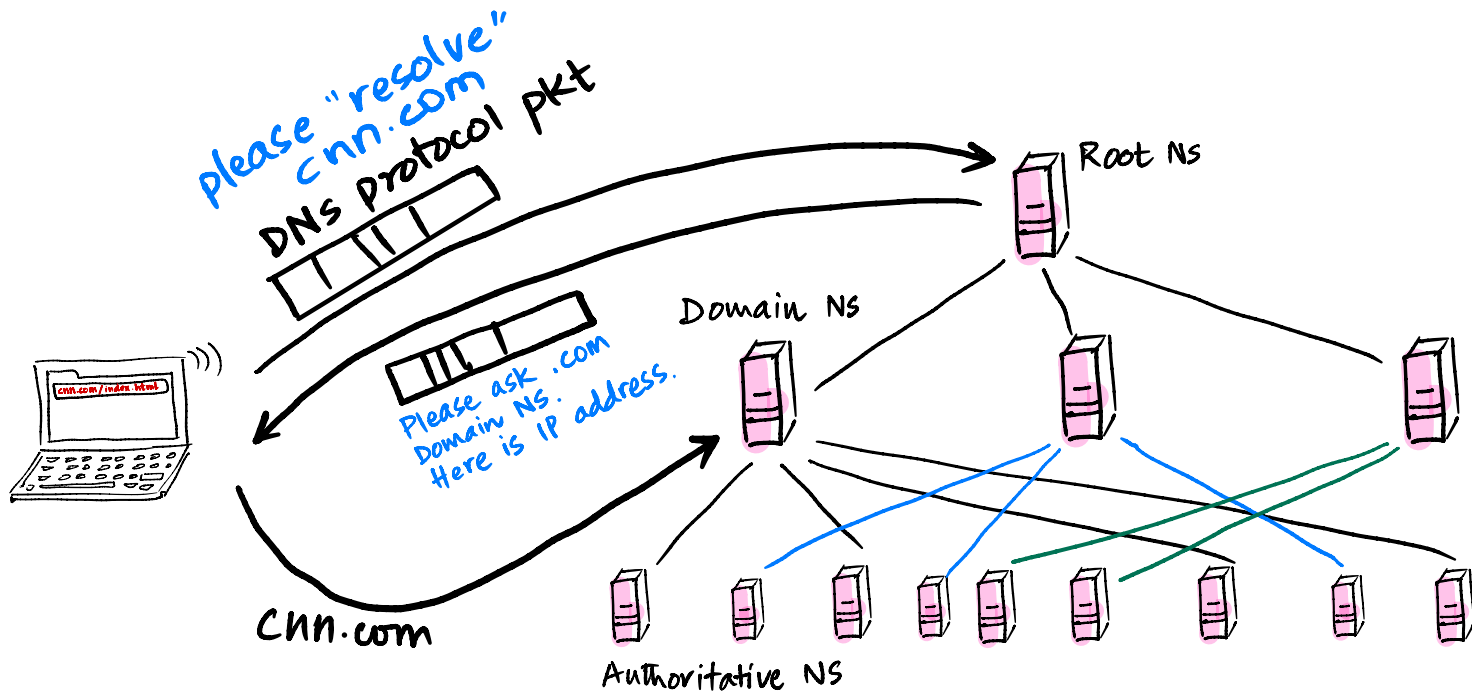
Step 2: Let's ask DNS server for IP address of cnn.com



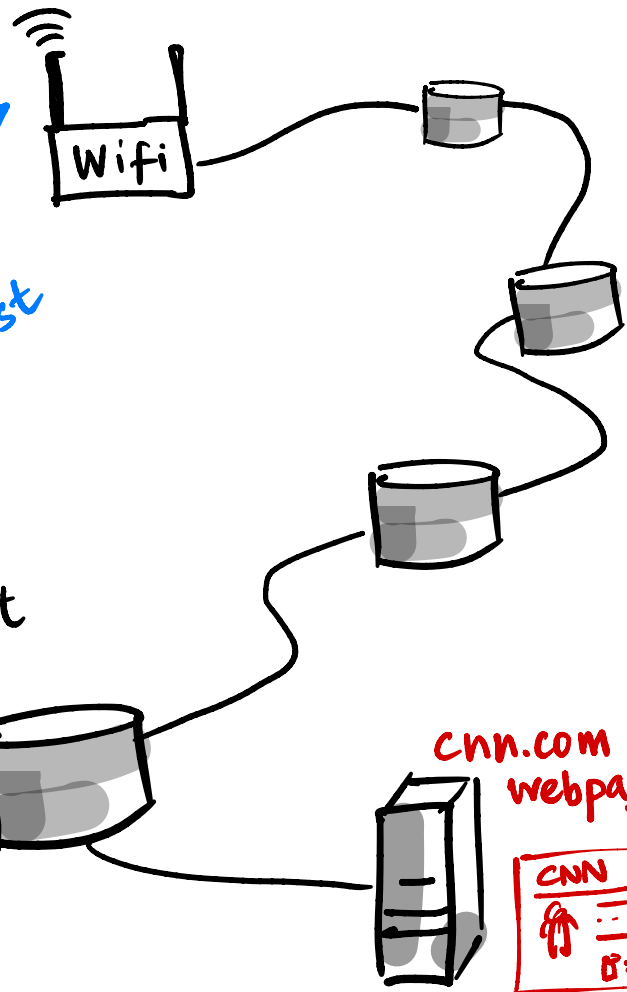
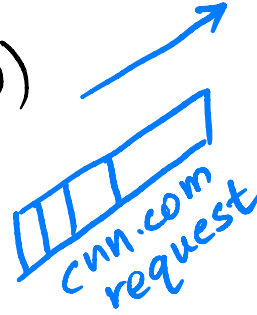
Hierarchy Again



Iterative DNS



Web Browsing application



Software inside laptop

Step 1: Create a **HTTP** request pkt

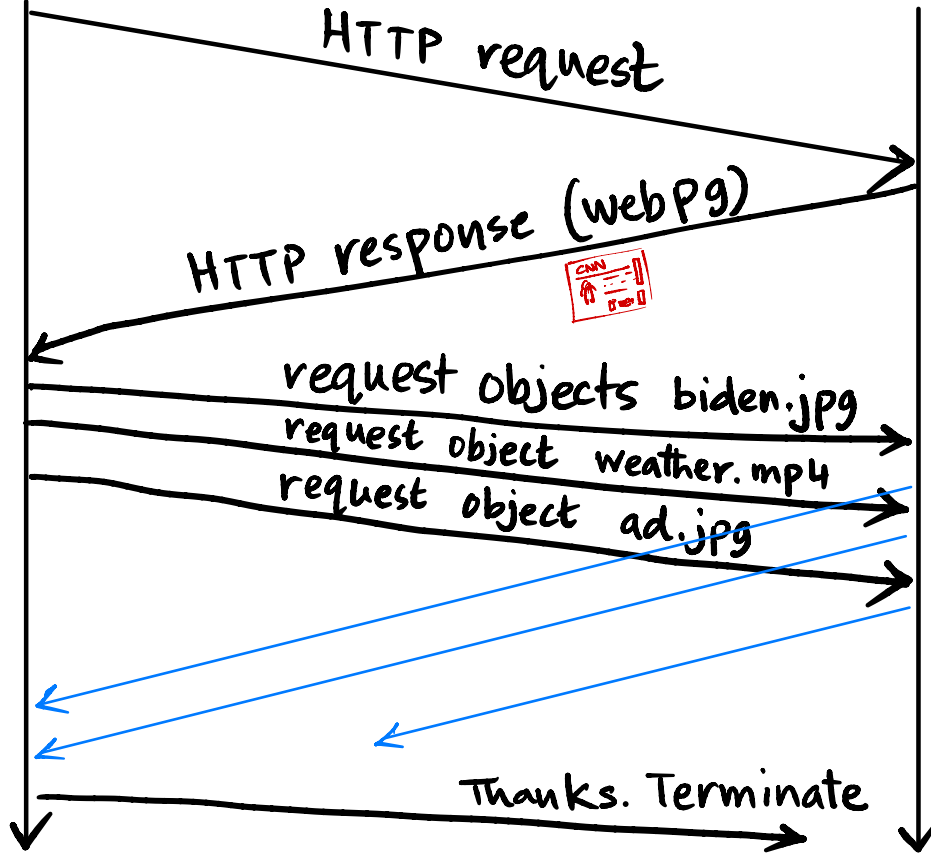
Step 2: Get IP address using **DNS**

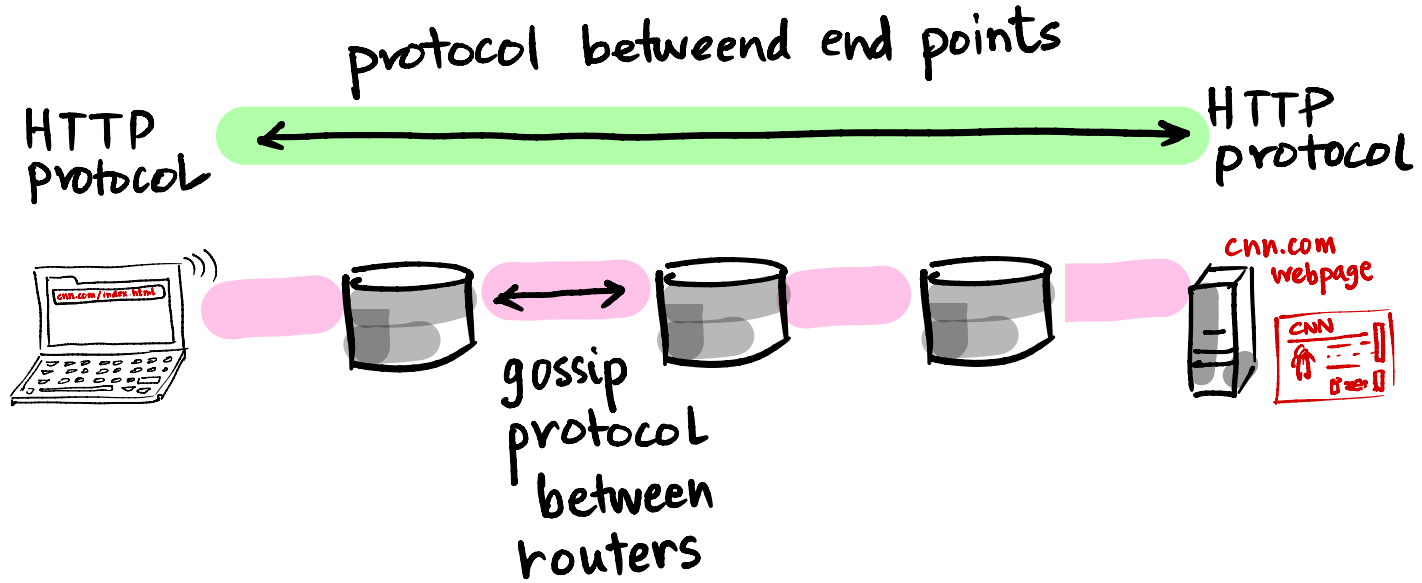
Step 3: Add IP address to the "destination IP" field in packet header

Step 4: Send data packet



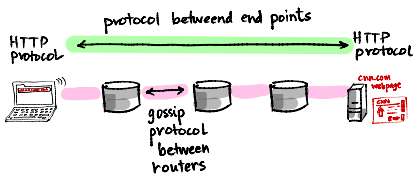
Time
↓





But say your bank balance is sent using HTTP

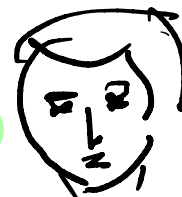
What if packet gets lost?
We Need acknowledgments



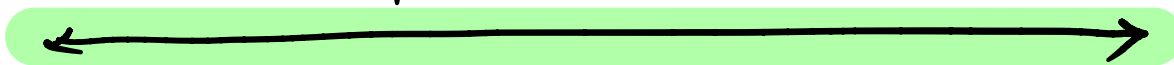
CEO Cook



CEO Musk



important matters



Reliable delivery



unreliable delivery



protocol between end points

HTTP
protocol

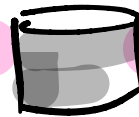


HTTP
protocol

Transport
protocol



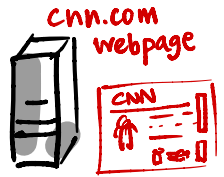
Transport
protocol



cnn.com
webpage

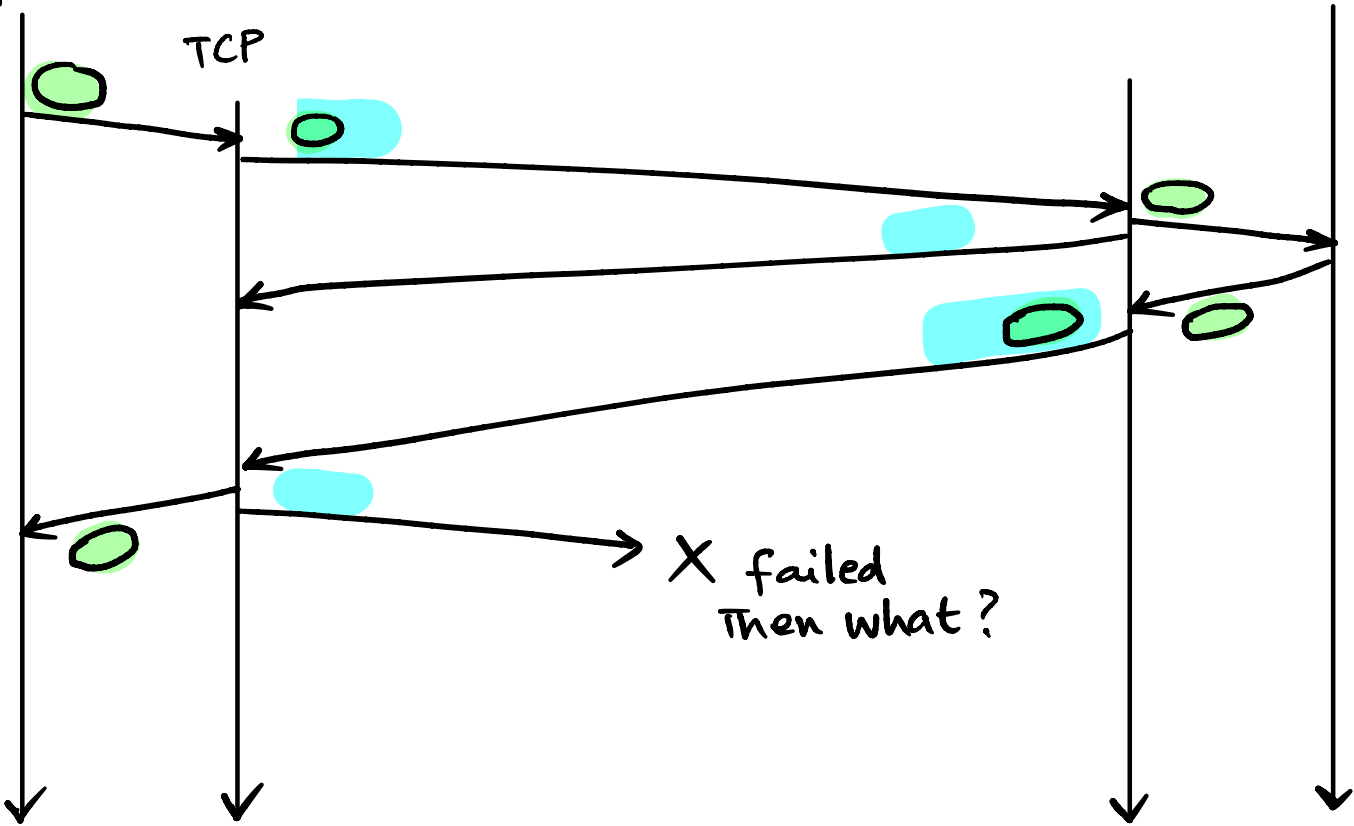


gossip
protocol
between
routers

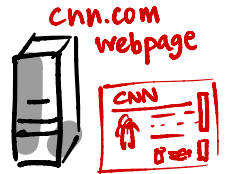


HTTP

TCP



X failed
Then what?



HTTP

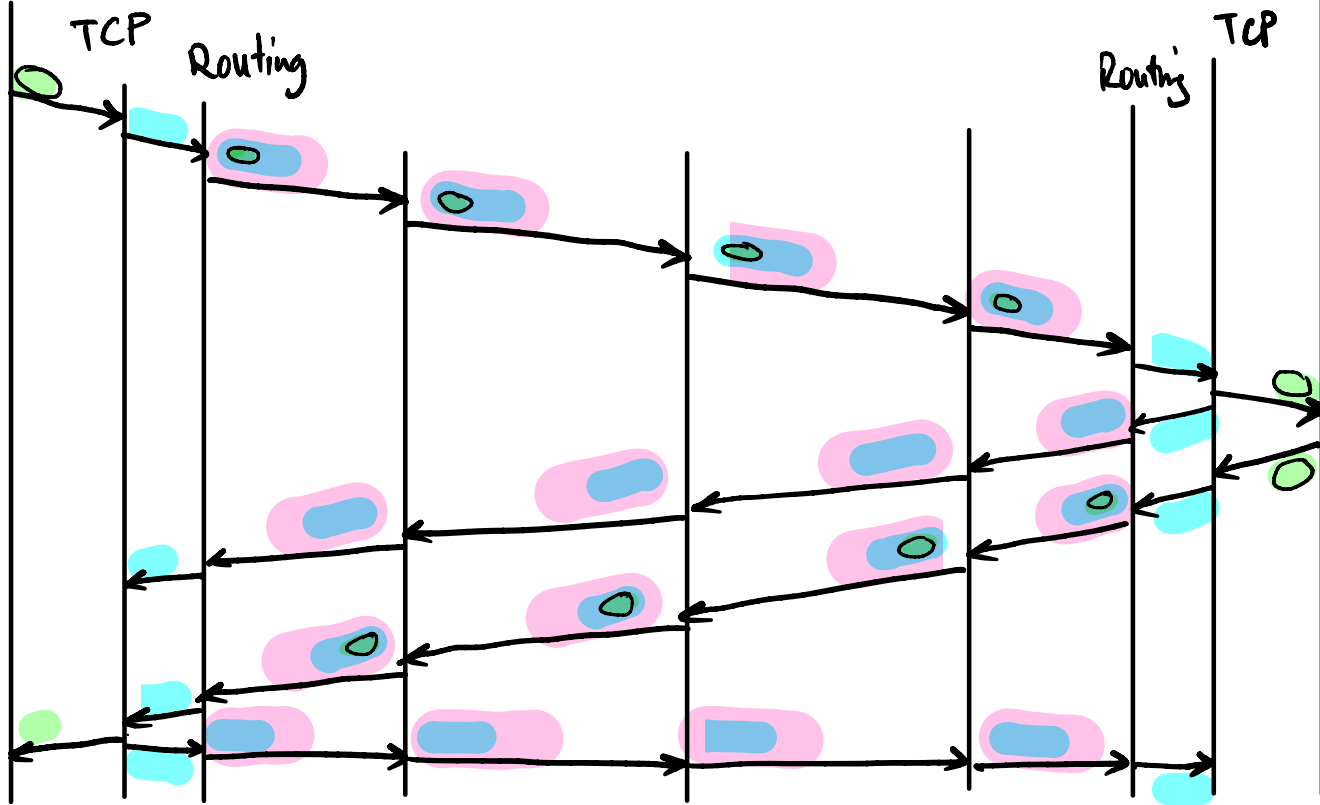
TCP

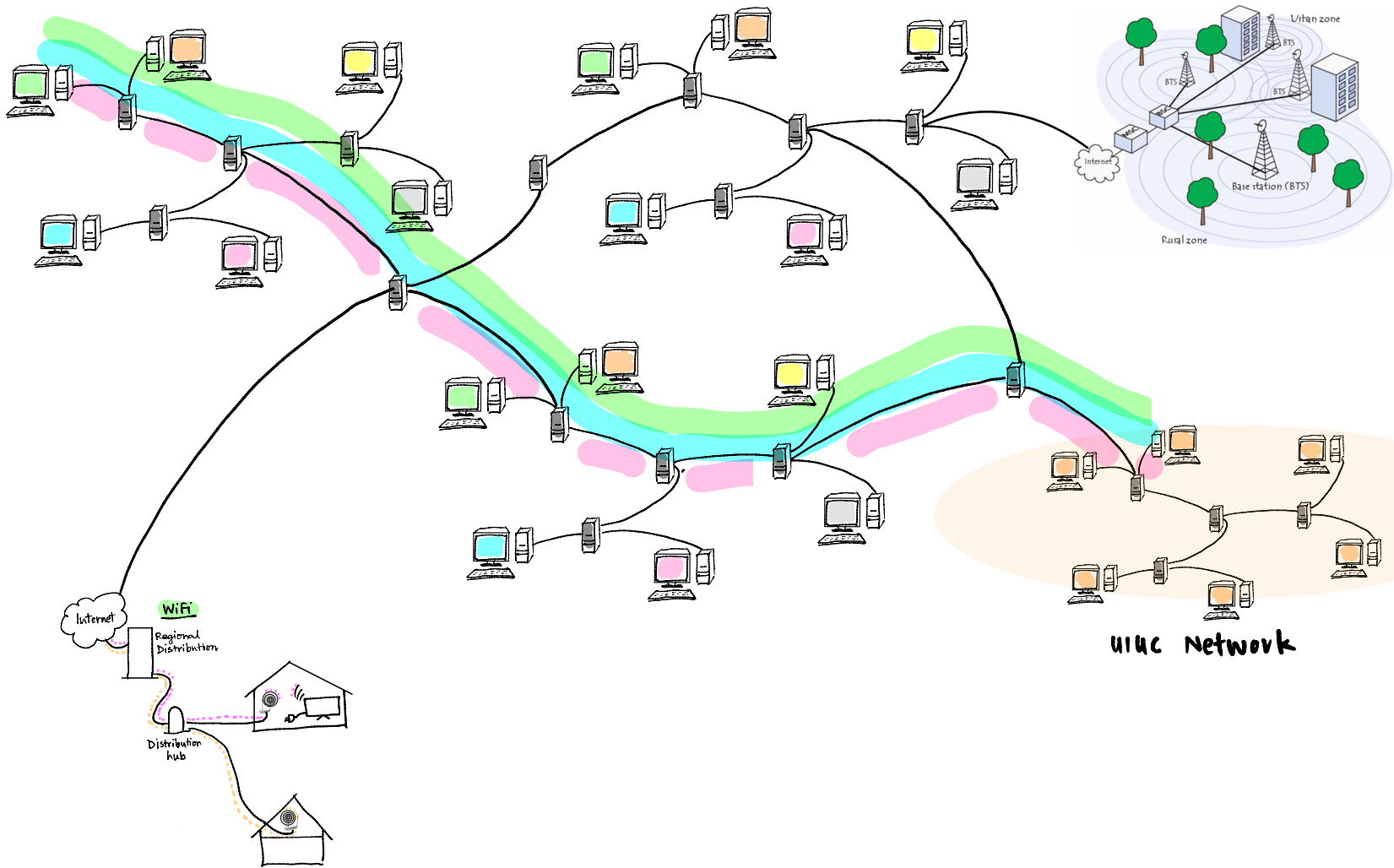
Routing

Routing

TCP

HTTP





Questions?

The word "Questions?" is written in a light green, rounded, hand-drawn font. The letter 'Q' is significantly larger than the other letters. There are two decorative circles: a small one above the 'i' and a larger one to the right of the 's'. Each circle consists of a light blue center, a darker blue ring, and a pink outer ring.