Communication Networks

Spring 2022

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http://comm-net.ethz.ch/

ETH Zürich

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A typical exercise session

interactive part
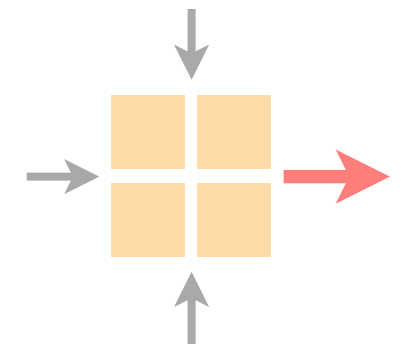let us know your topic preferences

exercise overview
brief overview + hints

time to solve the exercise
we are available on Slack/in-person

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Playing with network tools

Interactive questions

Exercise overview

Time to solve tasks

Important network tools

Is a destination reachable?   ping
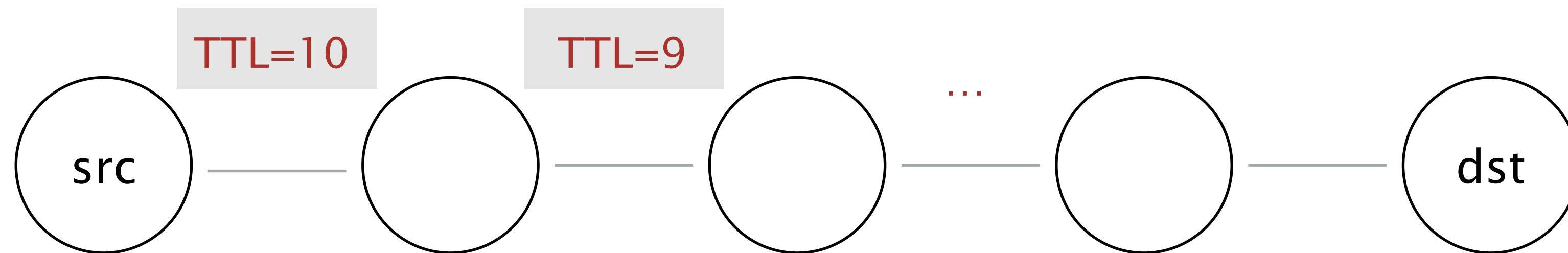
What is the path to the dst?   traceroute
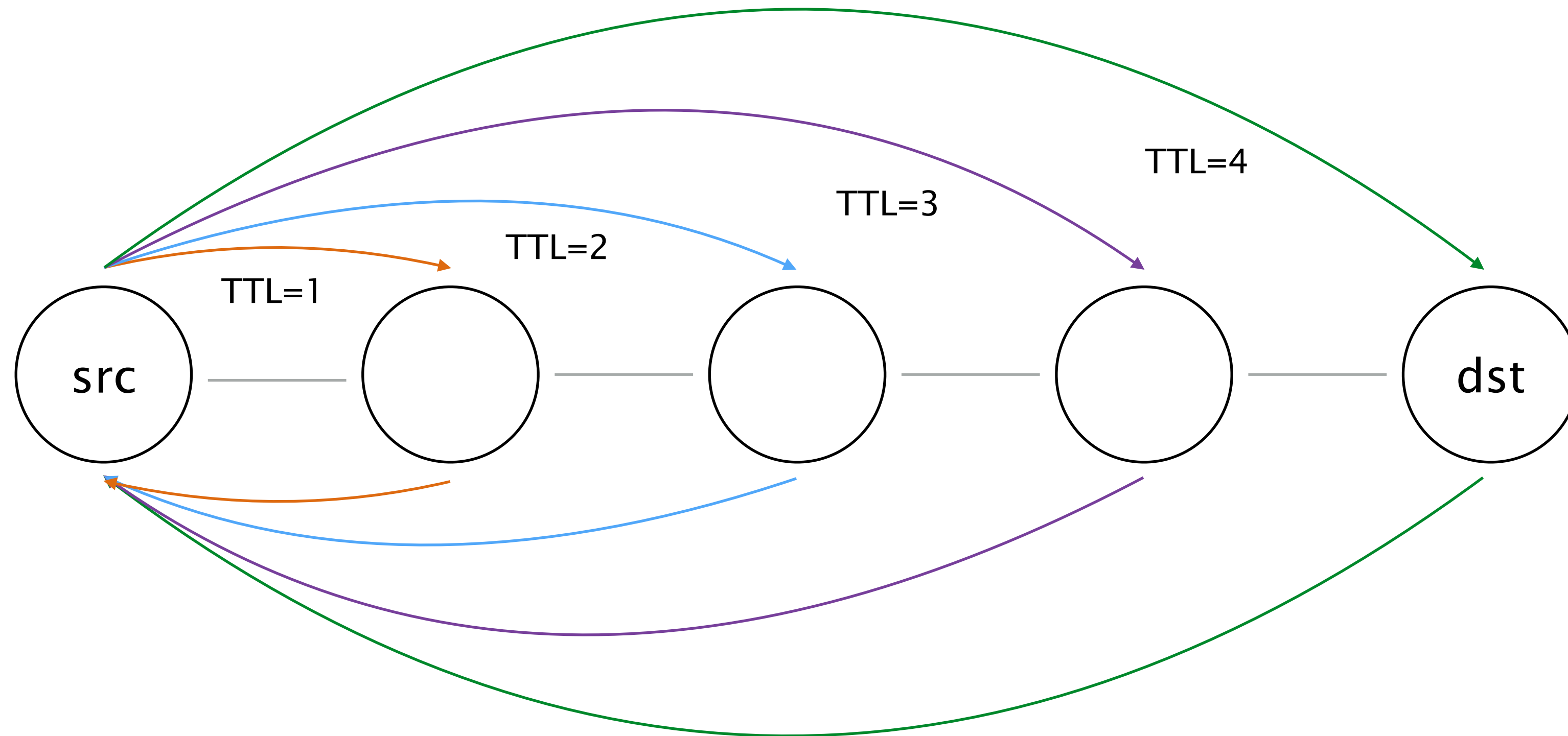
What is the IP of a domain?   dig

What packets does a device send?   Wireshark

The Time-To-Live (TTL)
decreases by 1 per hop

TTL=10

TTL=9

src — ○ — ○ ... ○ — dst

traceroute finds the path
thanks to expiring TTLs
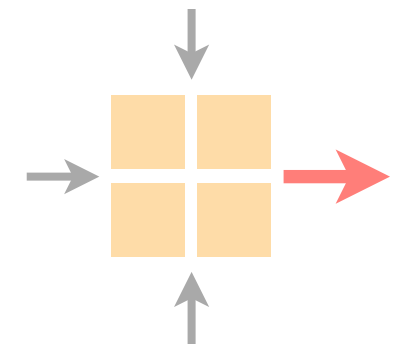
traceroute's method
has some "problems"

non-answering devices

different fwd/bwd paths

multiple possible parallel paths

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Packet-switching relies on buffers.

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Tier-3 ASes can provide transit.

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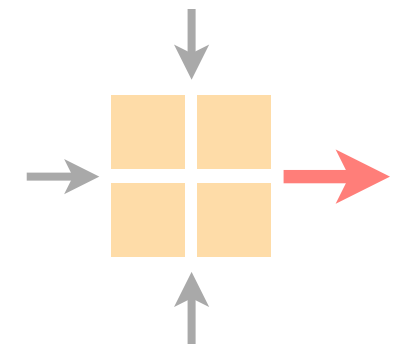
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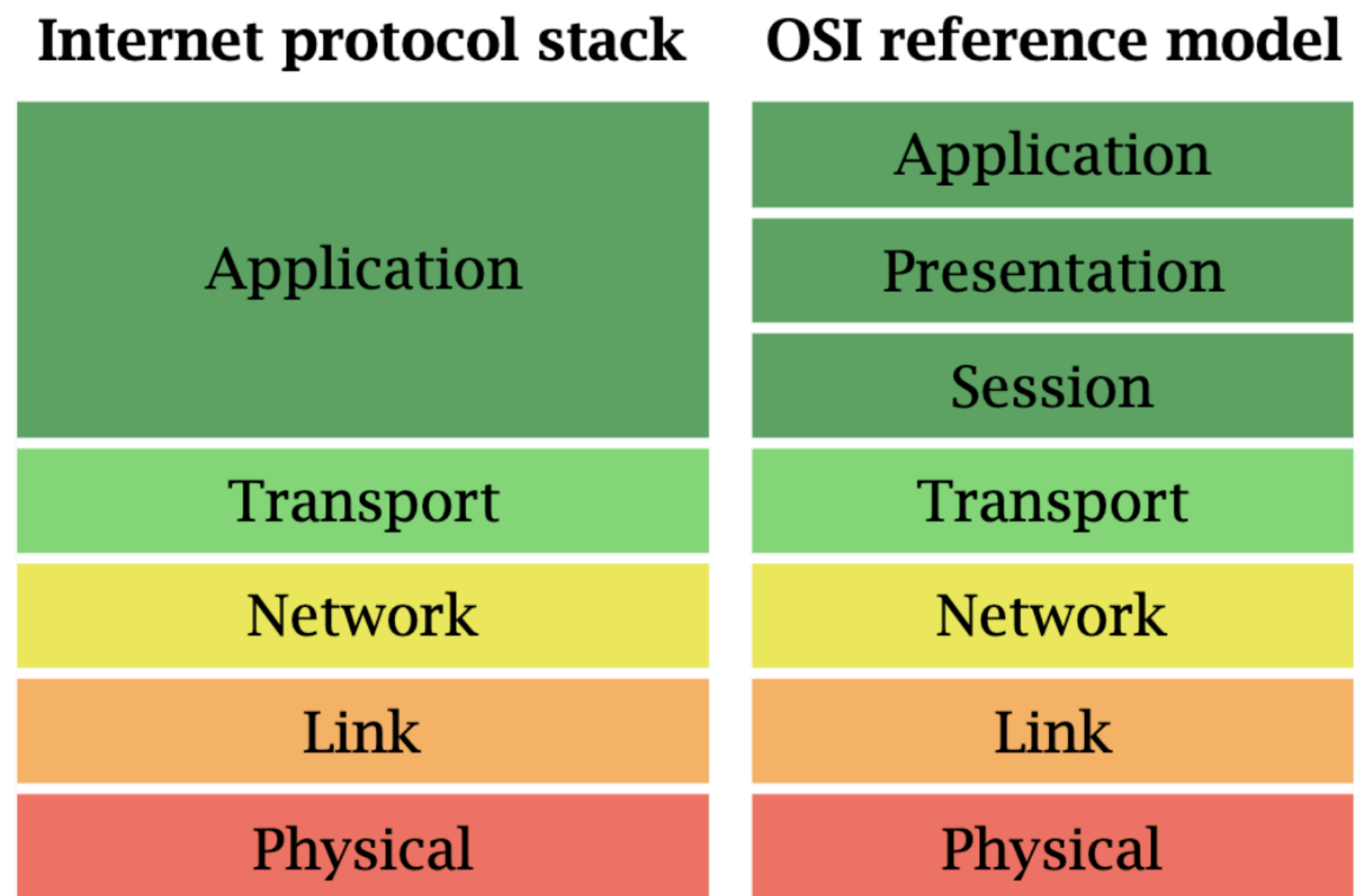Spring 2022

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Task 1
Layer Model
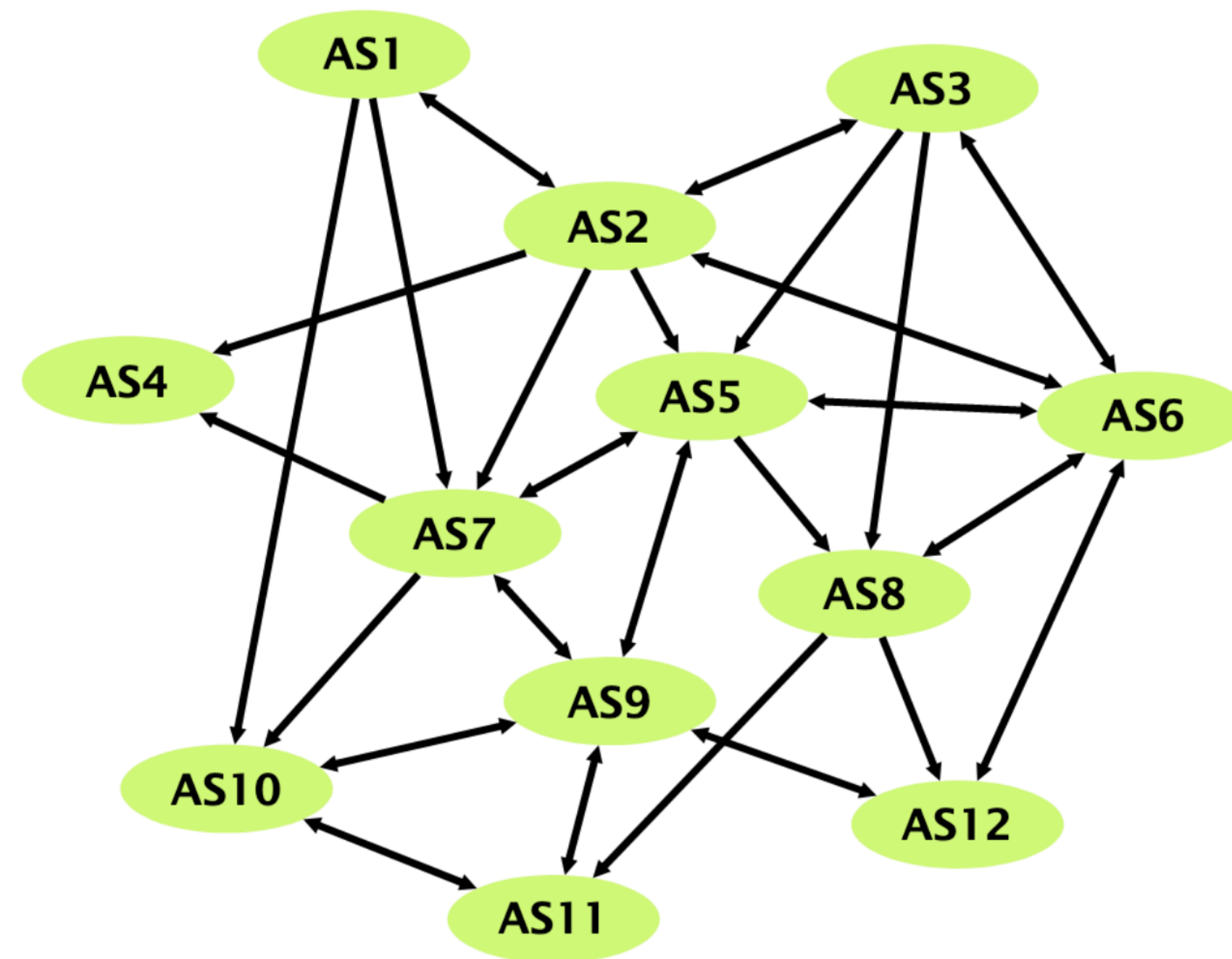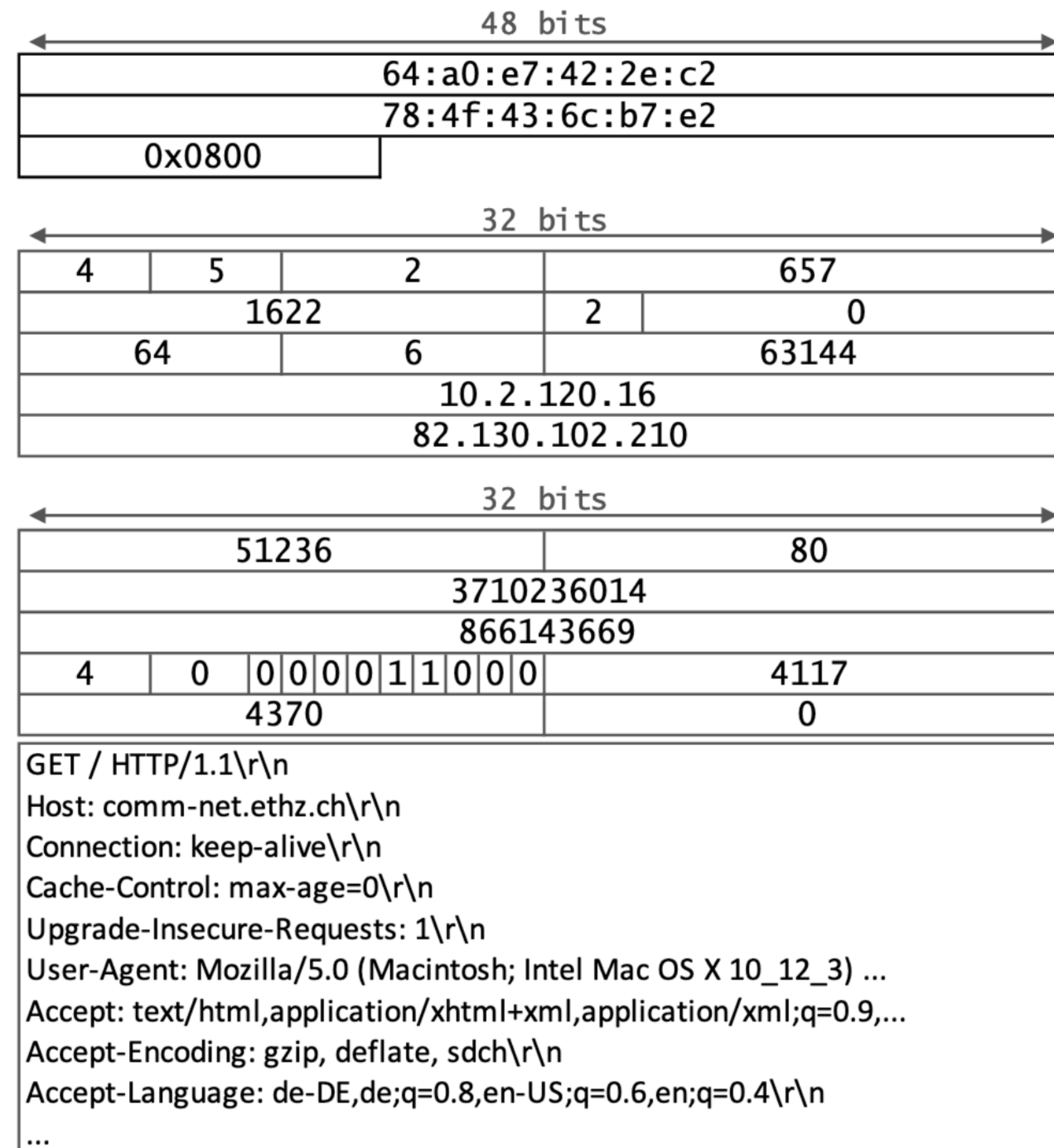
Internet protocol stack	OSI reference model
	Application
Application	Presentation
	Session
Transport	Transport
Network	Network
Link	Link
Physical	Physical

Task 2

Internet Organization

Internet Communication

48 bits

64:a0:e7:42:2e:c2
78:4f:43:6c:b7:e2

0x0800

32 bits

4	5	2	657
1622		2	0
64	6		63144
10.2.120.16			
82.130.102.210			

32 bits

51236	80
3710236014	
866143669	
4 0 0 0 0 0 0 1 1 0 0 0	4117
4370	0

```
GET / HTTP/1.1\r\n
Host: comm-net.ethz.ch\r\n
Connection: keep-alive\r\n
Cache-Control: max-age=0\r\n
Upgrade-Insecure-Requests: 1\r\n
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_12_3) …
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,…
Accept-Encoding: gzip, deflate, sdch\r\n
Accept-Language: de-DE,de;q=0.8,en-US;q=0.6,en;q=0.4\r\n
…
```

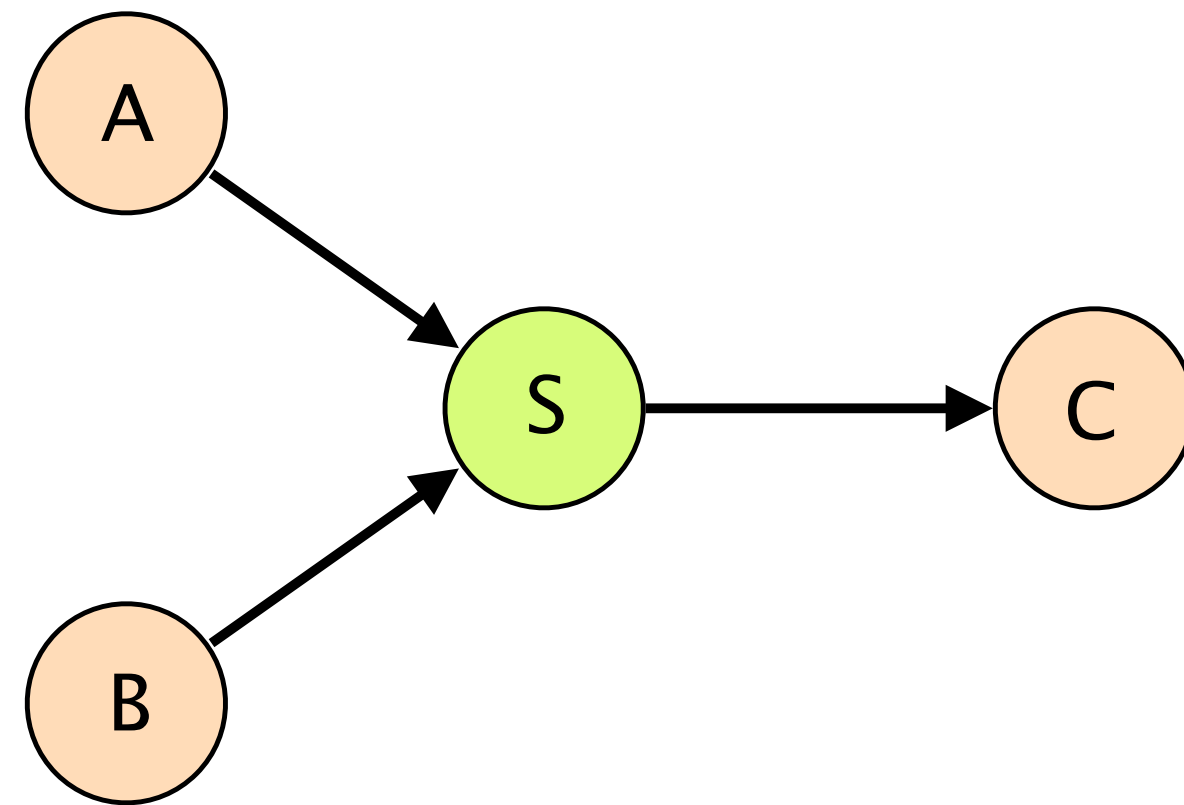# Network Characterization

vs.

vs.

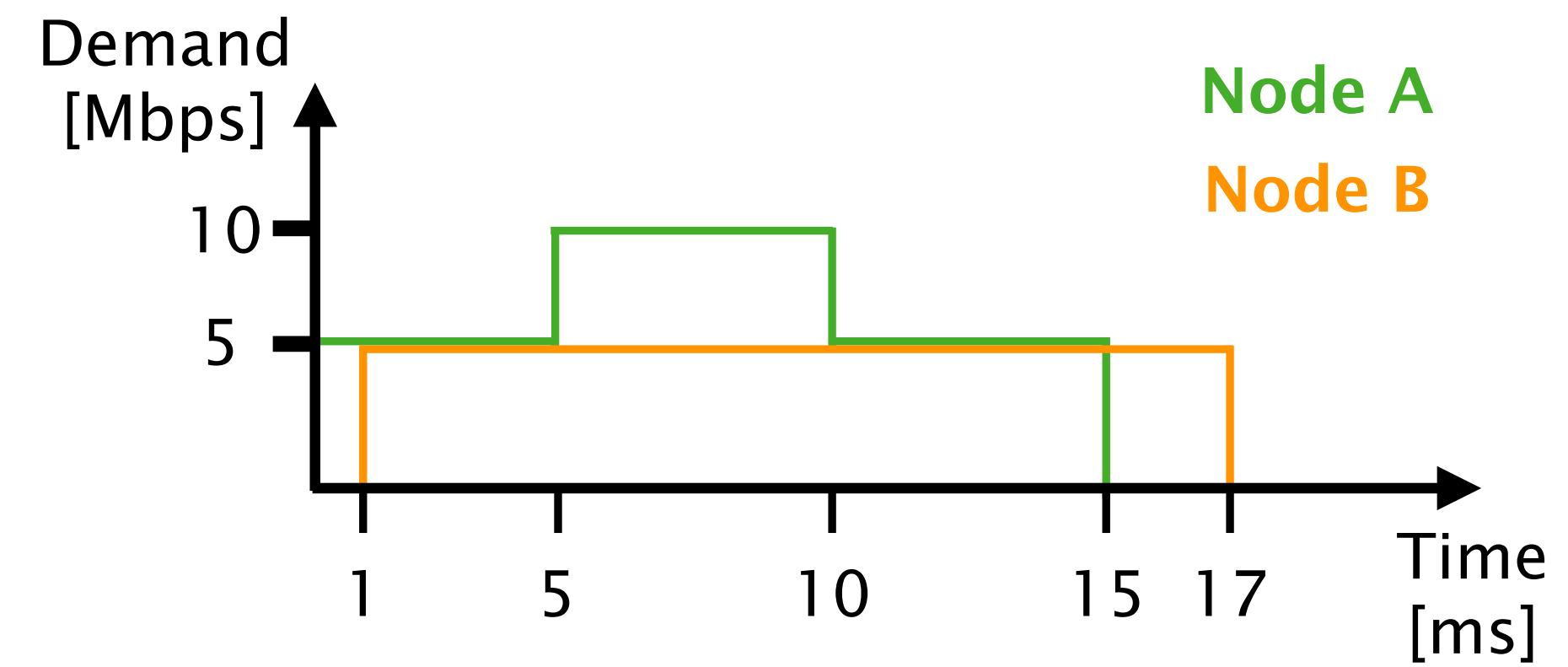Delay? Bandwidth?

Task 5
Types of Delay
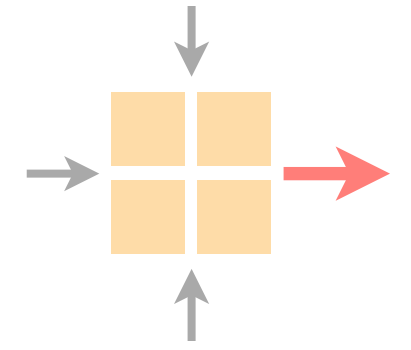
Packet vs. Circuit Switching

Network with a shared link

Different traffic demands

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