WEB DESIGN AND DEVELOPMENT

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THIS WEEK

History of the Internet

History of the World Wide Web

The difference between the two!

History of client-side technologies

Future trends

Lists, style sheets/CSS

HTML & CSS

HTML tags <a> <img>

Table tags

CSS <link>

Styling: colour, padding etc

EXERCISE

- <a>

- Go to OneNote

EXERCISE

- <a>

- In your folder where your index.html file is, create a new file in called page2.html

- Add the 5 essential tags

- We are going to link the 2 webpages with an anchor <a> tag

- Do you know whether it goes in between the <head> or <body> tags?

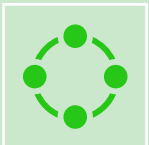- The format of the tag is link words

ARPANET

Early research into the concept of the Internet was performed by the U.S. Department of Defence in 1962

This research group established ARPAnet (**A**dvanced **R**esearch **P**roject **A**gency Network) in an effort to connect together the U.S. Defence Department network

In 1969, four computer clients were connected together via ARPAnet. The first message was delivered on Oct 29th, and caused the ARPA network to crash!

TRANSMISSION CONTROL PROGRAM

With ARPAnet, a computer packs data into packets and labels them with the correct address and sequence information

Packets could be routed over many alternative paths and then be reassembled when they arrived at their destination

As more locations joined ARPAnet the Transmission Control Program was developed

BIRTH OF THE WEB

In 1989 Tim Berners-Lee began developing a technology for sharing information via hyperlinked text documents

He called this **H**yper**T**ext **M**arkup **L**anguage: HTML

He also wrote the protocol for transferring information over the web – **H**yper**T**ext **T**ransfer **P**rotocol: HTTP

INTERNET

At is simplest the internet consist of

Hardware

- The wire (fibre optic cable etc.) that connects components on the internet
- Servers that are connected to the internet
- Routers that route packets of data across the wire

Protocols

- The protocols that determine how data is sent over the internet such as TCP/IP

TRANSMISSION

Computers are connected together via a network or transmission line

The objective of the ARPAnet project was to investigate the development of a *decentralized computer network*

The network then became known as the **Internet**

It has since adopted a suite of protocols called the Internet Protocol Suite or as more commonly known as **TCP/IP**

Now, the Internet has grown to encompass a huge number of autonomous networks an **Inter**connected **Net**work
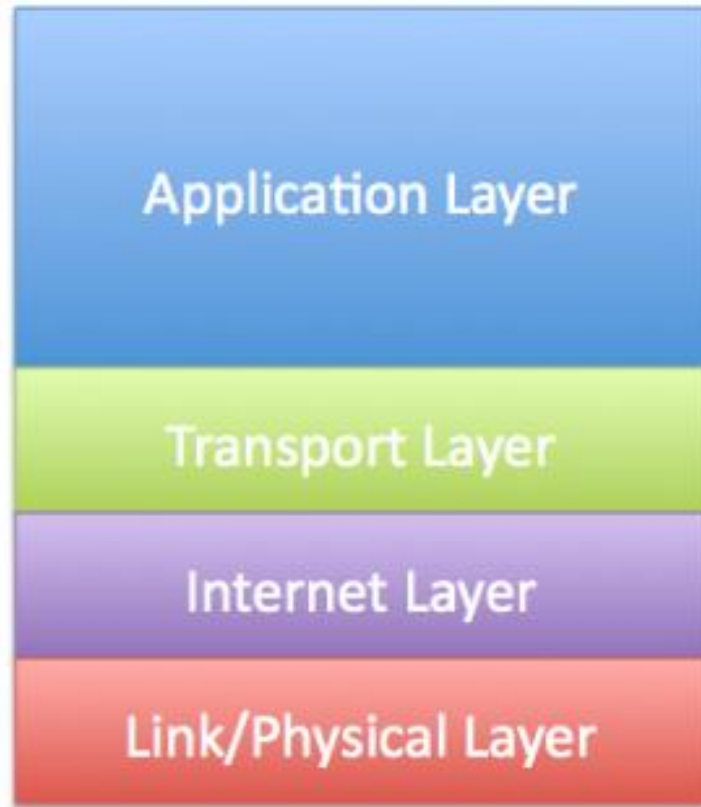
PROTOCOLS

Protocols establish the rules for how information passes through the Internet. Without these rules, you would need direct connections to other computers to access the information they hold. You'd also need both your computer and the target computer to understand a common language.

The protocols we will look at include:

TCP/IP

HTTP

TCP/IP

This Transmission Control Program was later divided into a modular architecture consisting of:
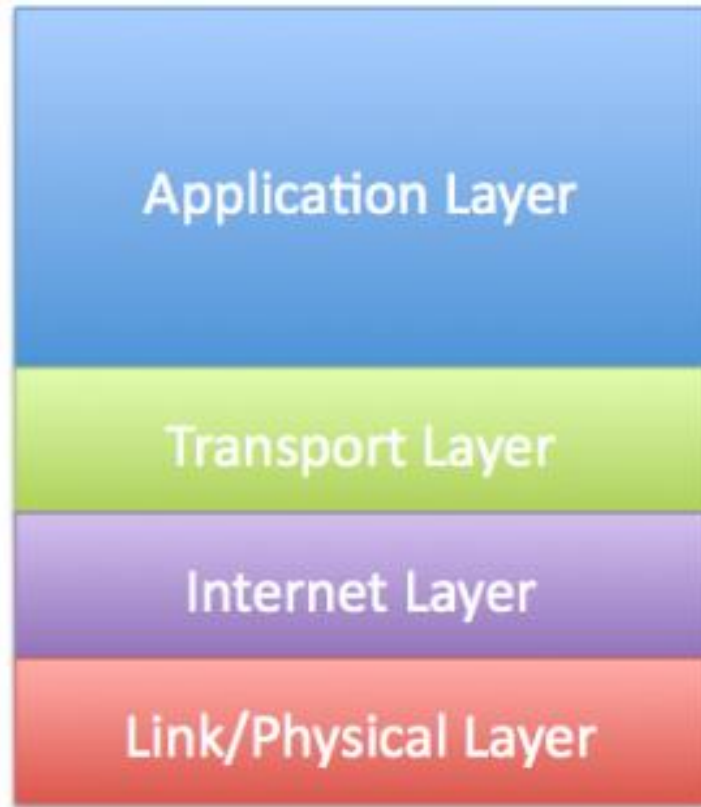
Transmission Control Protocol - TCP

Internet Protocol – IP

TCP/IP

Data sent over the internet gets broken into packets

TCP/IP transmits Packets over the internet

TCP/IP

Application Layer
Transport Layer
Internet Layer
Link/Physical Layer

TCP is responsible for breaking data into packets of information that contain both a segment of data to be transferred and the address where the data is to be sent
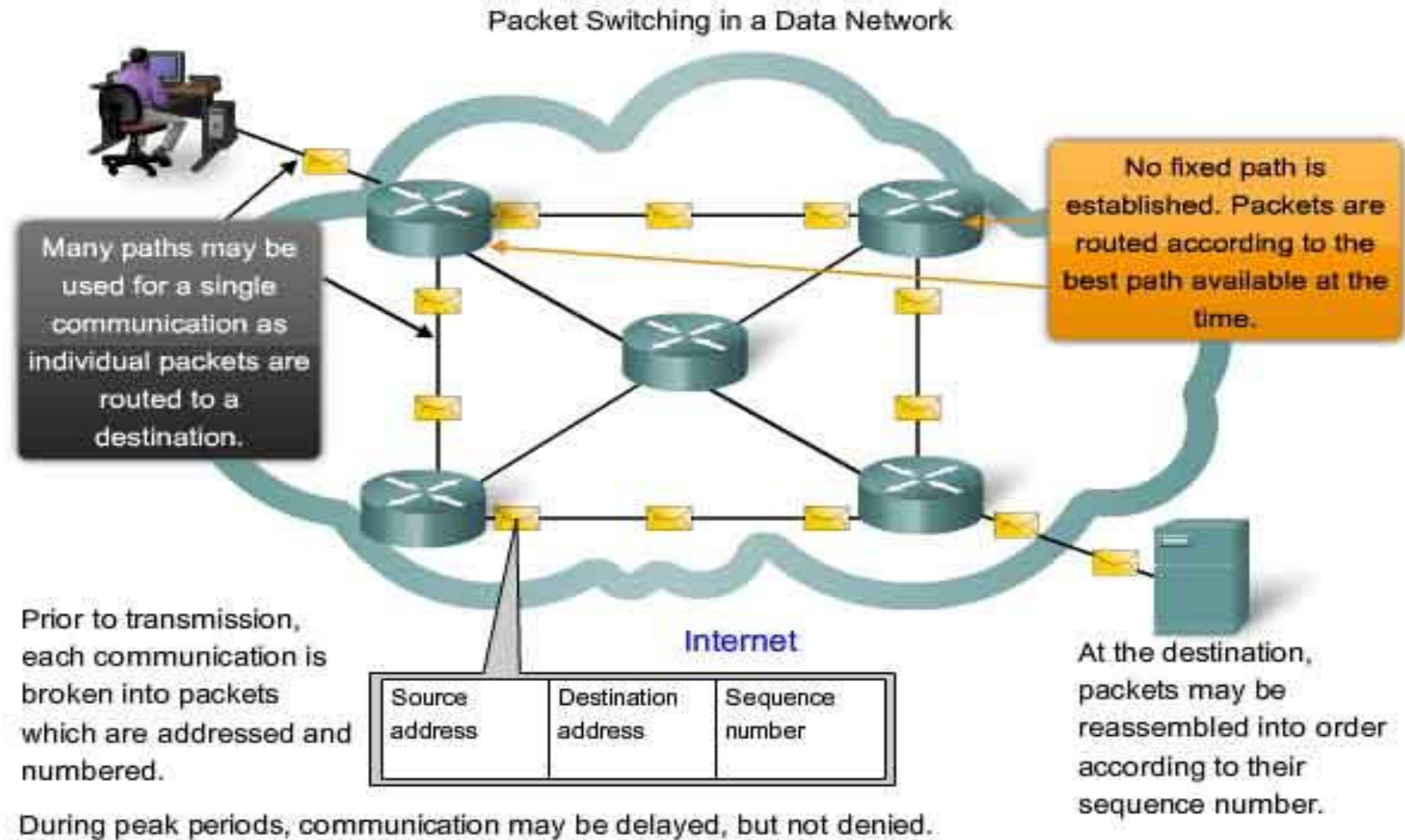
TCP is responsible for reassembling the packets on receipt of request in order

IP is responsible for ensuring the packets reach their correct destination

PACKETS

- **Packets** are parts of a file that range between 1,000 and 1,500 bytes.

- Packets have headers and footers that tell computers what's in the packet and how the information fits with other packets to create an entire file.

- Packets don't necessarily all take the same path -- they'll generally travel the path of least resistance.

- Because packets can travel multiple paths to get to their destination, it's possible for information to route around congested areas on the Internet

- When the packets get to its destination, destination device arranges them according to the rules of the protocols. It's kind of like putting together a jigsaw puzzle

PACKETS

Packet Switching in a Data Network

No fixed path is established. Packets are routed according to the best path available at the time.

Many paths may be used for a single communication as individual packets are routed to a destination.

Internet

Source address	Destination address	Sequence number

Prior to transmission, each communication is broken into packets which are addressed and numbered.

At the destination, packets may be reassembled into order according to their sequence number.

During peak periods, communication may be delayed, but not denied.

IS THIS THE WEB?

- No!

- The Internet is the framework, the web is only one use of it

- Along with email, ftp, online gaming, instant messaging, remote backup, remote login, streaming audio/video…

- The Web can be thought of as a set of servers all over the world containing data such as web pages

- These servers are connected to the internet which enables the transmission of data contained on these servers between each other

HTTP

- HTTP (Hypertext Transfer Protocol) is the set of rules for transferring files (text, graphic images, sound, video, and other multimedia files) on the World Wide Web

- Any Web server machine contains, in addition to the Web page files it can serve, an HTTP daemon, a program that is designed to wait for HTTP requests and handle them when they arrive. Your Web browser is a HTTP client, sending requests to server machines.
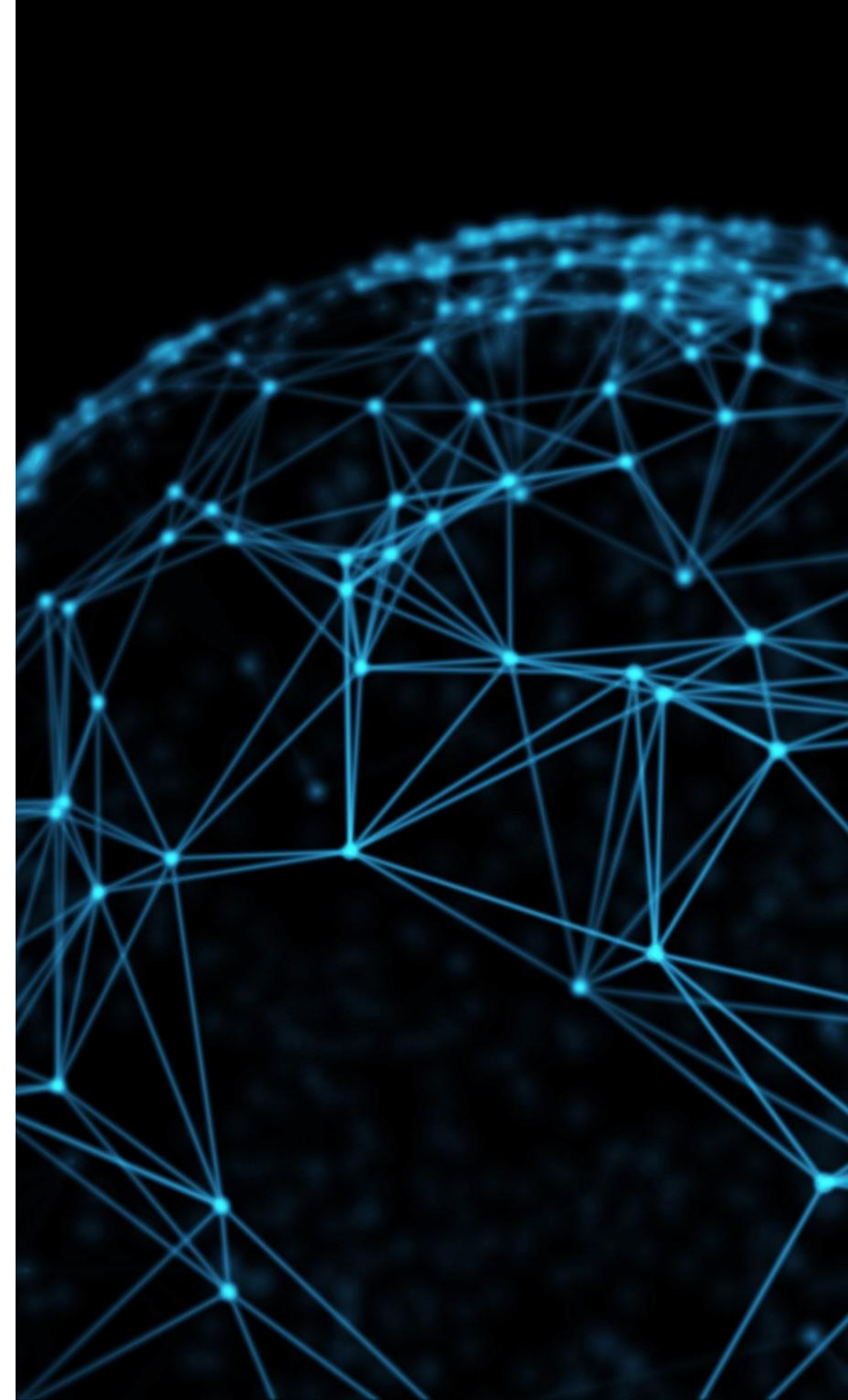
HTTP

- When the browser user enters file requests by either "opening" a Web file (typing in a Uniform Resource Locator or URL) or clicking on a hypertext link, the browser builds an HTTP request and sends it to the Internet Protocol address (IP address) indicated by the URL.

- The HTTP daemon in the destination server machine receives the request and sends back the requested file or files associated with the request. (A Web page often consists of more than one file.)

IP ADDRESSES

- Each computer must have an IP address before it can connect to the Internet.

- A Web site has an IP address or a URL to identify it

- An IP address is a set of numbers such as 127.0.0.1

- TCP/IP uses four numbers to address a computer.
  - The numbers are always between 0 and 255.
  - IP addresses are normally written as four sets of numbers separated by a period, like this: 192.68.20.50

IP ADDRESSES

- 127.0.0.1

- Those four numbers are 32 bits

- 32 bits = 4 bytes

- TCP/IP uses 32 bit addresses. One computer byte is 8 bits. So TCP/IP uses 4 computer bytes.

- A byte can hold 256 different values:
    - 00000000, 00000001, 00000010, 00000011, 00000100,
    - 00000101, 00000110 …….and all the way up to 11111111.

EXERCISE

Windows example:

- Open the command prompt (windows) or terminal (mac)

- Type the command: ping rte.ie

- What is the IP address of RTE?

More info on ping command: https://www.lifewire.com/ping-command-2618099

UNIFORM RESOURCE LOCATORS (URL)

- A Uniform Resource Locator (URL) is used to address a document on the Web.

- The name that corresponds to an IP address in the DNS is known as a URL

- A full Web address is like:

- https://www.ncirl.ie/Students/Current-Students-Hub/Academic-Calendar

- A URL usually follows these syntax rules:–
  scheme://host.domain.country_code:port/path/filename

DOMAIN NAMES

- Names are easier to remember than a 12 digit number

- Some applications let you identify a computer or an IP network by using a **logical or domain name:**– www.ncirl.ie is a domain name

- When you address a web site, like https://www.ncirl.ie/ , the name is translated to a number by a Domain Name Server (DNS)

- How can you find that number?

- When a new domain is registered together with a TCP/IP address, Domain Name Servers all over the world are updated with this information

DOMAIN NAMES

- **For International use, the domains end in the country code:**

  .ie - For Irish websites

  .fr - French websites

  .co.uk - United Kingdom

- **Some URLs end in the following:**

  .com - Commercial institute or service provider

  .me - Personal website

  .edu - Educational institute

  .gov - Government

  .org - Nonprofit organization
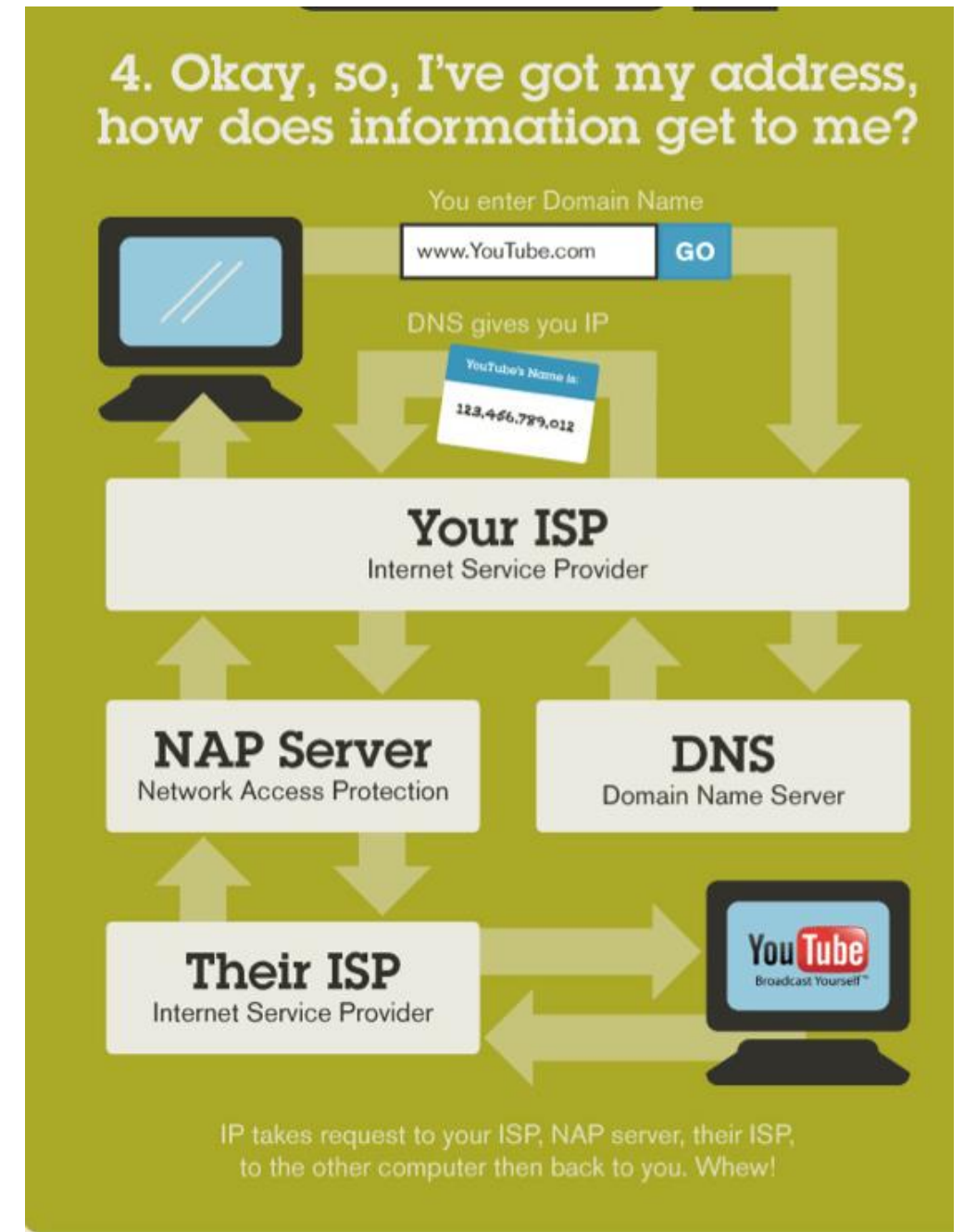
  .net - Network Service Provider

DOMAIN NAMES

- http://www.boredpanda.com/worst-domain-names/

When Domain
Names Go
BAD

HOW THE INTERNET WORKS

4. Okay, so, I've got my address, how does information get to me?

You enter Domain Name
www.YouTube.com GO

DNS gives you IP
YouTube's Name is:
123,456,789,012

Your ISP
Internet Service Provider

NAP Server
Network Access Protection

DNS
Domain Name Server

Their ISP
Internet Service Provider

You Tube
Broadcast Yourself™

IP takes request to your ISP, NAP server, their ISP, to the other computer then back to you. Whew!
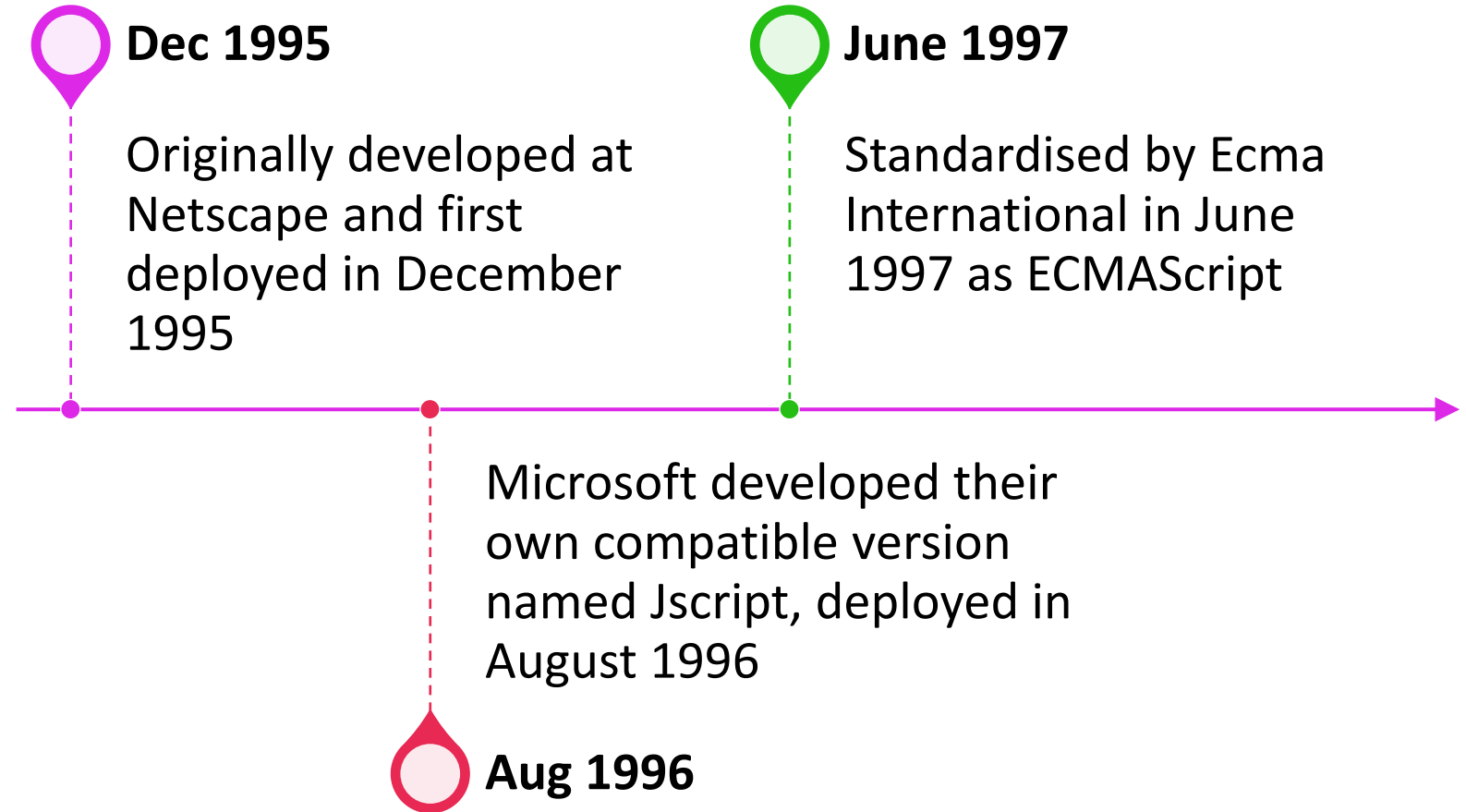
HTML VERSIONS

- HTML developed in 1993 by W3C and WHATWG. W3C checks standards

- HTML2 developed in 1995, to standardize across browsers

- HTML 3.2 in 1997, improved tags, and support for CSS in the HTML

- HTML4 in 1999, CSS separated to own files

- HTML5 in 2014, new tags such as email and can convert easily for mobile applications

HTML 3.2
HTML 4.01
HTML 2
HTML5
HTML 1.0
HTML
5
Versions of Html
W3C HTML Validator
www.educba.com

JAVASCRIPT

Dec 1995

Originally developed at Netscape and first deployed in December 1995

June 1997

Standardised by Ecma International in June 1997 as ECMAScript

Microsoft developed their own compatible version named Jscript, deployed in August 1996

Aug 1996

JAVASCRIPT

It is a frontend language

We use JS for the behaviour of the webpage

JS can store data locally

We can use it for animation effects

We can use it to program the mouse click events and pointer movement

FUTURE OF THE INTERNET

https://ec.europa.eu/programmes/horizon2020/en/h2020-section/future-internet

EU and global discussion to develop internet to foster innovative usages of social and economic value

More devices will be internet enabled – with more sensors

More concerns over security of data

Adaptive intelligent web-based systems

Artificial intelligence

EXERCISE

- <img>

- Download an image that you like.

- Right click on it and under properties check the file extension: .jpg, .png

- In your index.html we are going to add this image

- Do you know whether it goes in between the <head> or <body> tags?

- <img src="your file name" alt="close your eyes and describe image">

EXERCISE

- <link>

- In your index.html we are going to add a link in the head section

- It will link to the style sheet for our CSS

- Create a file called styles.css

the file name in the link tag will be the same as our new file

```
<head>
    <link rel="stylesheet" href="styles.css">
</head>
```
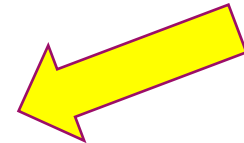
EXERCISE

- CSS

- In your styles.css add the code below, save all files

- Run your index.html through the browser and see what happens

```
body{
    color: red;
    /*  this is a css comment */
}
```

EXERCISE

-

- In your page2.html we are going to create an unordered list which will have list items

         list item one

- Can you do the same for the <ol> and look at the difference?

EXERCISE

- CSS

- Lets style the <a> tag

- In the CSS file add the following:

  a{

    color:#ffffff;

    padding: 10px;

    background-color: #33cc33;

  }

ANY QUESTIONS?

Reminder:
every expert started out as a beginner… with questions

You can post questions outside of class:
- in the MS Teams channel
- or in the Q&A on the moodle page.

Please jump in and help me out by answering each other!