Computer Fundamentals

Lecture 7

Internet

What is the Internet?

The internet is an very large network of billions of connected computers and other hardware devices.

- **Internet** stand for **Inter**connected **Net**work
- A **network** is a group of two or more computer systems linked together.

History of Internet

- The Department of Defense in USA created a small network called **ARPANET** (Advanced Research Projects Agency Network) in 1969.
- This network connected only contractors, military personals and university researchers.
- Initially, there were only four nodes, formally called **Hosts.**
- In 1972, the **ARPANET** spread over the globe with 23 nodes located at different countries and thus became known as **Internet.**
- Today the internet has grown into a huge spider's web where millions of computers, networks, phones and tablets are all joined together.

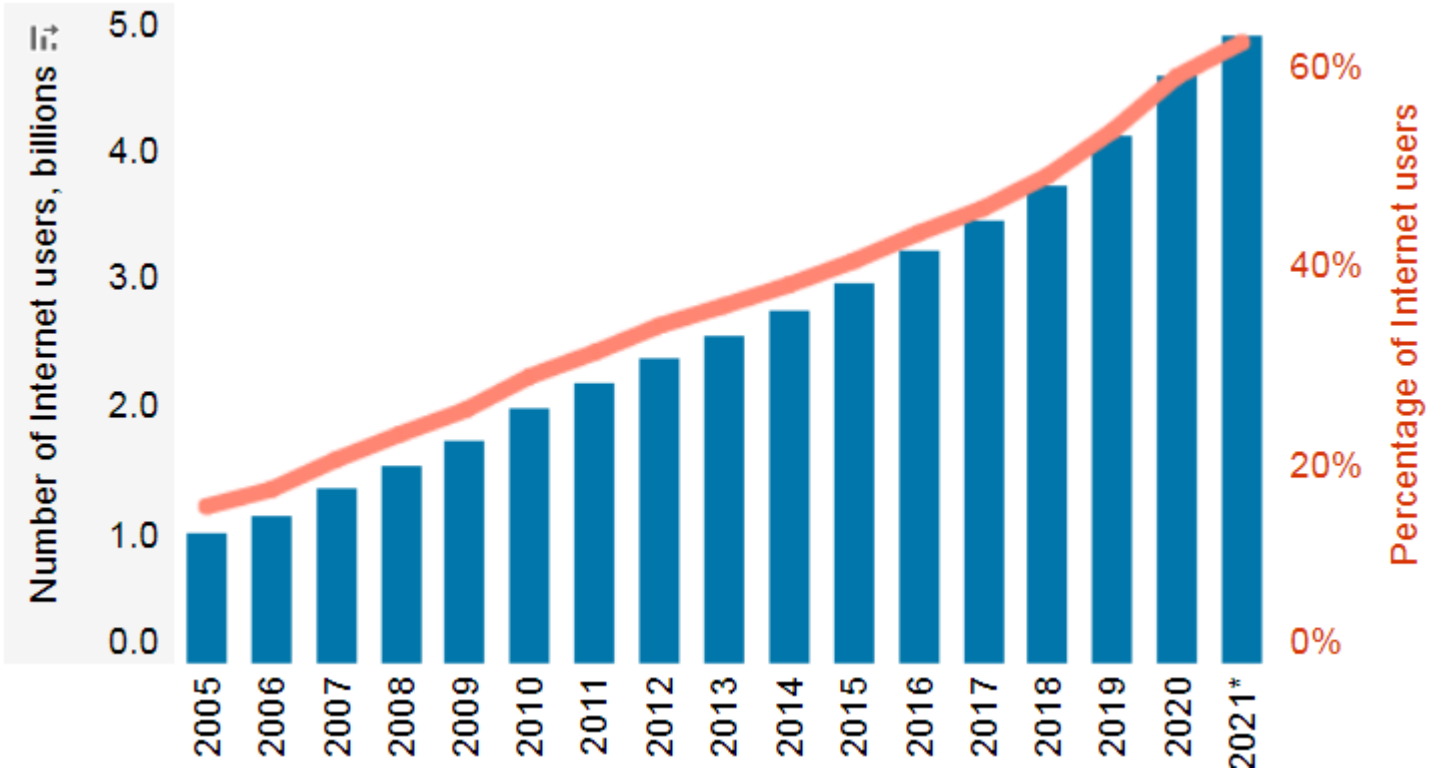
Internet Terminologies

- **Webpage**
  - The document that can be viewed in the web browser is known as the web page.
- **Website**
  - A website is a collection of several web pages. These pages are linked together with hyperlinks..
  - The first page of a website is known as the home page.
- **Web Browser**
  - A web browser is a software application that is used to view web pages,
  - Some of the common web browsers are:
  - Internet Explorer, Firefox, Google Chrome, and Safari.

The World Wide Web (WWW)

- The **internet** is the **physical network** of computers all over the world.
- The **World Wide Web** is a **virtual network** of **web sites** connected by **hyperlinks** (or **"links"**).
- The World Wide Web -- also known as the web OR WWW -- refers to all the public websites or pages that users can access on their local computers and other devices through the internet.
- Web sites are stored on **web servers** on the internet, so the World Wide Web is a part of the internet.

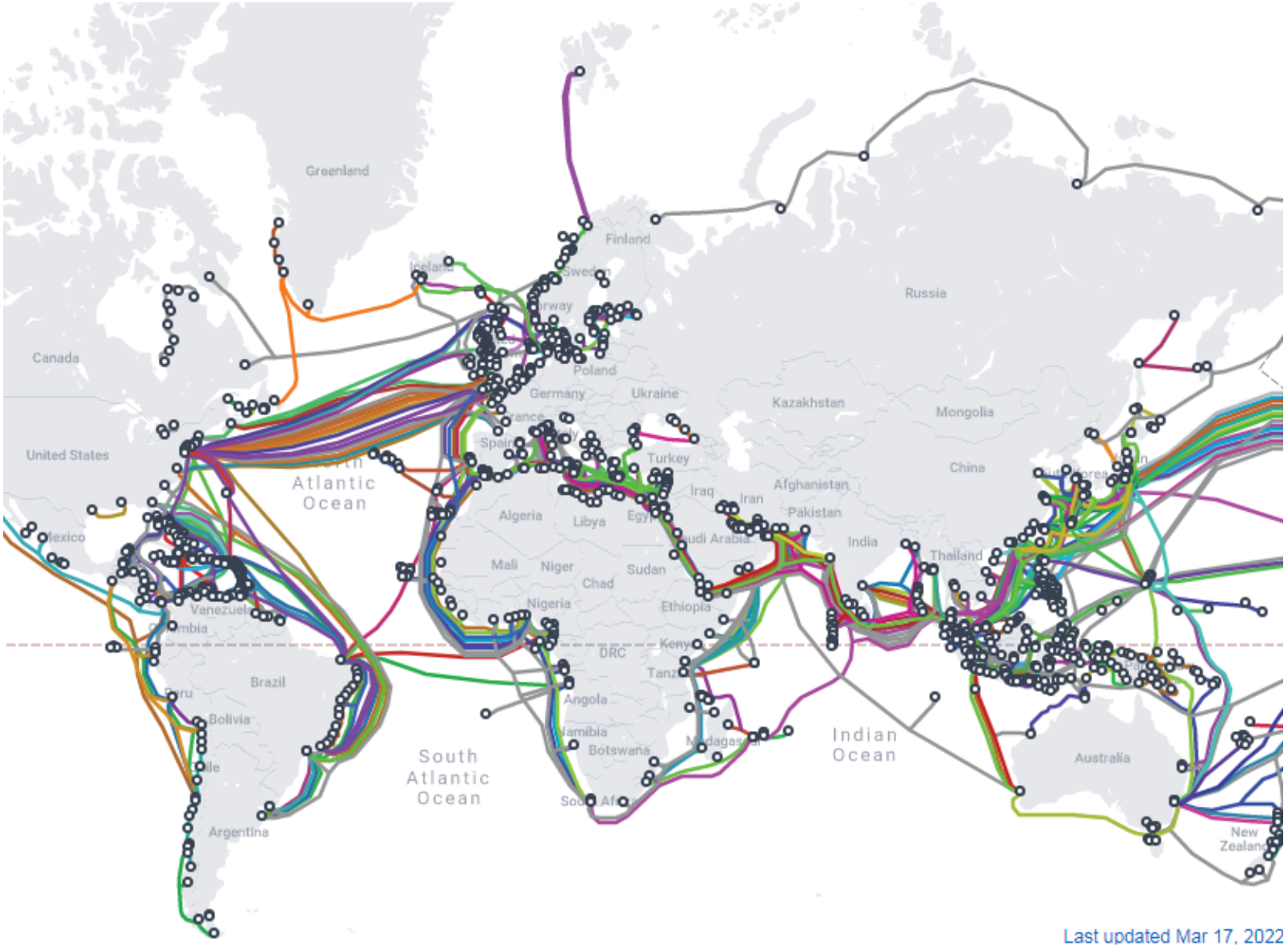
Individual using of the Internet



Approximately there are **4.9 billion** people – or 63% of the world's population are using the Internet in 2021
However, this leaves 2.9 billion people still offline.

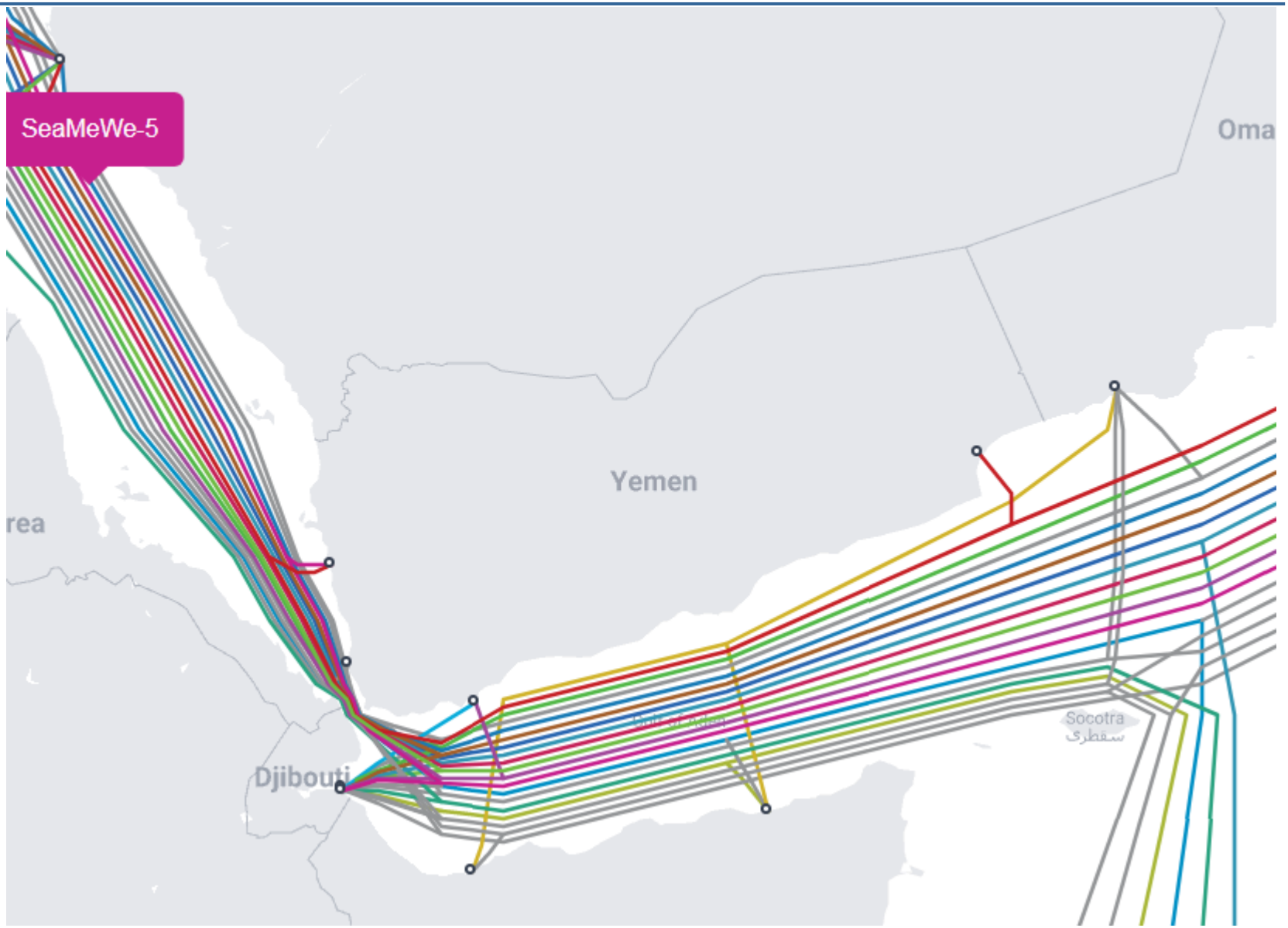
https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx

Submarine Cable Map



https://www.submarinecablemap.com/

Submarine Cable Map - Yemen



Some ways to use the Internet

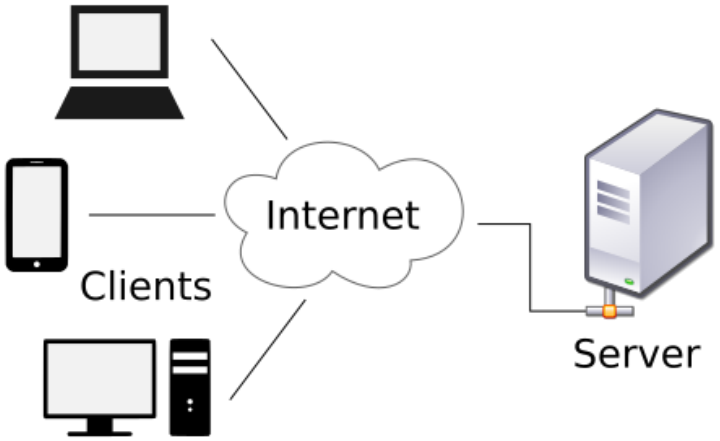
- E-mail
- Research
- Shopping
- News
- Games
- Chat/Messaging/Social Networking

Internet Architecture

- The Internet has Client/Server architecture.
- Key concepts of internet architecture are as follow:
  - Client/ Server
  - IP Address
  - URL: Uniform Resource Locator
  - Domain name

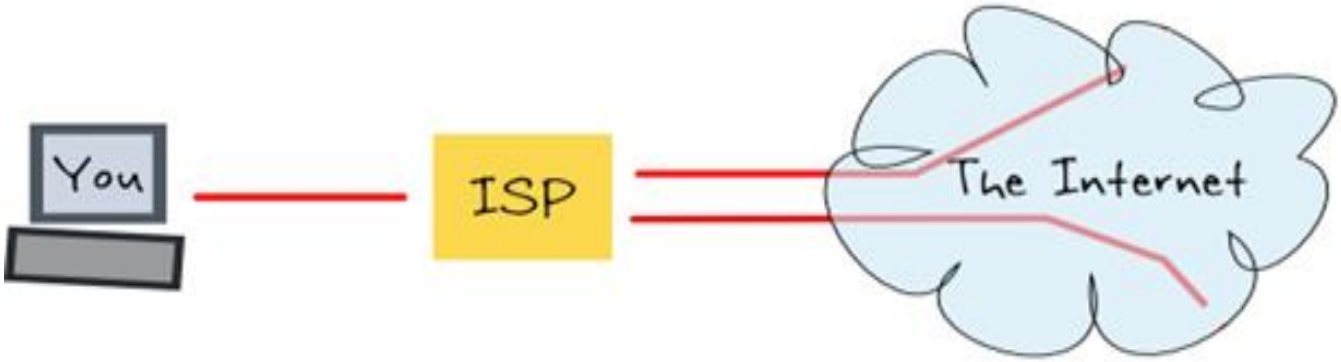
Internet Architecture: Client-Server Architecture

- The Internet has **Client/Server** architecture.
- Each computer or process on the network is either a client or a server.
- **Servers** are powerful computers which provides a function or service to one or many clients, which initiate requests for such services.
- **Clients** are PCs or workstations on which users run applications. Clients rely on servers for resources , such as files , devices , and even processing power.



How does the Internet work?

- Computers that we use every day are called **clients**.
- Your computer connects to the Internet through a system of computers at your Internet Service Provider (**ISP**).
- When you open a webpage on your computer, you connect to the webpage, and then you can access it. Computers break the information into smaller pieces called packets, which are reassembled in their original order.



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- When successfully connected to an ISP, you are assigned an IP address, which is a unique address given to your computer or network and allows it to be found while on the Internet.

- The Internet has no centralized governance in either technological implementation or policies for access and usage.

Protocol

- A protocol is a set of rules defining communication between systems, format, order of messages sent and received among network entities and how to handle errors.

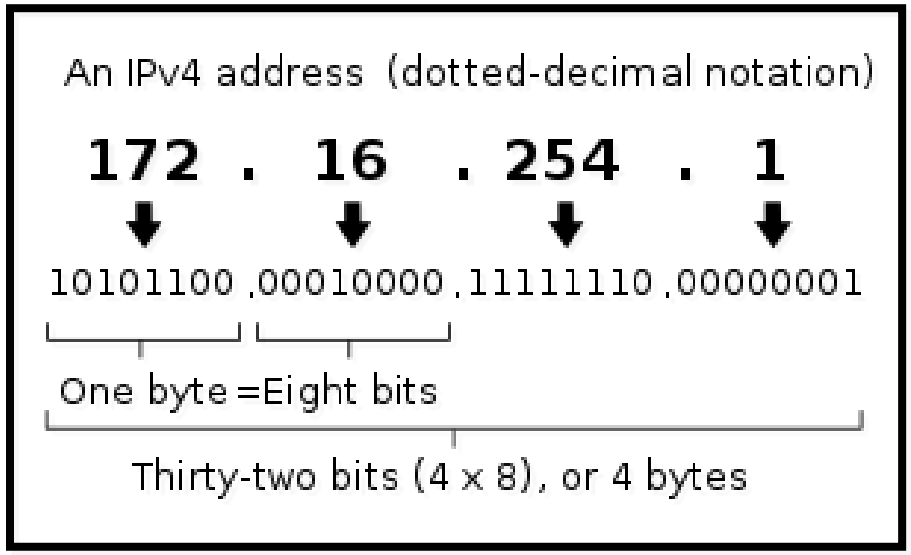
Protocol

- In the internet, interconnection of computers and computer networks using **TCP/IP** (Transport Control Protocol/ Internet Protocol) communication protocol.

- Various application protocols operate over TCP/IP such as:
  - Simple Mail Transfer Protocol - SMTP (E-Mail)
  - Hypertext Transfer Protocol - HTTP (Web)
  - Internet Relay Chat - IRC (Chat)
  - File Transfer Protocol - FTP (software packages), etc.

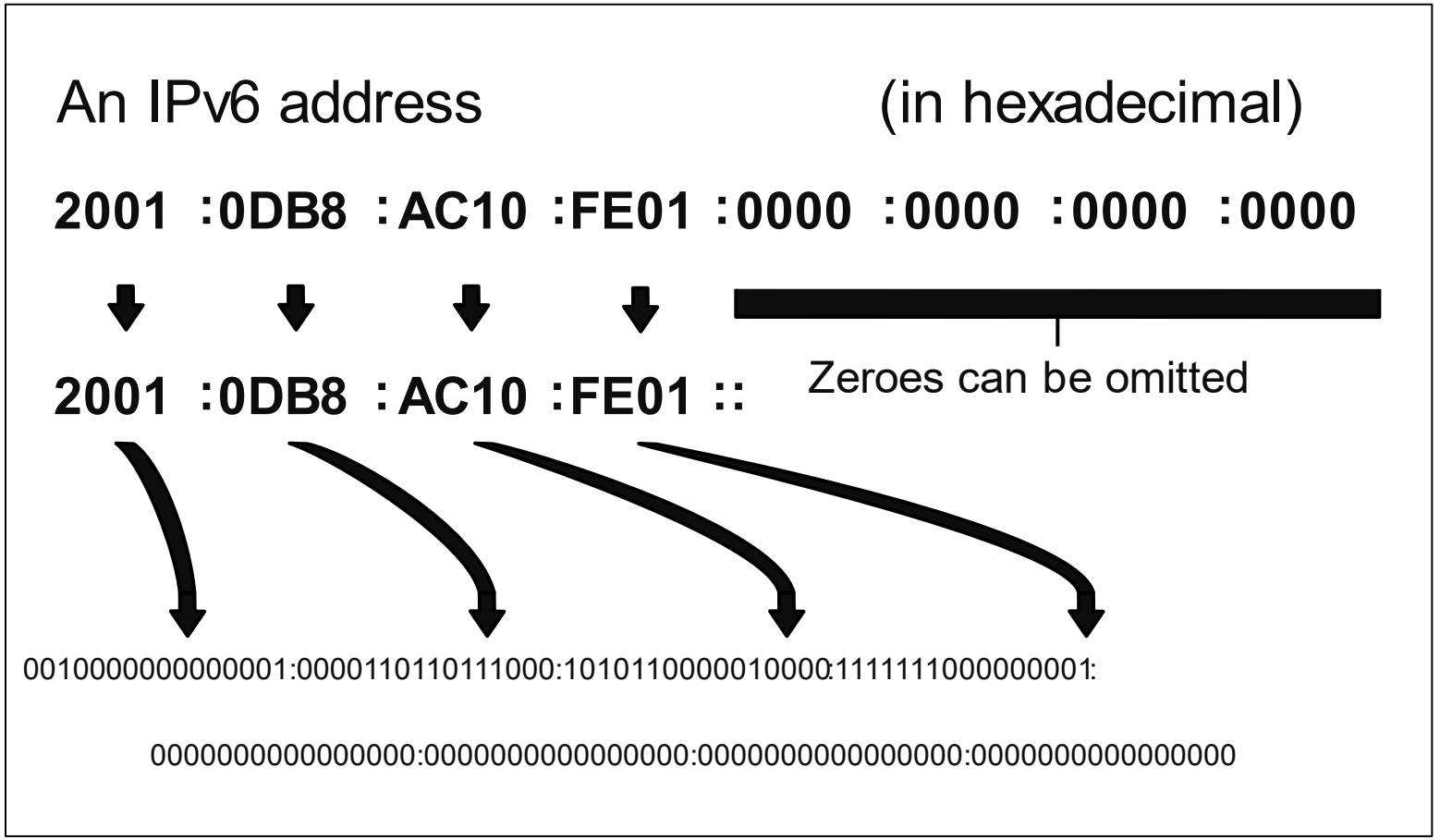
IP addresses

- IP Address is a unique set of numbers (such as 110.22.33.114) which identifies a computer location.
- The IPv4 address (Internet Protocol version 4) has a size of 32 bits, which limits the address space to 4294967296 (2^{32}) addresses.
- In IPv6, the address size was increased from 32 bits in IPv4 to 128 bits, thus providing up to 2^{128} (approximately 3.403×10^{38}) addresses.



IPv6

- IPv6 addresses have a size of 128 bits.



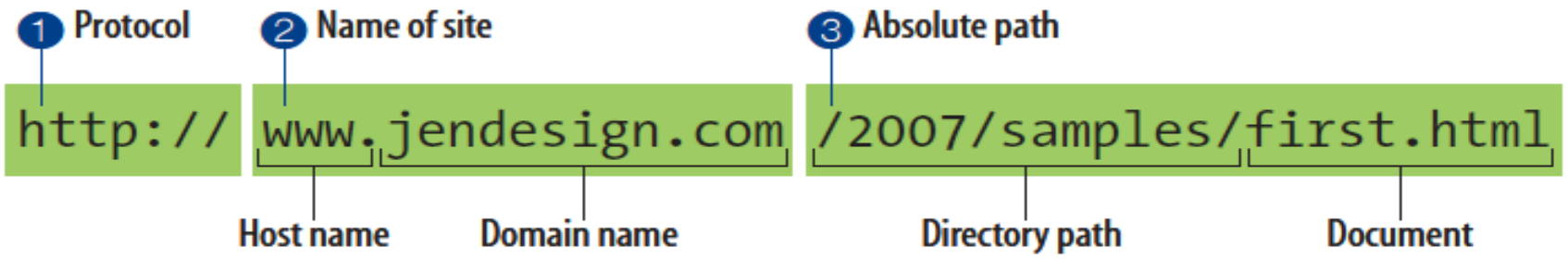
URLs

- **U**niform **R**esource **L**ocator (URL)
  - Has at least two parts
    - **Protocol**
    - **Domain name**
- Top-level domain (TLD)
  - Identifies the type of organization

Domain	Type of organization
.com	Commercial Business
.edu	Education
.gov	U.S. government agency
.int	International Entity
.mil	U.S. military
.net	Networking organization
.org	Non profit organization

Domain Name

- A domain name is a text-based name that corresponds to the IP address of a server that hosts a website.



The parts of a URL.

A Country Code TOP-Level Domain

A **country code top-level domain** (**ccTLD**) is an Internet top-level domain generally used or reserved for a country.

Example:

https://www.yemenmobile.com.ye

Name	Country
.ye	Yemen
.sa	Saudi Arabia
.pk	Pakistan
.jp	Japan
.eg	Egypt
.cn	China

Search Engine

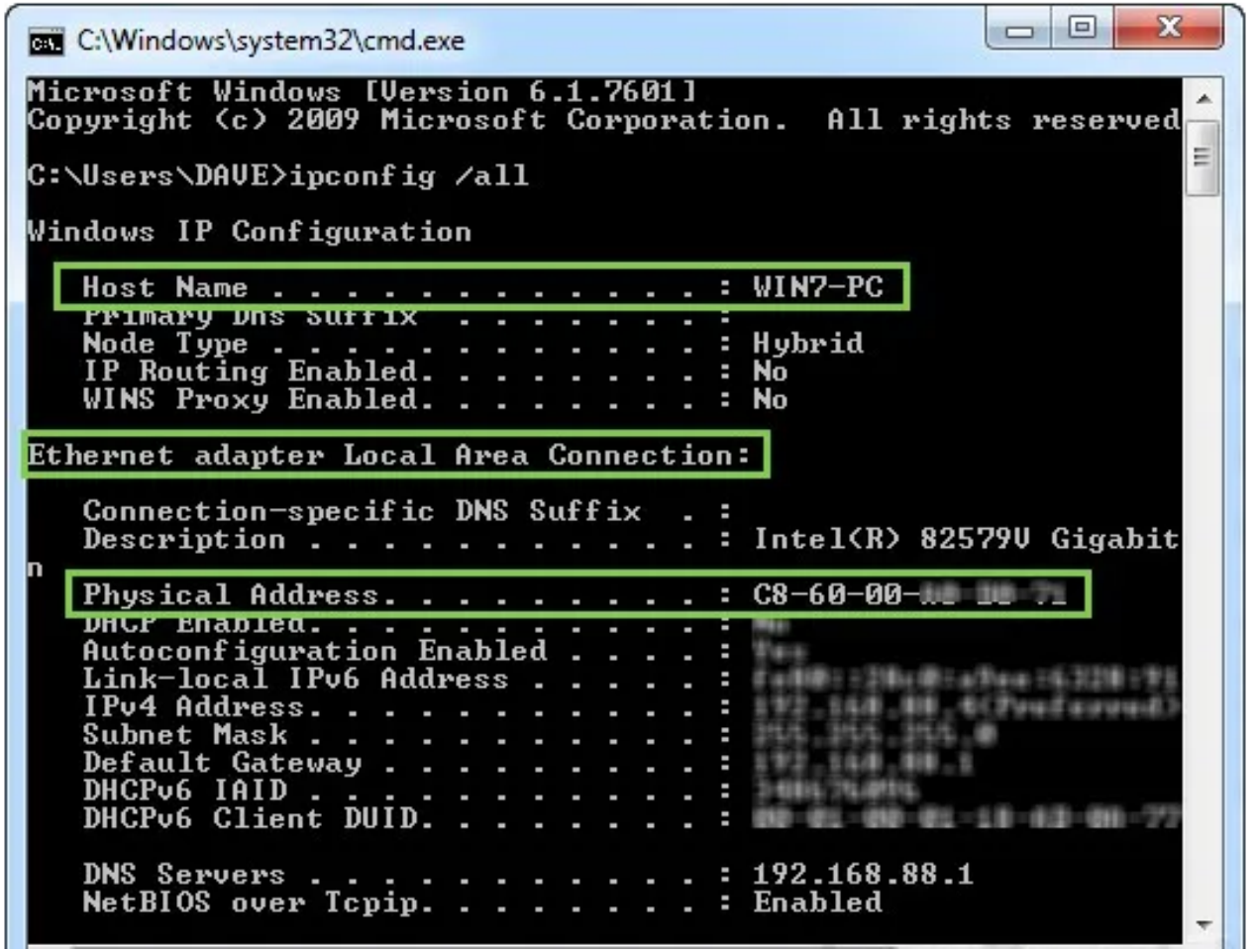
- A web site that will help you search the Internet for key words, subjects, etc.

- Popular examples of search engines are Google, Yahoo!, Bing, and MSN Search.

hostname and Host ID of a computer

- How do I find the hostname and Host ID of a computer?

- Type ‘cmd’ into the search bar
- When the cmd prompt opens, type **ipconfig /all**
- Press **Enter** on your keyboard



Assignment

- What is an Internet of Things (IoT)?