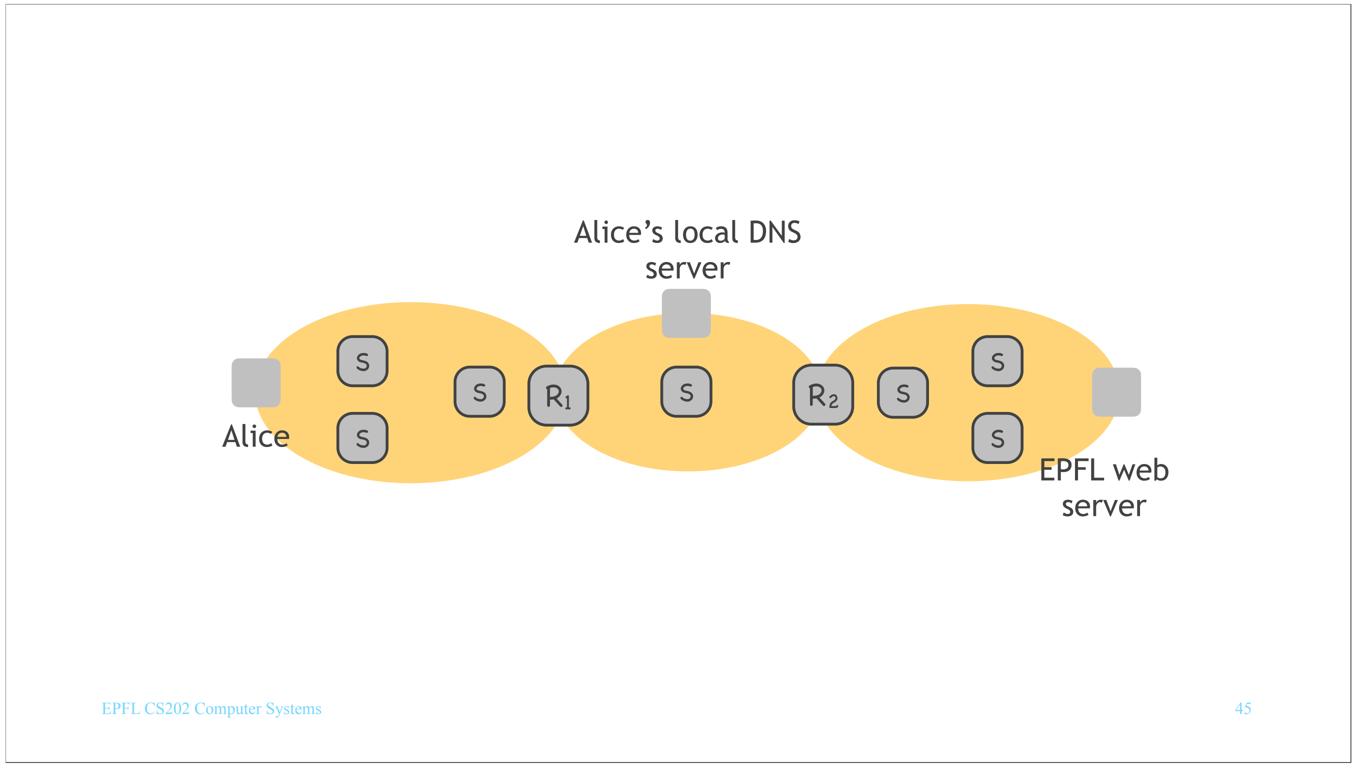
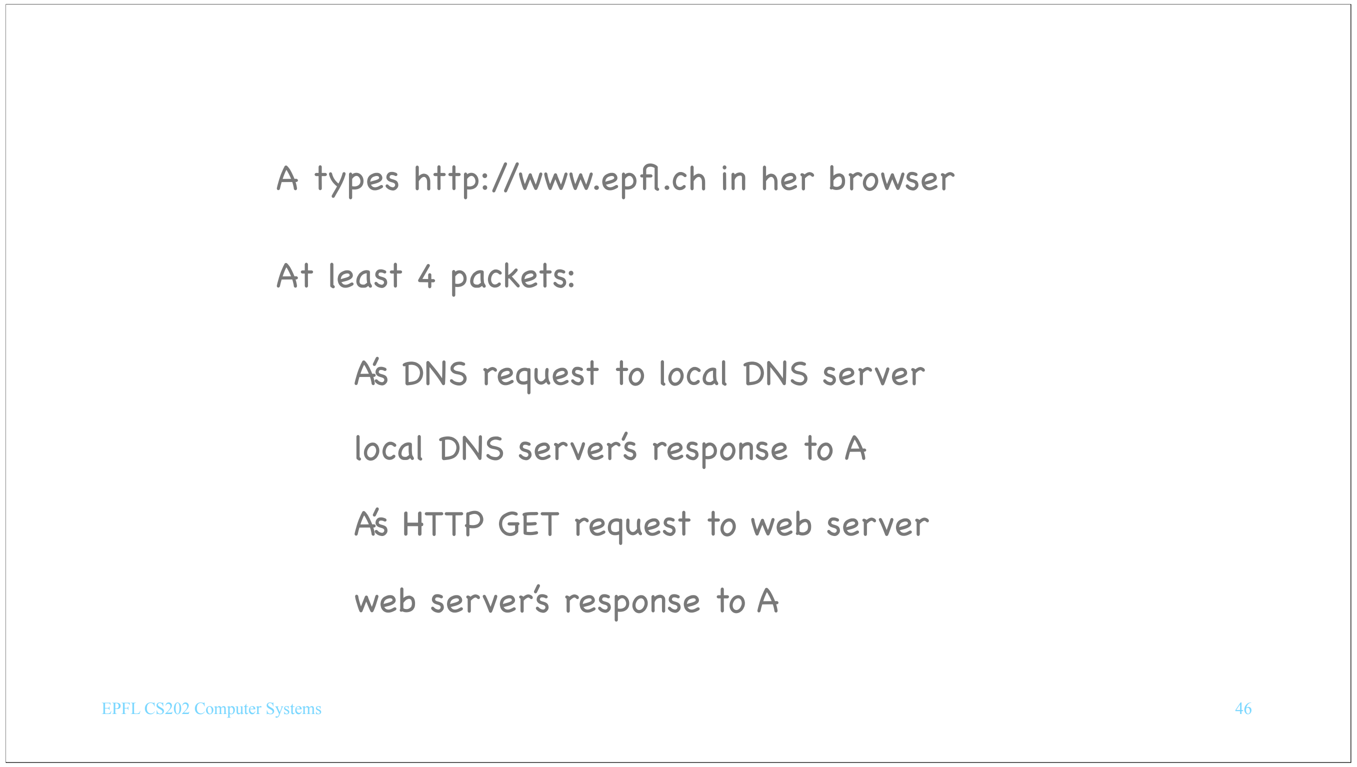


Now we will try to “put it all together,” i.e., discuss what happens from beginning to end, when an Internet end-system sends a packet to another Internet end-system.

Consider the topology shown above.

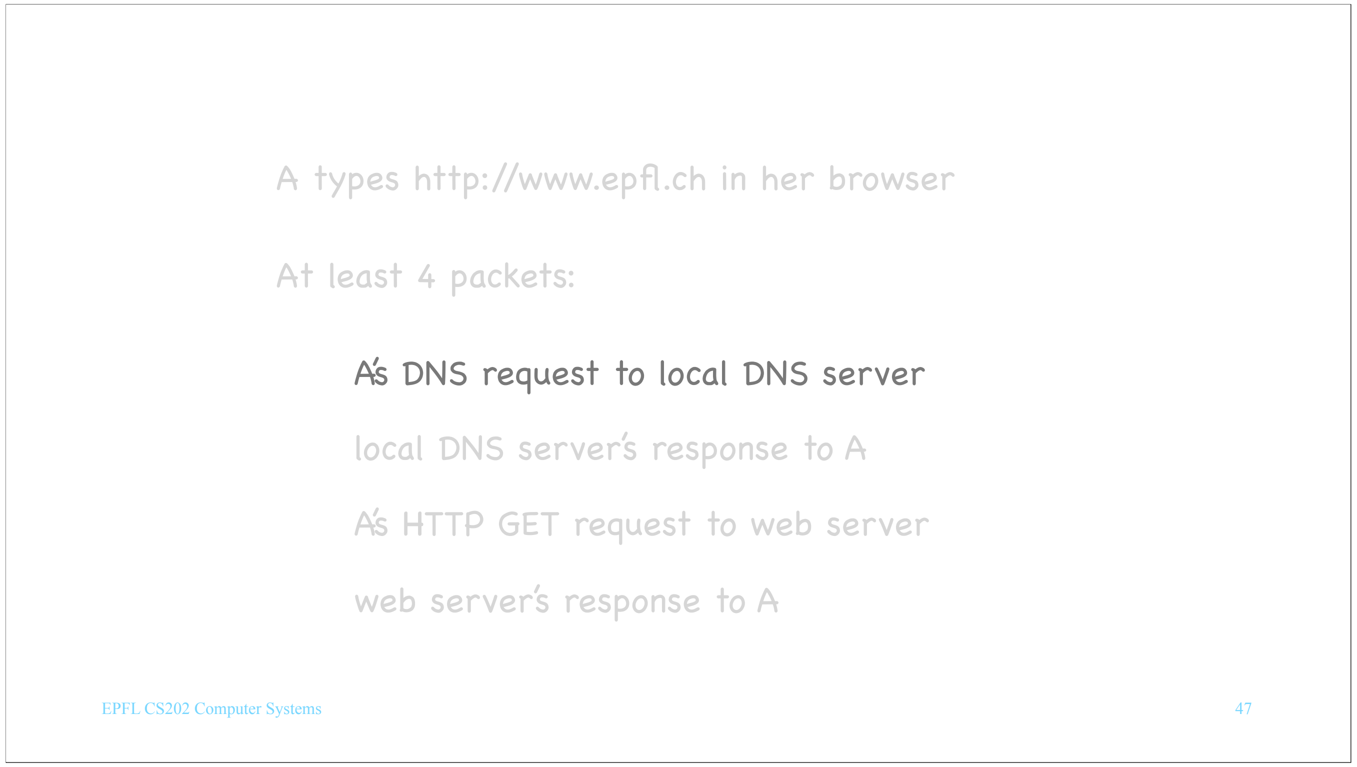


A types http://www.epfl.ch in her browser

At least 4 packets:

- A’s DNS request to local DNS server
- local DNS server’s response to A
- A’s HTTP GET request to web server
- web server’s response to A

Suppose Alice (A) types a URL in her web browser.
This results in at least 4 packets (without counting the TCP connection setup)…



A types http://www.epfl.ch in her browser

At least 4 packets:

- A's DNS request to local DNS server
- local DNS server's response to A
- A's HTTP GET request to web server
- web server's response to A

We will focus on one single packet: The DNS request that Alice sends to her local DNS server to obtain the IP address of the EPFL web server.

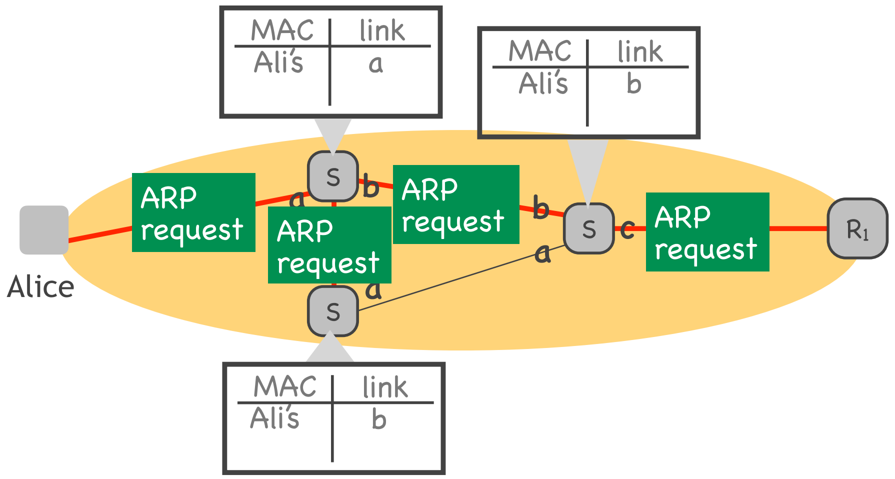
1. A’s DNS client process creates DNS request

2. Passed down to transport, network layer
   - IP src: A’s IP address
   - IP dst: local DNS server’s IP address

3. A’s network layer sends ARP request
   - to resolve DNS server’s IP address

src MAC: Alice's

dst MAC: broadcast

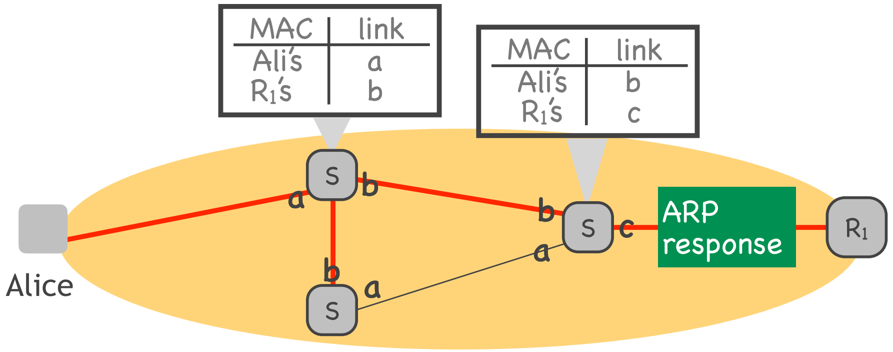


MAC	link
Ali's	a

MAC	link
Ali's	b

MAC	link
Ali's	b

4. R_1's network layer sends ARP response



src MAC: R_1's

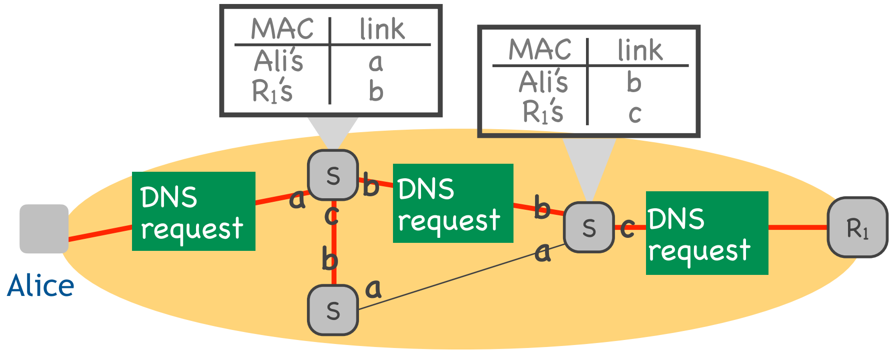
dst MAC: Alice's

5. A's network layer sends DNS request

- it now knows what dst MAC address to use

src MAC: Alice's
dst MAC: R_1's

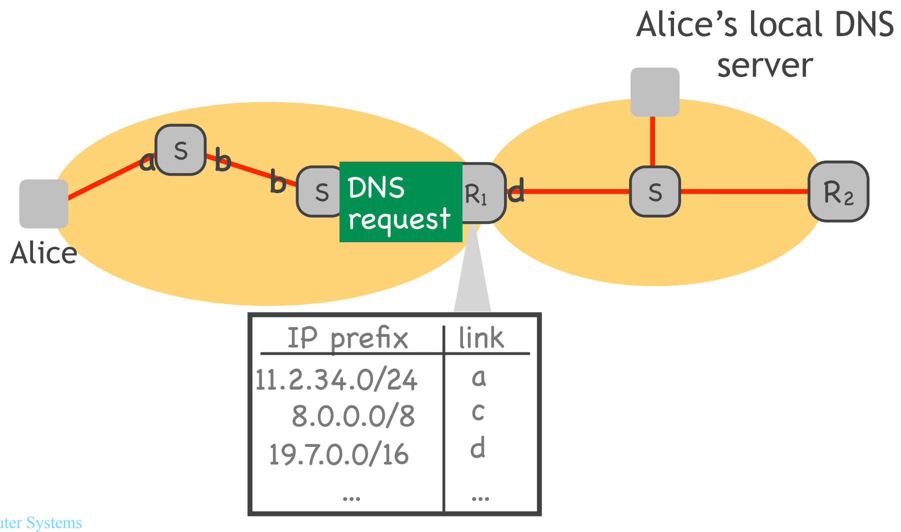
src IP: Alice's
dst IP: DNS server's



MAC	link
Ali's	a
R_1's	b

MAC	link
Ali's	b
R_1's	c

6. R_1's network layer performs IP forwarding



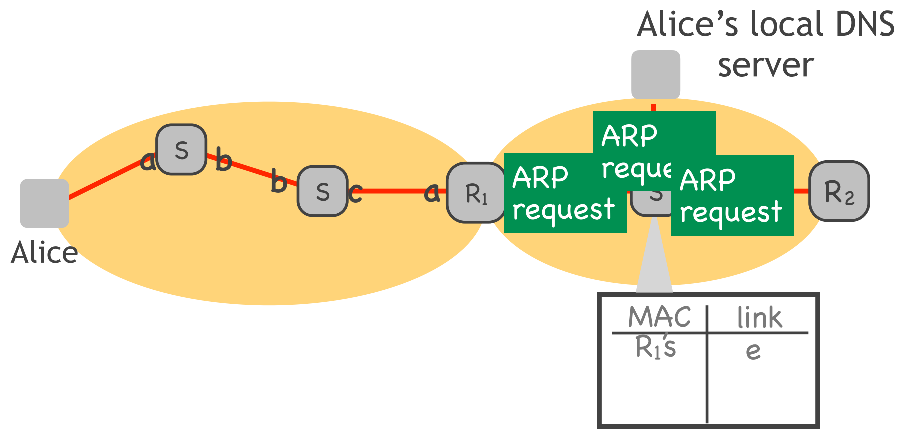
IP prefix	link
11.2.34.0/24	a
8.0.0.0/8	c
19.7.0.0/16	d
...	...

7. R_1's network layer sends ARP request

- to resolve DNS server's IP address

src MAC: R_1's

dst MAC: broadcast

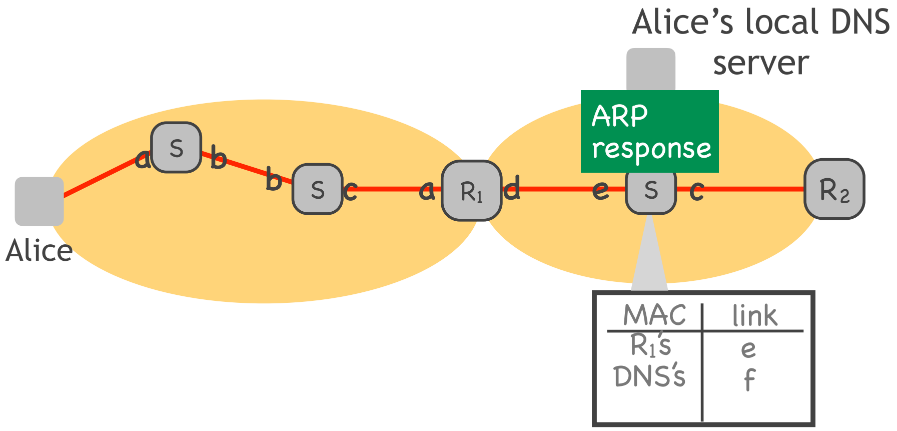


MAC	link
R_1's	e

8. DNS server's network layer sends ARP response

src MAC: DNS server's

dst MAC: R_1's



MAC	link
R_1's	e
DNS's	f