Communication Networks

Spring 2020

Coralie Busse-Grawitz
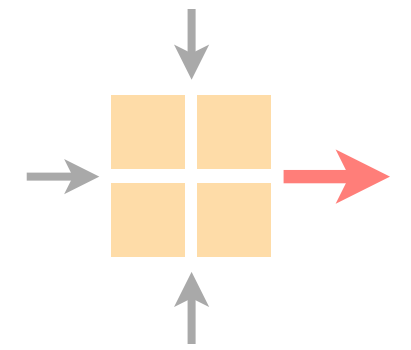
http://comm-net.ethz.ch/

ETH Zürich

28 May 2020

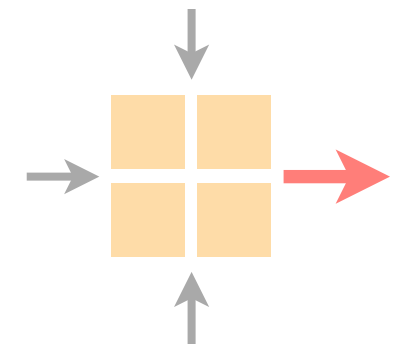# Communication Networks

Spring 2020

Exercise overview

Old exam question

Exam preparation

Communication Networks

Spring 2020

Exercise overview

Old exam question

Exam preparation

Task 1
NAT (Exam Question 2018)

10.0.0.11

10.0.0.12

NAT

1.2.3.4

5.6.7.8
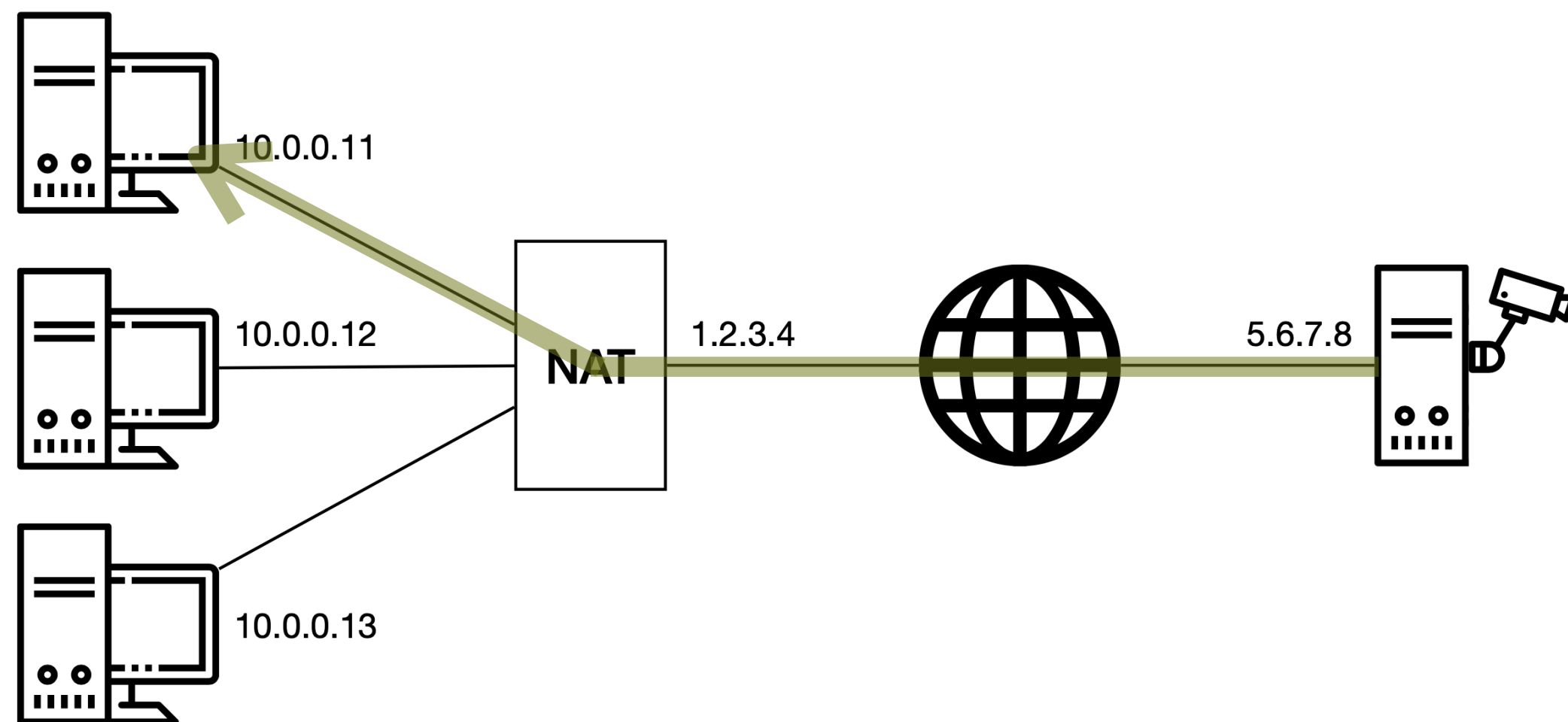
10.0.0.13

Alice has a camera and servers.

How can she receive the video stream on her PC with address 10.0.0.11 and at port 1234?

Task 2
IPv6 Computations

#Hosts in one IPv6 /64 network
vs. all of IPv4

IPv6 simplified notation

IPv6 longest prefix

Putting Everything Together (v6)

2000:0:0:36::10/64

Your laptop just rebooted…

How does it get a link-local and global unicast IPv6 address for one of its interfaces?

Communication Networks

Spring 2020

Exercise overview

Old exam question

Exam preparation

2017: Task 5 d)
Loading a website

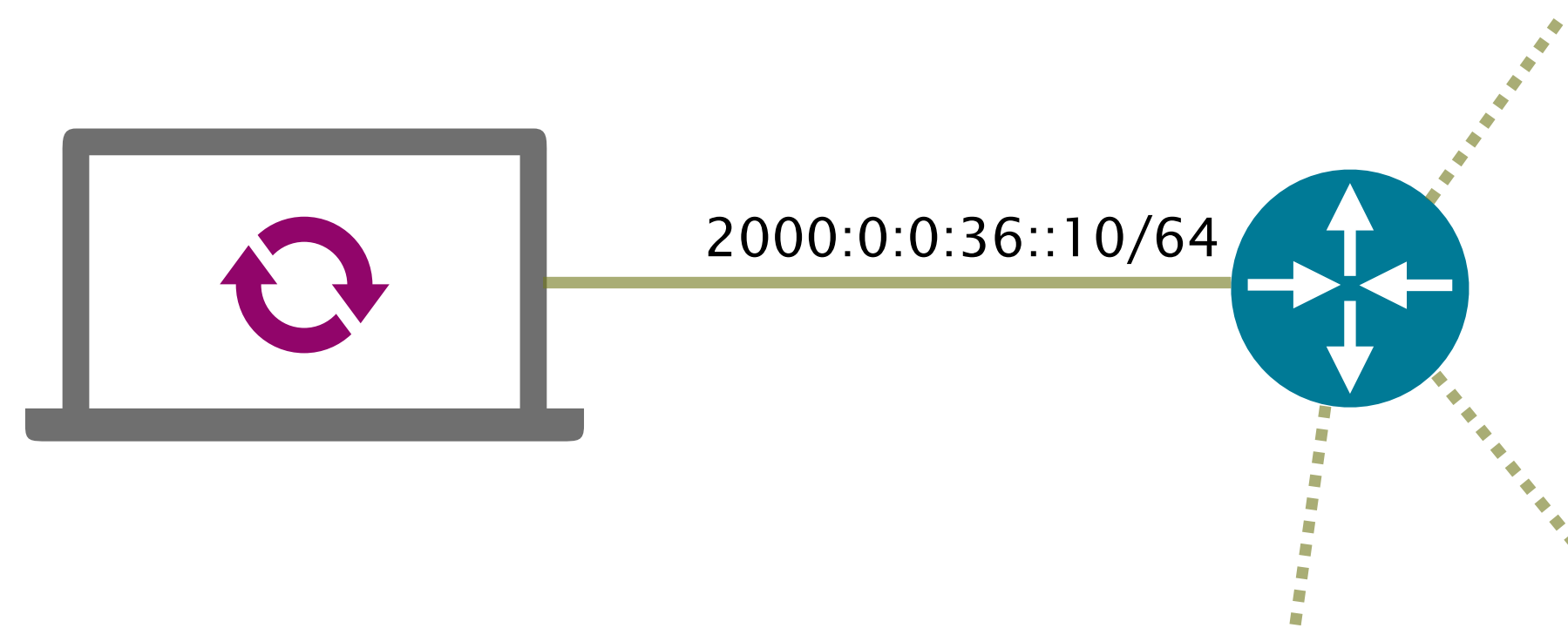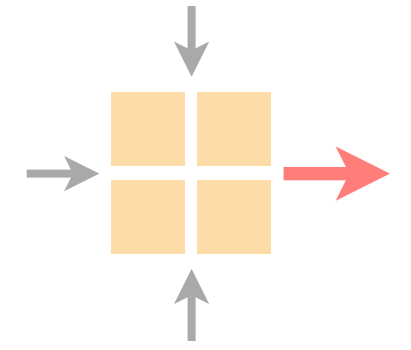**d) Loading a website**   **(10 Points)**

Consider the website hosted at `https://www.your-shop.ch` with the following elements:

- HTML   `https://www.your-shop.ch/index.html`
- Stylesheet   `http://www.your-shop.ch/style.css`
- Image   `http://your-shop.ch/logo.png`
- Image   `http://images.your-shop.ch/product.jpg`
- Facebook like button   `http://static.facebook.com/like.png`
- Facebook "tracking" code   `https://www.facebook.com/track.js`
- Google "tracking" code   `https://www.google.com/track.js`

(i)   Assuming that your host is configured to use a local recursive DNS server in your network and all caches are empty. List all the DNS queries that your host sends to this DNS server when you open up `https://www.your-shop.ch/` in your favorite browser.   **(3 Points)**

Loading a website

d) Loading a website (10 Points)

Consider the website hosted at `https://www.your-shop.ch` with the following elements:

- HTML   `https://www.your-shop.ch/index.html`
- Stylesheet   `http://www.your-shop.ch/style.css`
- Image   `http://your-shop.ch/logo.png`
- Image   `http://images.your-shop.ch/product.jpg`
- Facebook like button   `http://static.facebook.com/like.png`
- Facebook "tracking" code   `https://www.facebook.com/track.js`
- Google "tracking" code   `https://www.google.com/track.js`

(i) Assuming that your host is configured to use a local recursive DNS server in your network and all caches are empty. List all the DNS queries that your host sends to this DNS server when you open up `https://www.your-shop.ch/` in your favorite browser. (3 Points)

Solution:
Highlighted

Loading a website

d) Loading a website **(10 Points)**

Consider the website hosted at `https://www.your-shop.ch` with the following elements:

- HTML   `https://www.your-shop.ch/index.html`
- Stylesheet   `http://www.your-shop.ch/style.css`
- Image   `http://your-shop.ch/logo.png`
- Image   `http://images.your-shop.ch/product.jpg`
- Facebook like button   `http://static.facebook.com/like.png`
- Facebook "tracking" code   `https://www.facebook.com/track.js`
- Google "tracking" code   `https://www.google.com/track.js`

(ii) After loading the website, you send an email to `contact@your-shop.ch` via a mail server that uses the same DNS server as your host. Does the local recursive DNS server need to run additional queries to other DNS servers if it has all the replies from the queries in the previous task in its cache? Explain why or why not.   (2 Points)

Loading a website

d) Loading a website   **(10 Points)**

Consider the website hosted at `https://www.your-shop.ch` with the following elements:

- HTML   `https://www.your-shop.ch/index.html`
- Stylesheet   `http://www.your-shop.ch/style.css`
- Image   `http://your-shop.ch/logo.png`
- Image   `http://images.your-shop.ch/product.jpg`
- Facebook like button   `http://static.facebook.com/like.png`
- Facebook "tracking" code   `https://www.facebook.com/track.js`
- Google "tracking" code   `https://www.google.com/track.js`

(ii)   After loading the website, you send an email to `contact@your-shop.ch` via a mail server
that uses the same DNS server as your host. Does the local recursive DNS server need
to run additional queries to other DNS servers if it has all the replies from the queries
in the previous task in its cache? Explain why or why not.   (2 Points)

Solution:

Yes, need an MX entry

2017: Task 5 d)
Loading a website

d) Loading a website **(10 Points)**

Consider the website hosted at `https://www.your-shop.ch` with the following elements:

- HTML   `https://www.your-shop.ch/index.html`
- Stylesheet   `http://www.your-shop.ch/style.css`
- Image   `http://your-shop.ch/logo.png`
- Image   `http://images.your-shop.ch/product.jpg`
- Facebook like button   `http://static.facebook.com/like.png`
- Facebook "tracking" code   `https://www.facebook.com/track.js`
- Google "tracking" code   `https://www.google.com/track.js`

(iii) How many TCP connections would an unoptimized browser (also referred to as "naive" in the lecture) open to load `https://www.your-shop.ch`? Briefly explain your answer.

Loading a website

d) Loading a website **(10 Points)**

Consider the website hosted at `https://www.your-shop.ch` with the following elements:

- HTML   `https://www.your-shop.ch/index.html`
- Stylesheet   `http://www.your-shop.ch/style.css`
- Image   `http://your-shop.ch/logo.png`
- Image   `http://images.your-shop.ch/product.jpg`
- Facebook like button   `http://static.facebook.com/like.png`
- Facebook "tracking" code   `https://www.facebook.com/track.js`
- Google "tracking" code   `https://www.google.com/track.js`

(iii) How many TCP connections would an unoptimized browser (also referred to as "naive" in the lecture) open to load `https://www.your-shop.ch`? Briefly explain your answer.

Solution:

Seven (one for each element)

Loading a website

d) Loading a website   **(10 Points)**

Consider the website hosted at `https://www.your-shop.ch` with the following elements:

- HTML   `https://www.your-shop.ch/index.html`
- Stylesheet   `http://www.your-shop.ch/style.css`
- Image   `http://your-shop.ch/logo.png`
- Image   `http://images.your-shop.ch/product.jpg`
- Facebook like button   `http://static.facebook.com/like.png`
- Facebook "tracking" code   `https://www.facebook.com/track.js`
- Google "tracking" code   `https://www.google.com/track.js`

(iv) During your holidays in Australia, you realize that the Facebook like button loads much faster than the logo of the shop even though both images have the same size. Can you explain the reason for this and why you do not observe this behavior in Switzerland?

Loading a website

d) Loading a website **(10 Points)**

Consider the website hosted at `https://www.your-shop.ch` with the following elements:

- HTML   `https://www.your-shop.ch/index.html`
- Stylesheet   `http://www.your-shop.ch/style.css`
- Image   `http://your-shop.ch/logo.png`
- Image   `http://images.your-shop.ch/product.jpg`
- Facebook like button   `http://static.facebook.com/like.png`
- Facebook "tracking" code   `https://www.facebook.com/track.js`
- Google "tracking" code   `https://www.google.com/track.js`

(iv) During your holidays in Australia, you realize that the Facebook like button loads much faster than the logo of the shop even though both images have the same size. Can you explain the reason for this and why you do not observe this behavior in Switzerland?

Example solution:

The Facebook button is hosted in a CDN, contrary to the shop logo

Loading a website

d) Loading a website **(10 Points)**

Consider the website hosted at `https://www.your-shop.ch` with the following elements:

- HTML   `https://www.your-shop.ch/index.html`
- Stylesheet   `http://www.your-shop.ch/style.css`
- Image   `http://your-shop.ch/logo.png`
- Image   `http://images.your-shop.ch/product.jpg`
- Facebook like button   `http://static.facebook.com/like.png`
- Facebook "tracking" code   `https://www.facebook.com/track.js`
- Google "tracking" code   `https://www.google.com/track.js`

(v) One hour later (still in Australia), you open the shop's website again. This time, the logo of the shop and the Facebook button appear at the same time. Explain **two distinct reasons** that would justify this behavior. (2 Points)

Loading a website

d) Loading a website   **(10 Points)**

Consider the website hosted at `https://www.your-shop.ch` with the following elements:

- HTML   `https://www.your-shop.ch/index.html`
- Stylesheet   `http://www.your-shop.ch/style.css`
- Image   `http://your-shop.ch/logo.png`
- Image   `http://images.your-shop.ch/product.jpg`
- Facebook like button   `http://static.facebook.com/like.png`
- Facebook "tracking" code   `https://www.facebook.com/track.js`
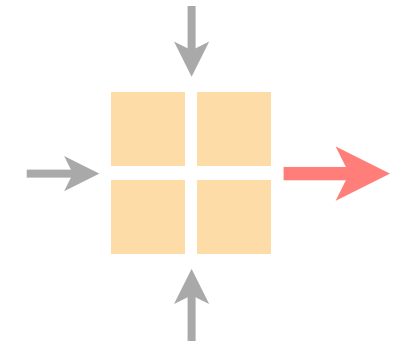- Google "tracking" code   `https://www.google.com/track.js`

(v) One hour later (still in Australia), you open the shop's website again. This time, the logo of the shop and the Facebook button appear at the same time. Explain **two distinct reasons** that would justify this behavior.   (2 Points)

Example solution:

1. Logo moved to CDN

2. Logo cached in browser

Communication Networks

Spring 2020

Exercise overview

Old exam question

Exam preparation