



Introduction to the Art of Programming

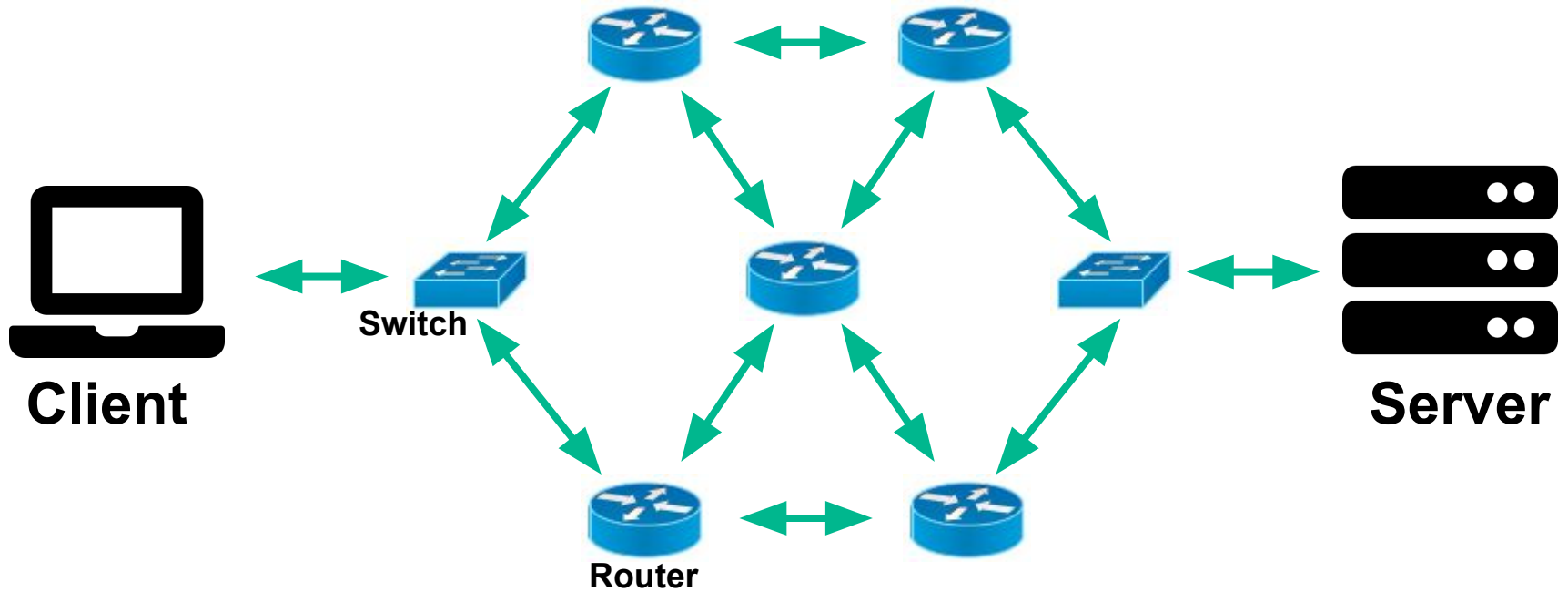
Module 4: Basic Internet Concepts

CAS Digital Masterclass, June 26th 2021
Jürg Stuker, <https://et.academy>

I call a Website...



I call a Website...



Addressing: IP

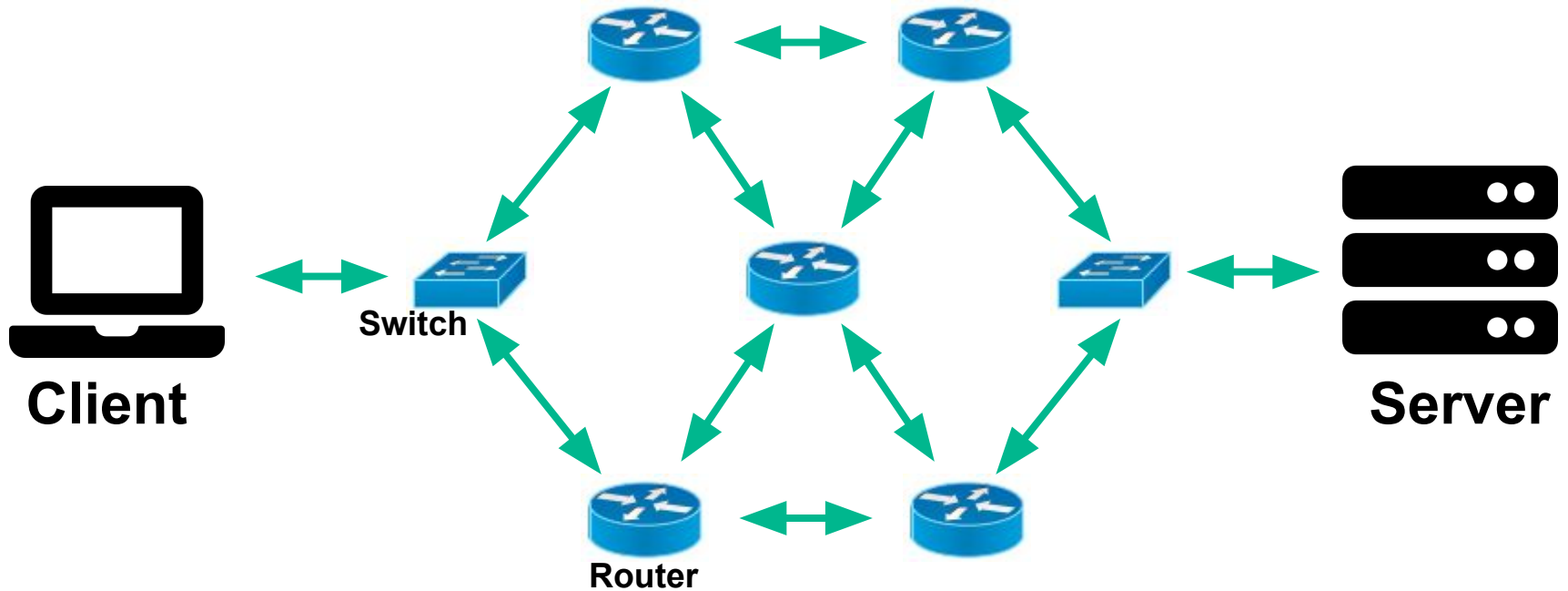
- IP = Internet Protocol
- Internet addresses
 - originally 4 octets (IPv4): 32 bit
 - update 6 octets (IPv6): 128 bit
 - common representation for IPv4: a.b.c.d
 - my current IP is **192.168.8.99**
 - reserved addresses / spaces auch das 192.168.c.d., 10.c.b.d or 127.0.0.1



Addressing: DNS

- DNS = Domain Name Service
- DNS is a directory service that translates names to numbers (and vice versa).
- zhaw.ch translates (at the moment) to 160.85.104.112

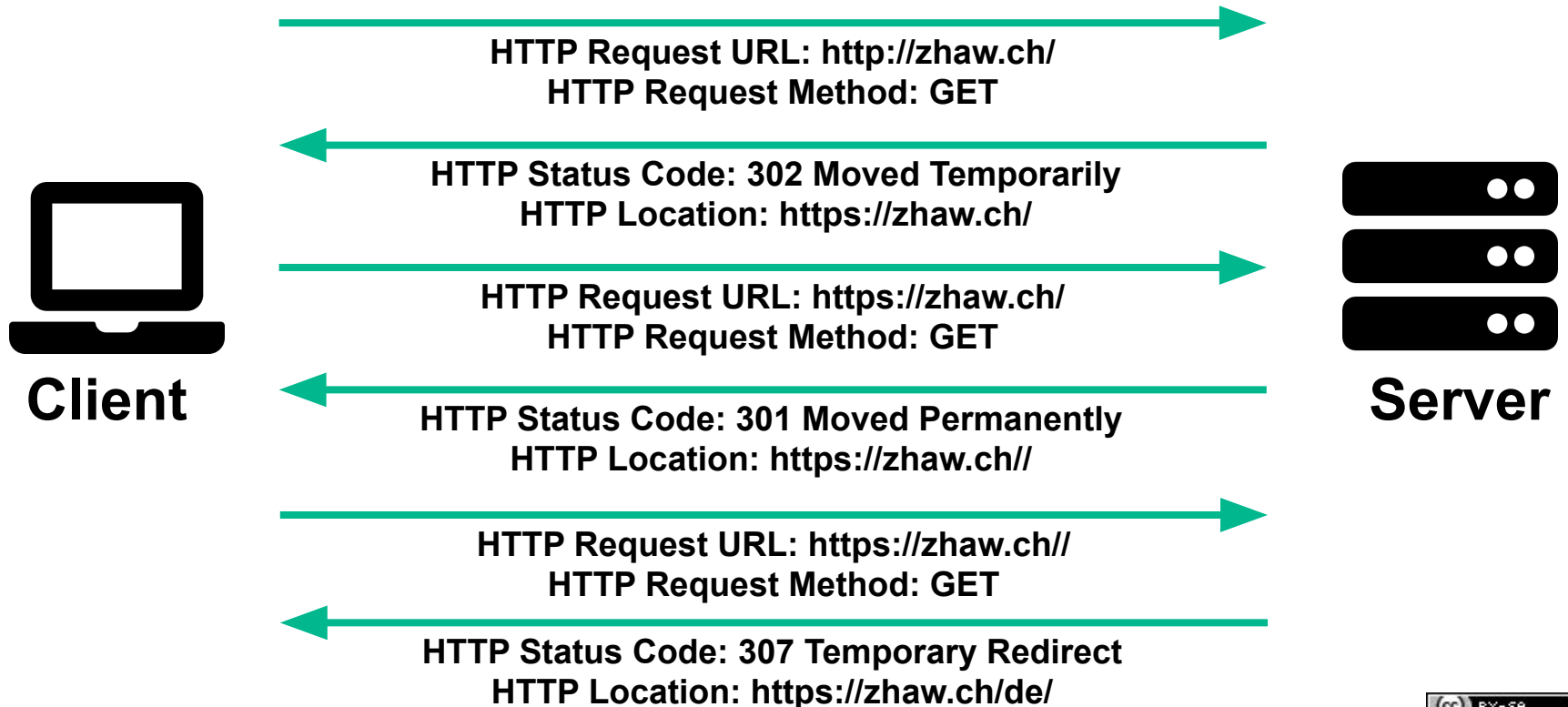
How does my Information Travel?



I call a Website...



I call a Website...



HTTP Status Codes

1xx – Informational response

2xx – Success

- 200 = OK

3xx – Redirection

- 301 = Moved Permanently
- 302 = Found (Moved Temporarily)

4xx – Client errors

- 404 = Not found

5xx – Server errors

URL

An URL identifies and localizes a resource like a website for example

URL = Uniform Resource Locator

- more generic identifier of a resource is URI (Uniform Resource Identifier)
- URL is the first and the most used type of a URI

`https://juerg:geheim@www.namics.com:8080/index.html?p1=A&p2=B#ressourc`

The diagram shows the URL `https://juerg:geheim@www.namics.com:8080/index.html?p1=A&p2=B#ressourc` with red brackets and labels identifying its components:

- `https` is labeled as **schema**.
- `juerg` is labeled as **user**.
- `geheim` is labeled as **password**.
- `www.namics.com` is labeled as **host**.
- `:8080` is labeled as **port**.
- `/index.html` is labeled as **path**.
- `?p1=A&p2=B` is labeled as **query**.
- `#ressourc` is labeled as **fragment**.

I call a Website...



HTML (Hypertext Markup Language)

```
<a href="/de/impressum/" role="menuitem" itemprop="url">Impressum</a>
```

HTML is markup language (not a programming language)

a is a tag with the meaning anchor

- <a> opens the tag
- closes the

href, role and itemprop are attributes

- href stays for hypertext reference (what we usually call link)
- role designate a role according to ARIA (Accessible Rich Internet Applications)
- itemprop is a global attribute to describe semantics

Impressum in the example above is the content (of the tag)

CSS (Cascading Style Sheets)

```

▶ background-color      rgba(0, 0, 0, 0)
▶ box-sizing            border-box
▶ color                rgb(255, 255, 255)
▶ cursor               pointer
display                inline
▼ font-family           Arial, "Helvetica Neue", Helvetic
  Arial, "Helvetica Neue", Helvetica, sans-serif    body
  merged-8ceb2f8b_s?1616426800:1
  -apple-system, BlinkMacSystemFont, "Segoe UI", Roboto, "Helvet:
  bootstrap.min-c_s?1606769259:1
  sans-serif      html    bootstrap.min-c_s?1606769259:1
▶ font-size            16px
▶ font-weight           400
height                 auto
▶ line-height           16px
▶ list-style-image      none
▶ list-style-position   outside
▶ list-style-type        none
▶ text-align            left
▶ text-decoration-color  rgb(255, 255, 255)
▶ text-decoration-line  underline
▶ text-decoration-style  solid

```

background-color

- 0 red, 0 green, 0 blue, 0 alpha

box-sizing

- defining boxing (spacing) model

color

- 255 red, 255 green, 255 blue

cursor

- type of mouse cursor

font-family

- if installed “Arial” else “Helvetica Neue” else “Helvetica” else browser standard for sans-serif

JavaScript

```
alert('Hello, World');
```

Wrap up of Wrap up ;)

- Don't fear the (black)box
(and the people that care about)
- Programming is a creative process
- Ambiguity of specification is a challenge
- All roads lead to Rome
- Programs do age...



(but do not require the effort ;)

And now?

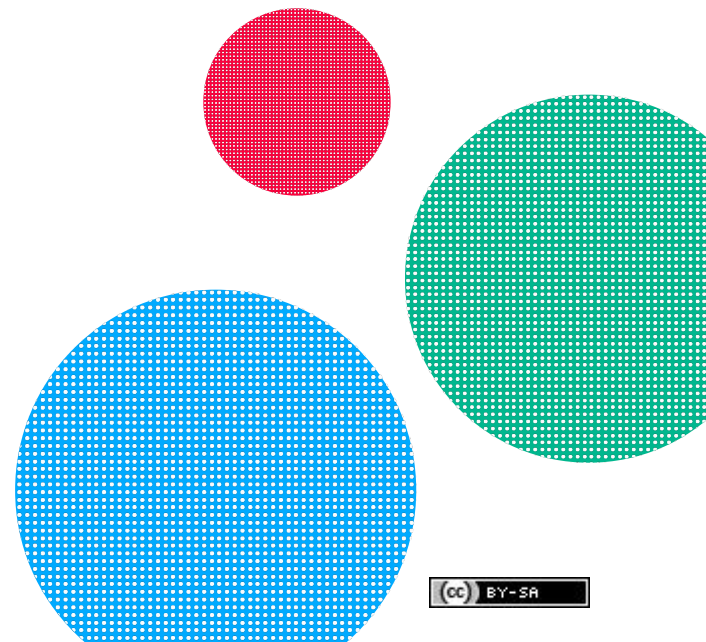
The fascinating fact is that so much is public (including standards and application components)

- <https://www.w3.org/>, <https://www.ietf.org/>...

Again there is a myriad of free of learning content and infrastructure to build and run stuff

- <https://www.coursera.org/>, <https://www.khanacademy.org/>,
<https://www.codecademy.com/>, <https://www.edx.org/>,
<https://www.freecodecamp.org/>...
- <https://cloud.google.com/>, <https://aws.amazon.com/>,
<https://azure.microsoft.com/>...

“Just do it”



Please ask anytime...



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