

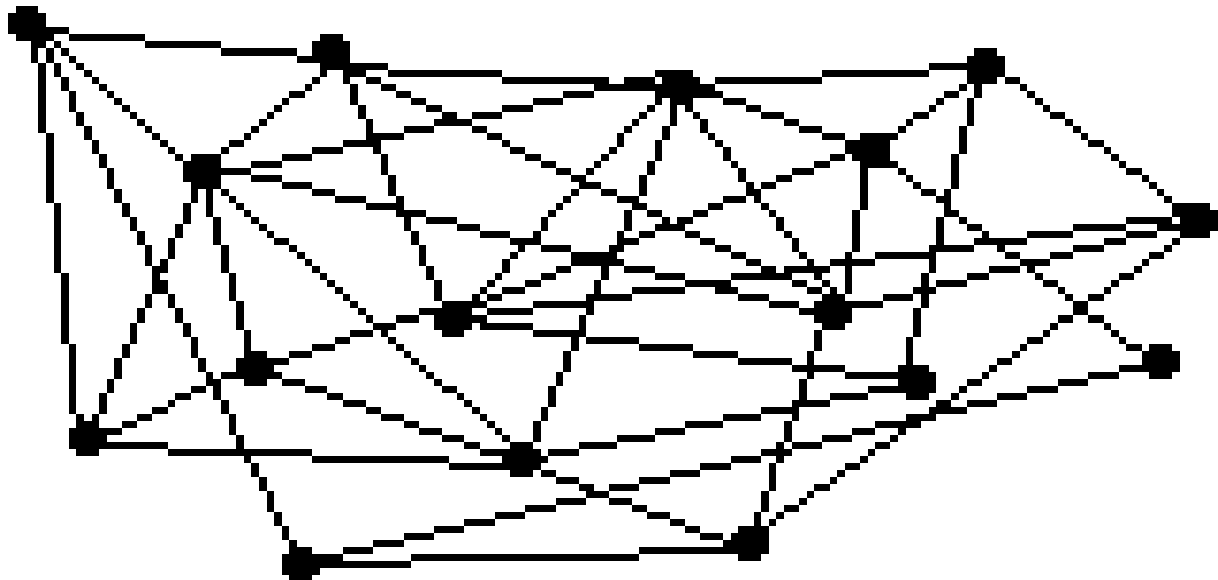
# Internet Architecture & Working

# What is the Internet?

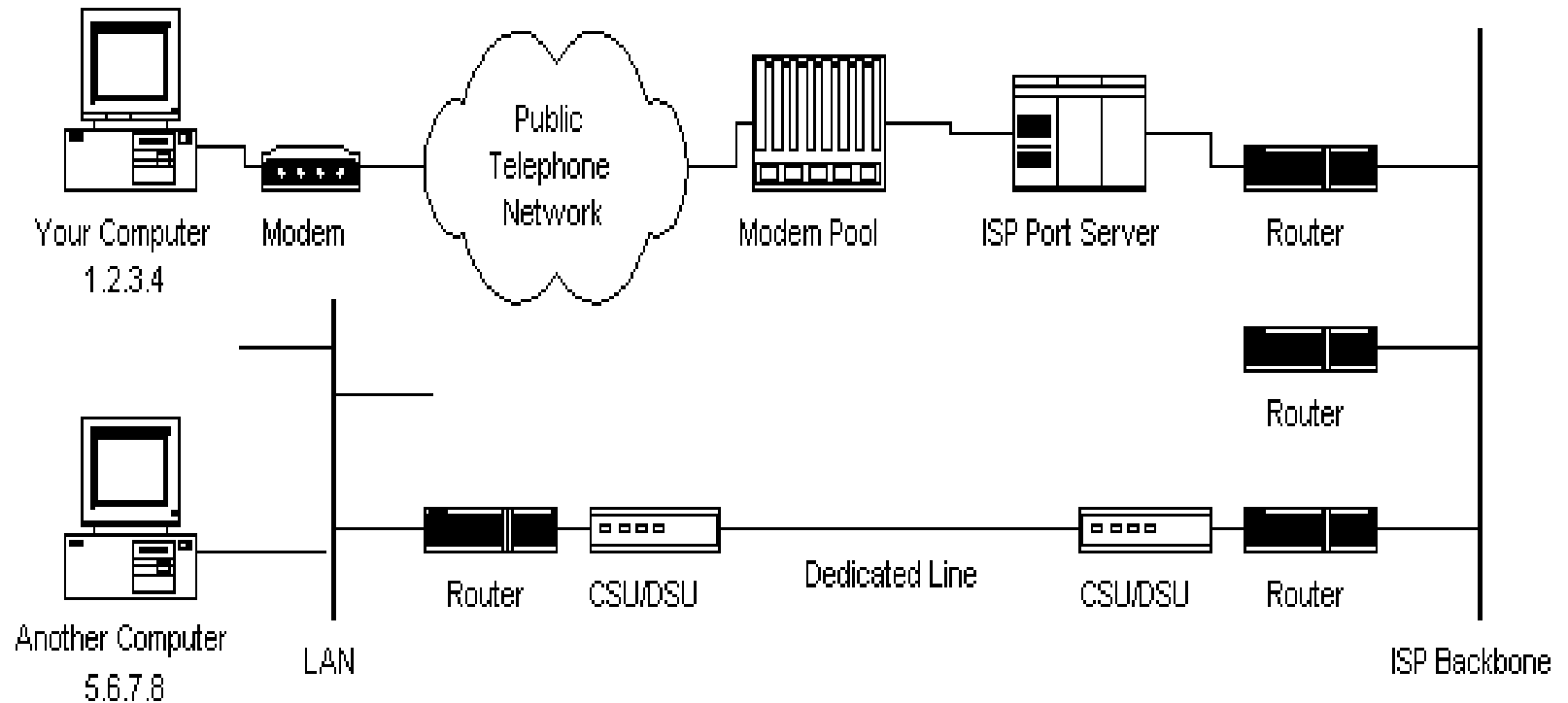
- A network of networks, bringing together people, information, hardware and software around the World.
- You can connect to the Internet:
  - dialing out to an Internet Service Provider (ISP) using SLIP (Serial Line Internet Protocol) or PPP (Point to Point Protocol).
  - directly through Cable Modem, DSL (Digital Subscriber Line), dedicated ISP connection, using TCP/IP (Transmission Control Protocol/ Internet Protocol).

# What is the Internet?

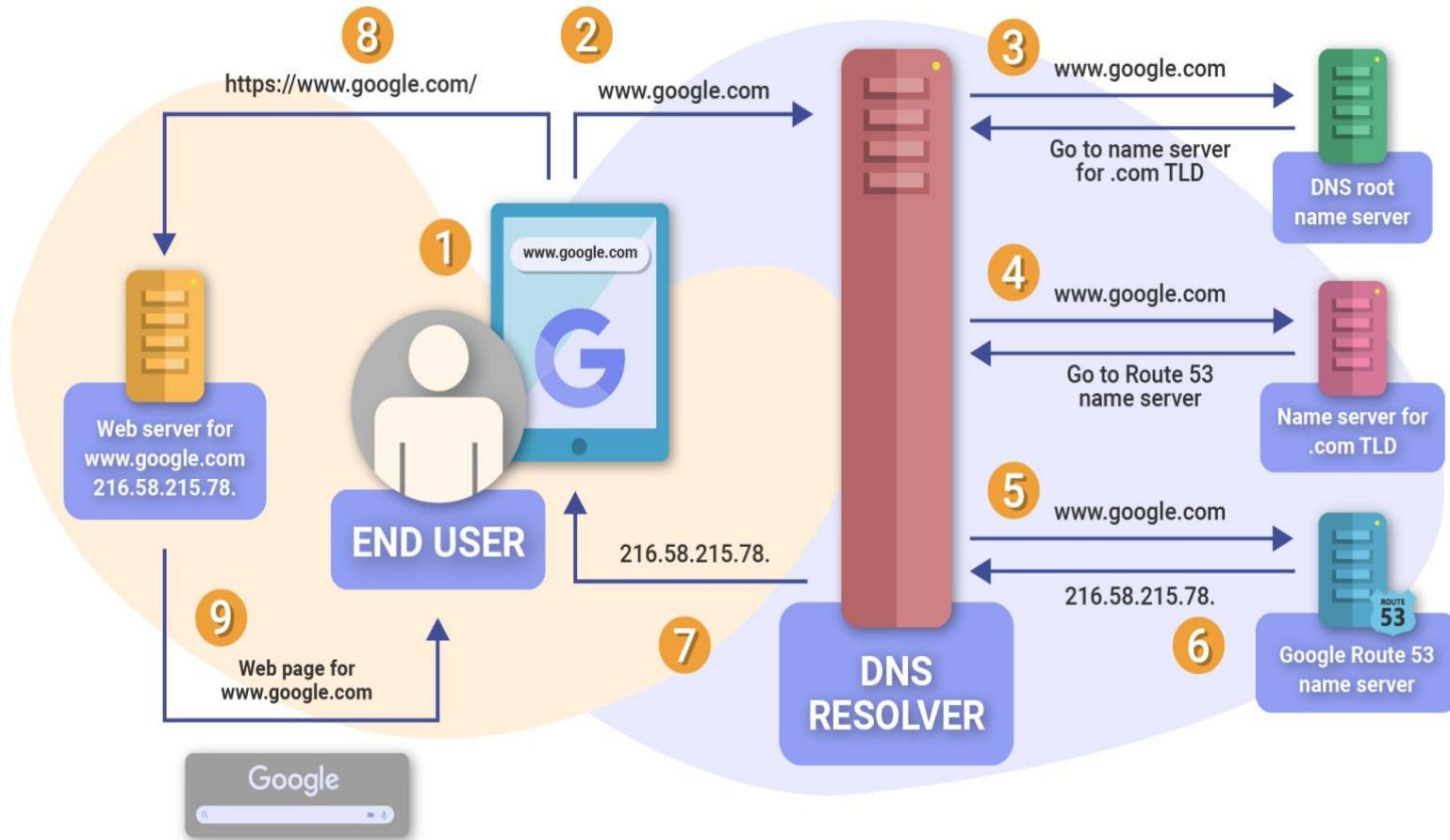
- The Internet is a network of networks of computers.



# Internet Working



# Internet Working



# A Typical Internet Request

- You type in a URL in your web browser (<http://www.google.com>)
- The web browser needs to know the IP address that is assigned to this URL, so it makes a request to a Domain Name Server (DNS).
- The request gets passed along from one name server to the next, until the address is found, or the request times out.

# A Typical Internet Request

- Once the browser has the IP address (123.456.789.123), it can prepare the HTTP request packets and send them to the server.
- The message is divided into packets, which can be addressed with the source and destination IP addresses.

# A Typical Internet Request

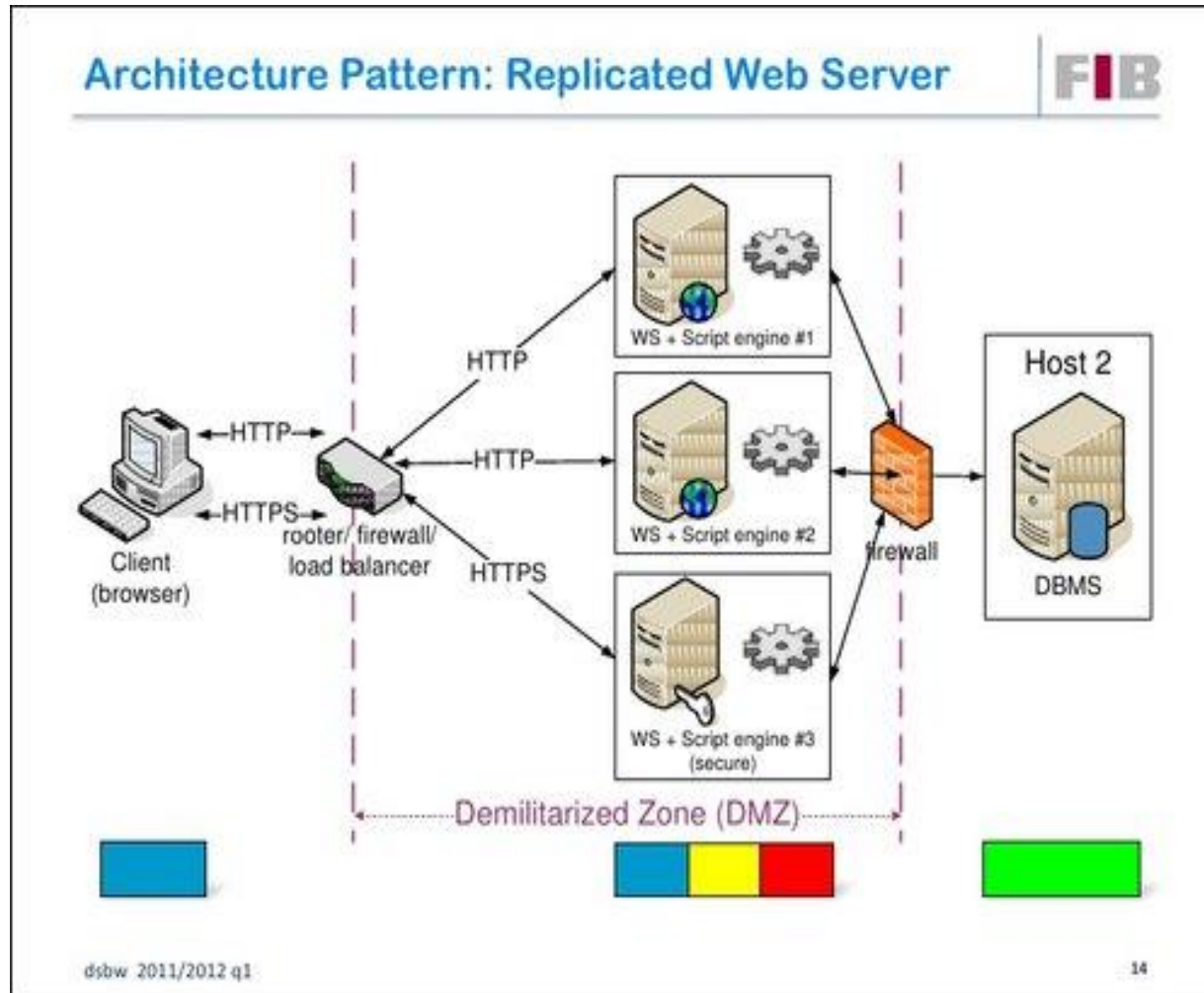
- The message packets are then sent on their way.
- From a dial-up connection, the first step is the ISP.
- The ISP's router looks at the destination address, and if it can't deliver the message, it passes it on to another router, etc. until the message reaches its destination.



# A Typical Internet Request

- The message reaches its destination site, usually a web server, which processes the request.
- It then gets the requested page, if available, and prepares a reply message, including the requested information, and then divides it into packets and sends it back to the originator of the request.

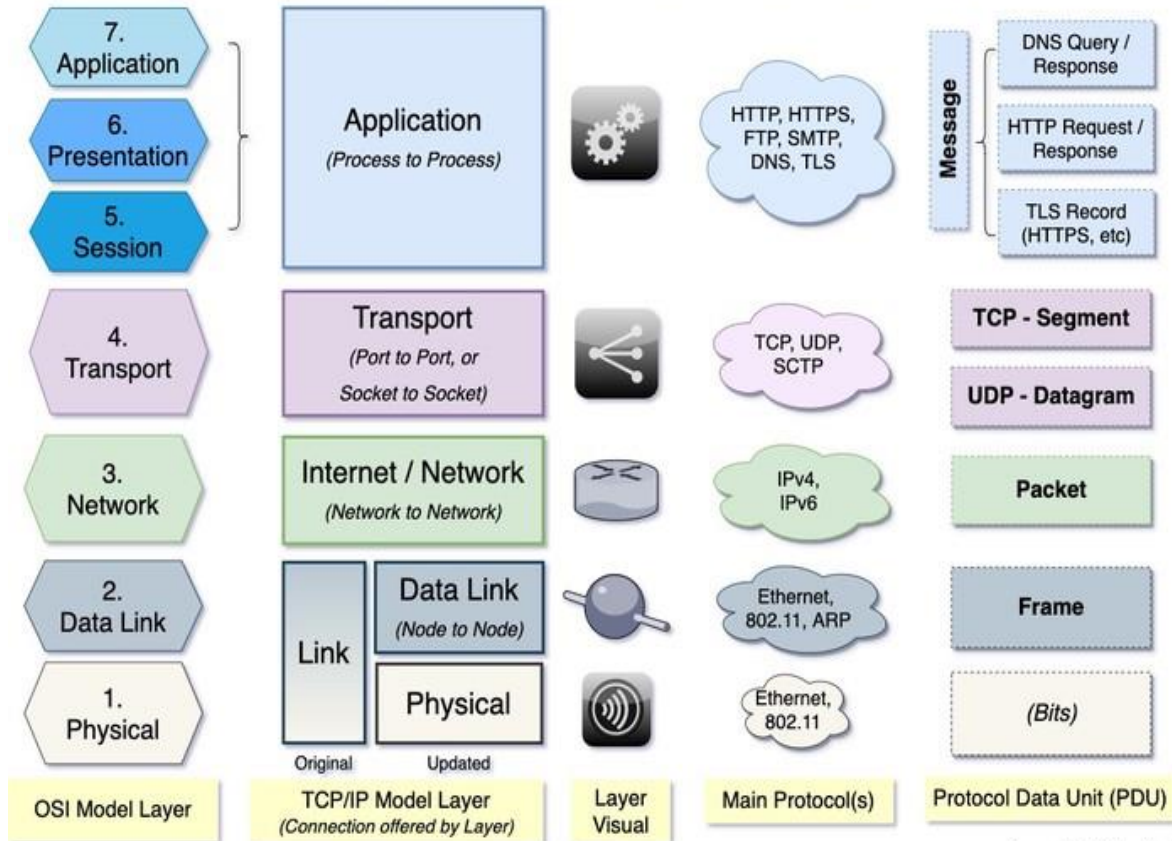
# Architecture Web Server



# Internet Layers

The Internet Layers: Overview of the OSI and TCP/IP Models

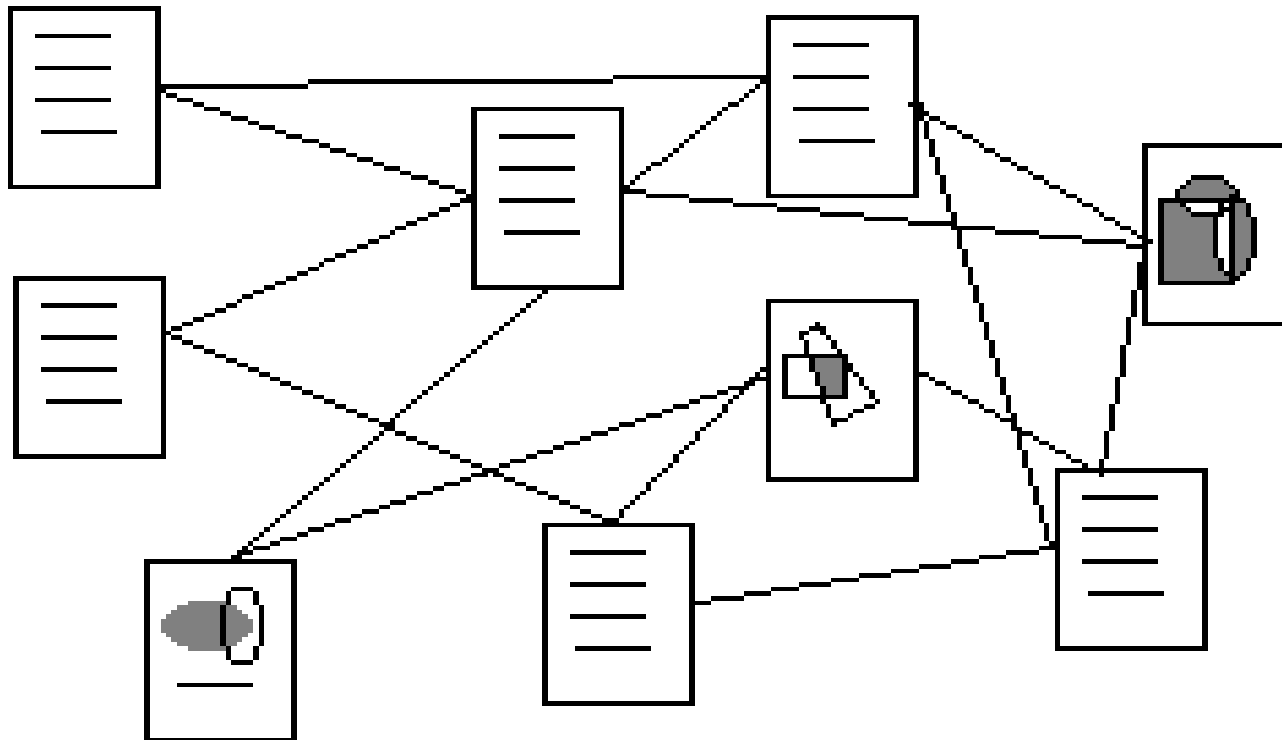
v. 2



Source: Vahid Dejwakh, 2020

# What is the World Wide Web?

- The World Wide Web is a hyperlinked network of documents and other resources found on the computers of the Internet.



# How Domain work?

- For example an Internet address (URL) like home.ublat.edu tell us that this address:
  - (a) belongs to the .edu -- education -- domain,
  - (b) is part of a network called ubalt (of course the name of the UB network), and
  - (c) that the machine (computer) name is home.
  - there are many different (top) domains like gov, mil, com, net, etc, with new ones being added presently.
  - each computer is assigned an IP number, like 198.202.0.35 -- the home.ubalt.edu IP number.
  - a computer with a Fully Qualified Domain Name (FQDN) has a fixed IP number and name registered in the Internet.

# What can you do in the Internet?

- Communications
- Information search
- File manipulation
- Remote control of other computers
- Cruise the Net through hypermedia
- Electronic Commerce

# Communications

- Send/receive e-mail: the main use of the Internet.
- Send/receive Chat room and Instant Messages: same time message exchange.
- Participate in Web Forums: discussions, help and information.
- Participate in Online Communities: Facebook, MySpace, YouTube.
- Participate in Audio and/or Video Conferencing: same time voice and/or video communications.
- Participate in mailing and discussion lists and newsgroups: you can get help and receive news.

# Web browsers

A Web browser contains the basic software you need in order to find, retrieve, view, and send information over the Internet.

This includes software that lets you:

- Send and receive electronic-mail (or e-mail) messages worldwide nearly instantaneously.

- Read messages from newsgroups (or forums) about thousands of topics in which users share information and opinions.

- Browse the World Wide Web (or Web) where you can find a rich variety of text, graphics, and interactive information.



# Information search

- Web search engines like Google, Ask.com, etc.
- Web site directories (portals) like Yahoo, MSN, etc.
- former tools like Gopher, Veronica and WAIS are rarely used today.

# Locating resources

- In order for the WWW to be useful, we need a way of referencing all the resources available.

# URL

## Uniform Resource Locator

- What does a URL do?
- A URL allows every resource (e.g. HTML page, image, sound clip etc.) on the WWW to have a unique address.

# Parts of a URL

http://	www.someaddress.com:	8080/	files/intro.html
Protocol	Domain name	Port	Directory and resource path

- The protocol gives the method of communication to be used. http is most common, but you may see ftp as well.

# Parts of a URL

**http://www.someaddress.com:8080/files/intro.html**

<b>Protocol</b>	<b>Domain name</b>	<b>Port</b>	<b>Directory and resource path</b>
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- The domain name is the name of the computer that has the resource you want.
- This computer is often called the host.

# Domain names

- Domain names are broken down into different levels.
- E.g. `www.someaddress.com`
  - The top level domain name is `com`
  - The second level domain name is `someaddress`
  - The third level domain name is `www`

# Parts of a URL

**http://www.someaddress.com:8080/files/intro.html**

<b>Protocol</b>	<b>Domain name</b>	<b>Port</b>	<b>Directory and resource path</b>
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- The exact path to the desired resource follows the domain name (and port number if given).

# Request/Response

- The HTTP protocol is set up to work in terms of requests and responses.
- In a typical WWW example, you type in a URL in your browser's location window, and press enter.
- Your browser then sends a message (request) to a web server, asking for a given HTML page.
- The web server sends back the page, or a reason it can't comply (response).



# Standards on the Internet/WWW

- Standards related to the World Wide Web (e.g. HTML) are set by the World Wide Web Consortium (W3C)
- URL – [www.w3.org](http://www.w3.org)
- Standards released by the W3C are not necessarily implemented completely or in the same way by different web browsers.

# FTP/TELNET

TELNET: The Internet allows computers to converse with each other over networks. A telnet program allows us to log into a distant computer almost as if we were actually sitting physically at that computer.

FTP: File Transfer Protocol allows us to transfer files between two different computers on the Internet.