Introduction

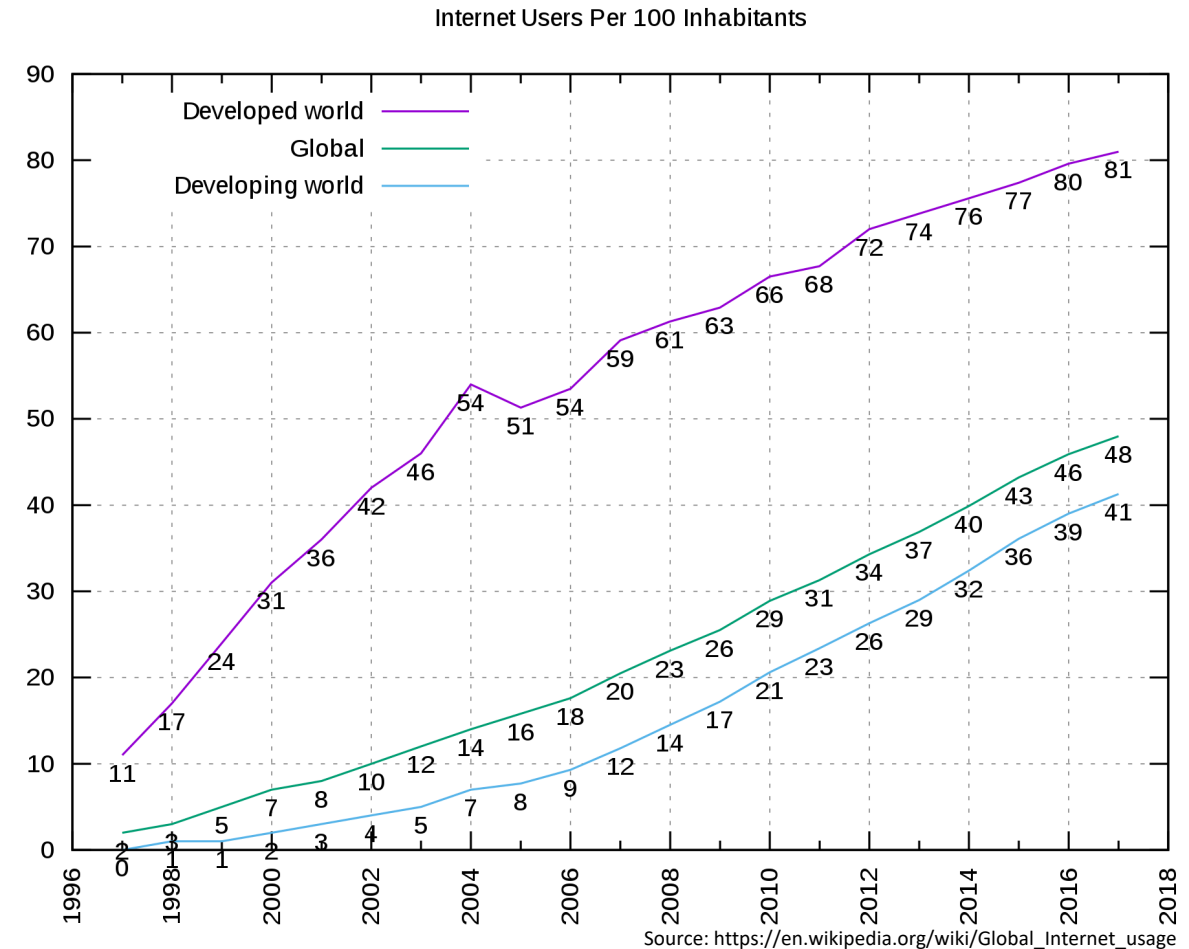## Databases and Interfaces COMP1041

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Outline

- The Internet

- Transmission Control Protocol/Internet Protocol (TCP/IP)

- Domain name

- Uniform (or Universal) Resource Locator (URL)

- Hyper Text Transfer Protocol

World Population and Internet Access

- As of January 2020, 59% of the world's population has internet access [1].

- In 1960, the purposes were communication, program sharing, and remote access.

- Today, additional usages include social networking, shopping, searching for information.
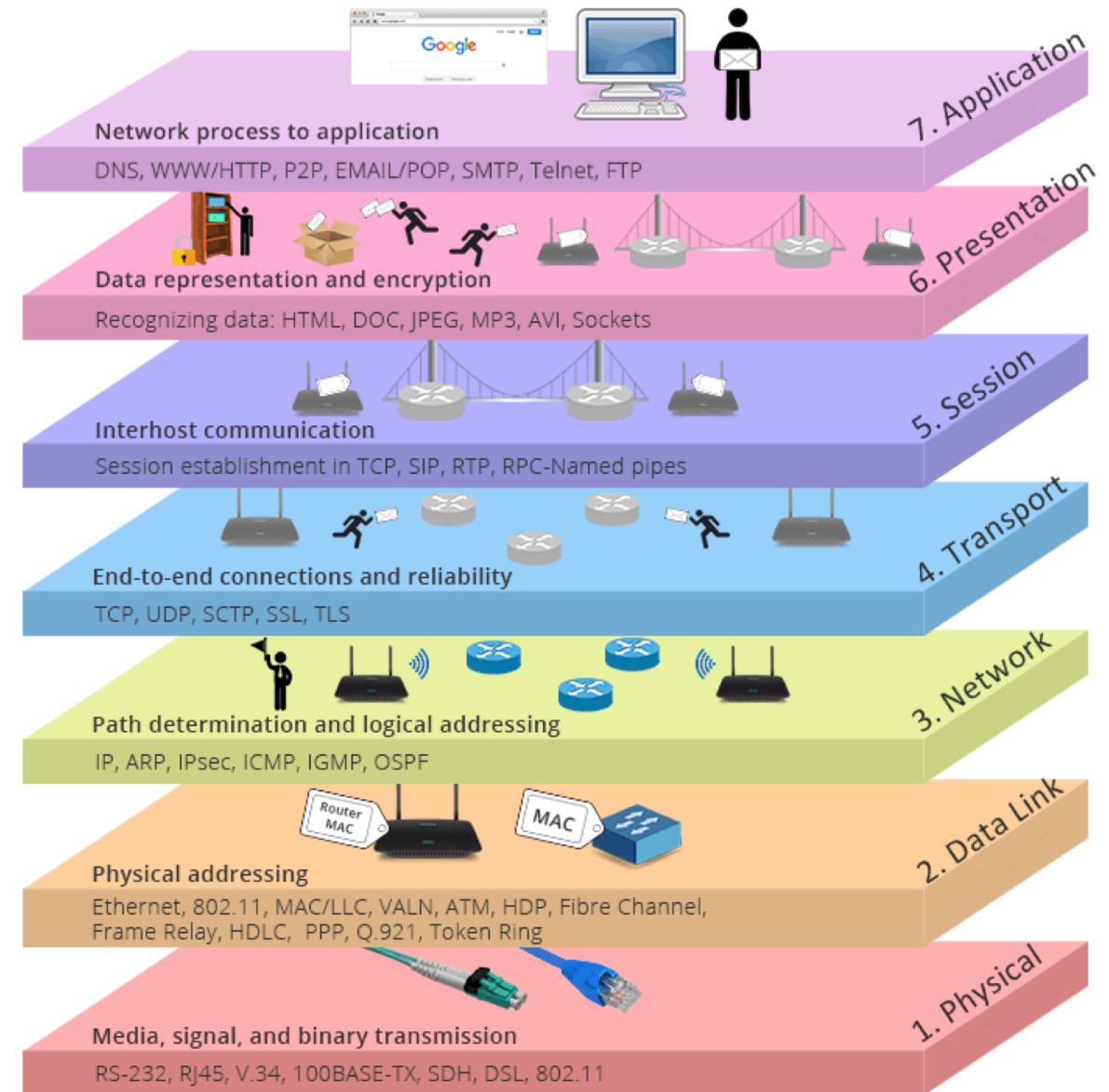
Internet Users Per 100 Inhabitants

References:
[1] https://www.statista.com/statistics/617136/digital-population-worldwide/

Source: https://en.wikipedia.org/wiki/Global_Internet_usage

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TCP/IP

- Transmission Control Protocol/Internet Protocol (TCP/IP) allows devices on the Internet to communicate with each other.

- Internet Protocol addresses (or IP addresses) are used to uniquely identify all devices connected to the Internet.

7. Application
Network process to application
DNS, WWW/HTTP, P2P, EMAIL/POP, SMTP, Telnet, FTP

6. Presentation
Data representation and encryption
Recognizing data: HTML, DOC, JPEG, MP3, AVI, Sockets

5. Session
Interhost communication
Session establishment in TCP, SIP, RTP, RPC-Named pipes

4. Transport
End-to-end connections and reliability
TCP, UDP, SCTP, SSL, TLS

3. Network
Path determination and logical addressing
IP, ARP, IPsec, ICMP, IGMP, OSPF

2. Data Link
Physical addressing
Ethernet, 802.11, MAC/LLC, VALN, ATM, HDP, Fibre Channel, Frame Relay, HDLC, PPP, Q.921, Token Ring

1. Physical
Media, signal, and binary transmission
RS-232, RJ45, V.34, 100BASE-TX, SDH, DSL, 802.11

Source: https://community.fs.com/blog/tcpip-vs-osi-whats-the-difference-between-the-two-models.html

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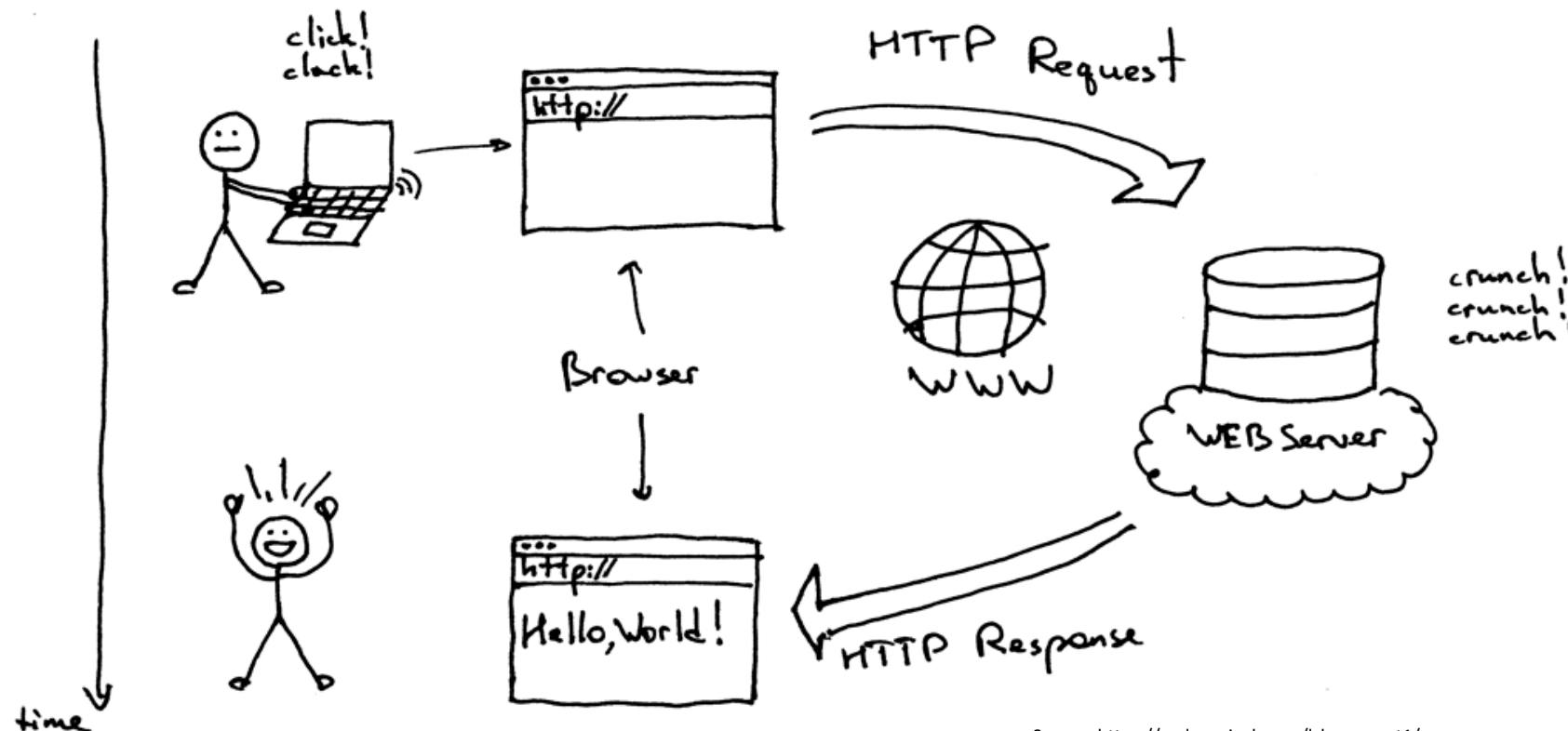UK | CHINA | MALAYSIA

Domain Name

- Begins with the name of the host machine, followed by progressively larger collections of machines i.e. domains.
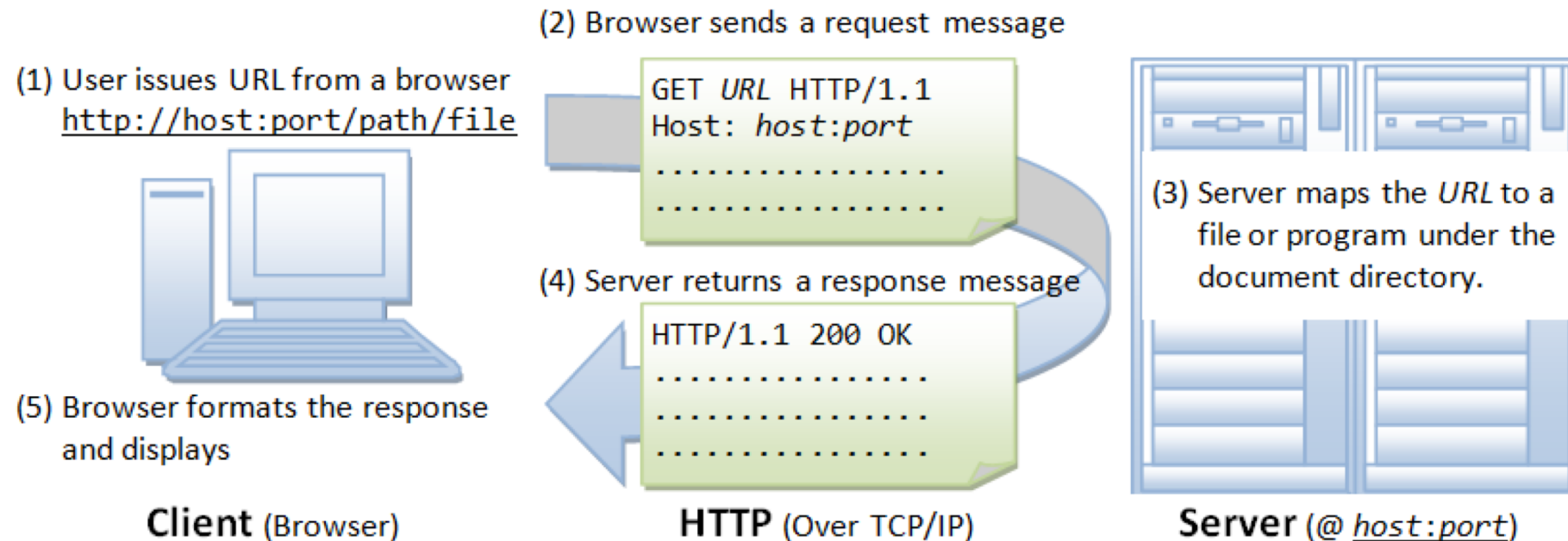
- Easier to remember than IP addresses (for humans).

https://winningwp.com → Domain name

SLD   TLD

Source: https://winningwp.com/what-is-a-domain-name/

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World Wide Web

- A vast collection of documents that are connected by links

Source: https://ruslanspivak.com/lsbaws-part1/

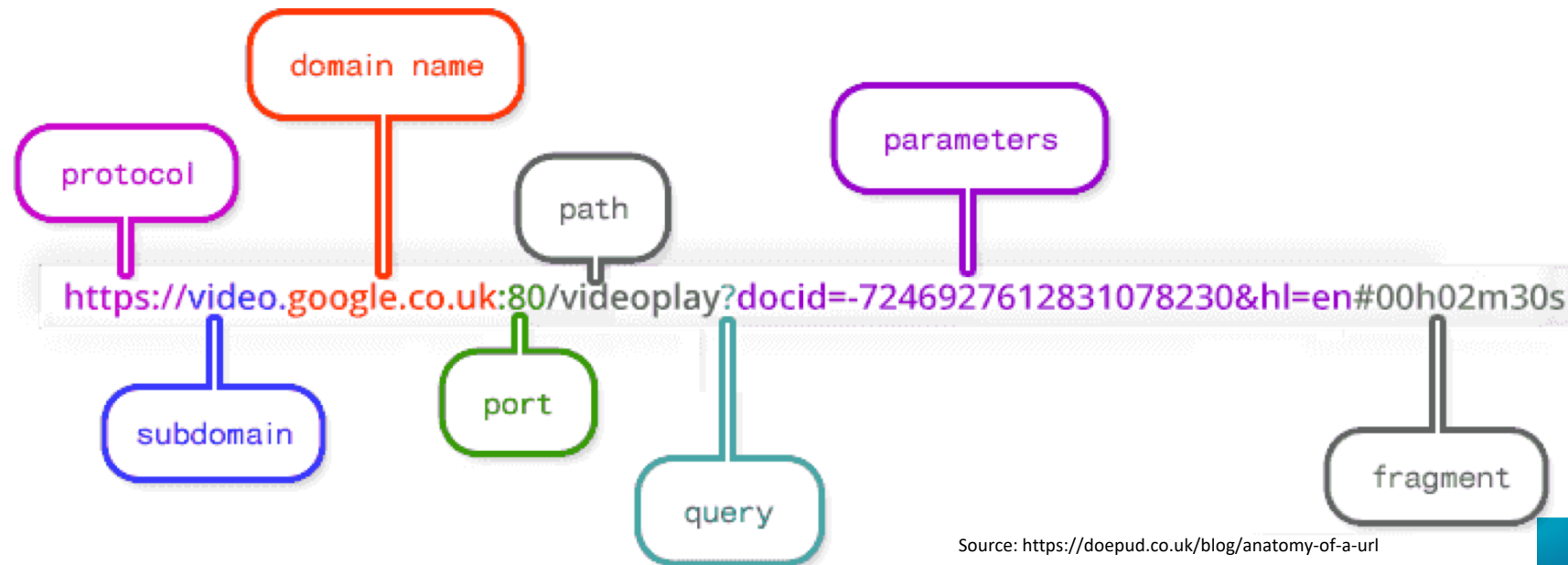DBI - COMP1041

Hypertext Transfer Protocol

- HTTP consists of: request or response.

Source: https://github.com/foundersandcoders/old-coursebook/blob/master/patterns/week2/httprequest.md
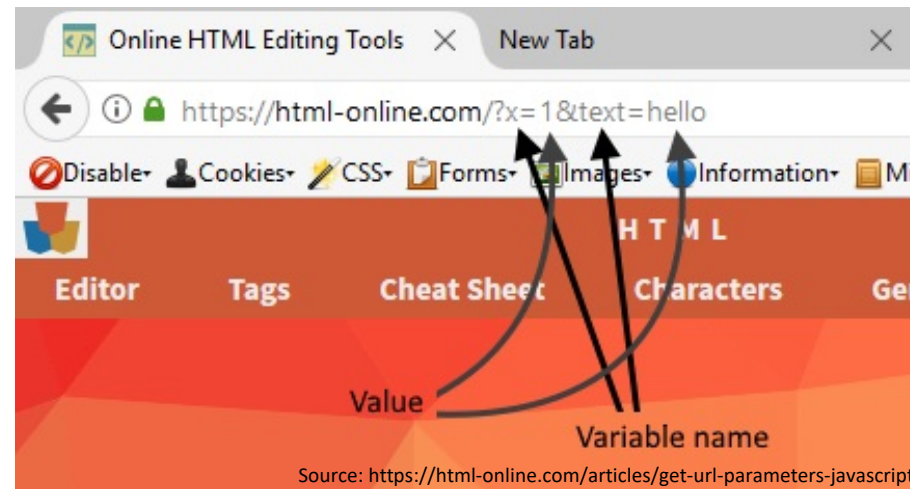
Uniform Resource Locators

- URLs are a path to, or locations of, a resource on the Internet.
- URL format is: *scheme:object-address*
- The scheme is often a communication protocol, e.g. HTTP, FTP.

Source: https://doepud.co.uk/blog/anatomy-of-a-url

Passing Parameters using URL

- URL parameters are probably the easiest way of passing variables from one webpage to another.

Source: https://html-online.com/articles/get-url-parameters-javascript/
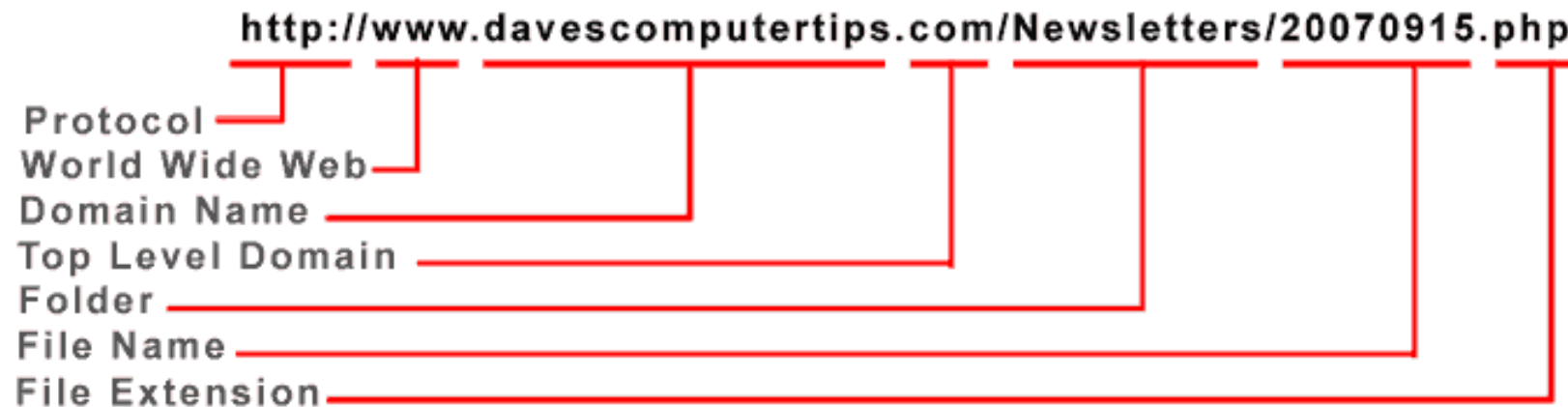
- GET method is used to request data from a specified resource.
- POST method is used to send data to a server to create or update a resource.

URL and Partial Path

- The path to the document for the HTTP protocol is similar to a path to a file or directory in the file system of an operating system.

- BUT, the URL may not include all directories i.e. partial path

Uniform Resource Locator

http://www.davescomputertips.com/Newsletters/20070915.php

Protocol
World Wide Web
Domain Name
Top Level Domain
Folder
File Name
File Extension

Source: https://davescomputertips.com/what-is-a-url/

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URL and Partial Path

- The actual location of a file in the file system of a web server can be different from the URL e.g.

  a file in ../var/site/forum/index.php
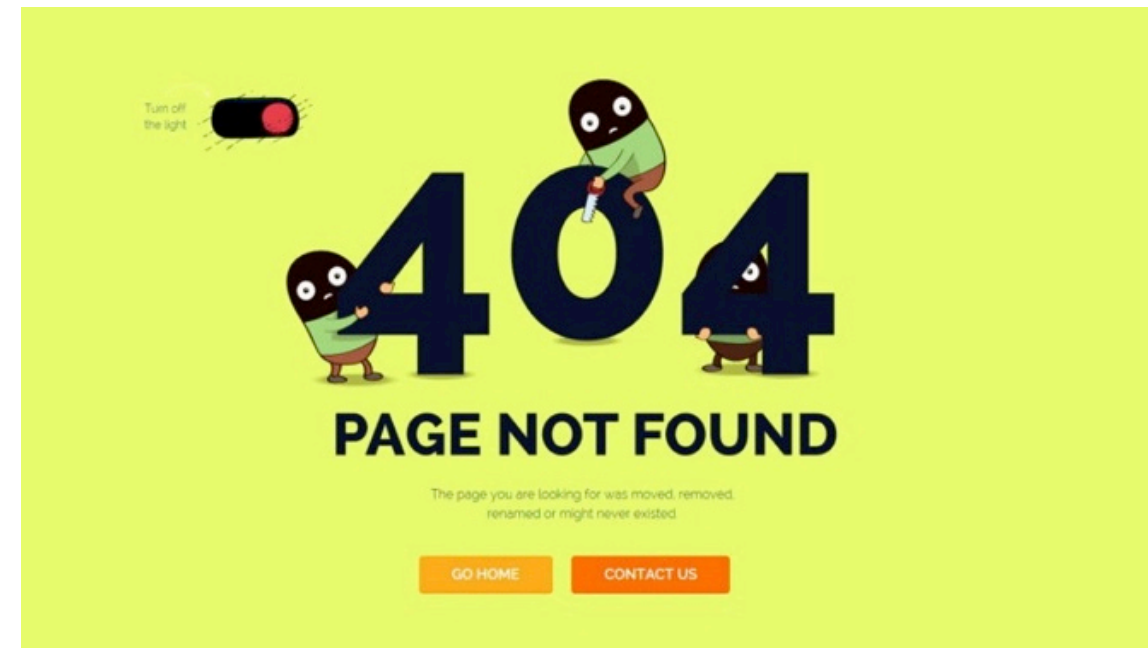 maybe access using
  http://www.site.ru/forum/index.php

- In PHP, the file can be accessed using

```php
$path = $_SERVER['DOCUMENT_ROOT'] . "/forum/index.php";
```

Source: https://phpdelusions.net/articles/paths

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Using index.html as a Security Feature

- Sometimes a user may specify a directory but a document name is not given e.g.   http://www.yourwebsite.com/yourfolder

- The web server will search for a servable document e.g. index.html

- If a servable document is not found, by default, a directory listing will be returned i.e. all files in that directory.

Source: https://www.mockplus.com/blog/post/404-error-page-design

Conclusions

- Devices connected on the Internet rely on TCP/IP protocol to communicate.

- IPv4 addresses are four-part numbers xxx.xxx.xxx.xxx

- DNS translates IP addresses to domain names so as to be human readable.

- URN/URI identify resources on the Internet, URL identify paths or locations of the resources.

- HTTP is a standard protocol for web communication.

- Commonly used HTTP requests are GET and POST.

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