

7.3 INTERNET PRINCIPLES OF OPERATION



INTERNET

- The internet is the global network of computers which are all connected allowing us to share information and communicate with each other.

WWW

- The world wide web is the series of web pages and files which are stored on the internet. You don't always use the world wide web when you're on the internet. For example, you might be making a Skype call or playing an online game.

WEB BROWSER

- A web browser is a piece of software for converting the code in which web pages are written in to things you can see and understand. The web browser displays the text, images and video which are contained on the internet in to a clear structure so they can be browsed and viewed easily.



INTRANET

- An **intranet** is a private network accessible only to an organization's staff. A wide range of information and services from an organization's internal IT systems are unavailable to the public, unlike the Internet.

HTTP

- HTTP (HyperText Transfer Protocol), the underlying protocol used by the World Wide Web. HTTP defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands. For example, when you enter a URL in your browser, this actually sends an HTTP command to the Web server directing it to fetch and transmit the requested Web page



PROTOCOLS

Protocols A protocol is the set of rules that define

- how devices communicate. how the communication will start
- the transmission speed
- the significance of the bits being transmitted
- how the bits will be delivered (one at a time or in groups of 16 for example)
- error checking procedures used The Internet Protocol is known as TCP/IP.



IP ADDRESSING

- IP Addressing An Internet Protocol (IP) address is a unique 32-bit reference number that is allocated to devices on a computer network that uses the Internet Protocol.
- IP addresses are stored as 32-bit numbers $2^{(32)} = 4$ billion possible unique IP addresses
- For our convenience IP addresses are usually displayed as a series of 4 decimal numbers, each one representing 8 bits of the original binary address.
- 32-bit binary version: 11001001101000000101101101111111

11001001 → 201

10100000 → 160

01011011 → 91

01111111 → 127

- decimal version: 201.160.91.127
- Some IP addresses are reserved for private network ranges e.g.

10.0.0.0 - 10.255.255.255

172.16.0.0 - 172.31.255.255

192.168.0.0 - 192.168.255.255



MAC ADDRESSING

- MAC Addressing In computer networking, a Media Access Control address (MAC address) is a unique 48-bit number assigned to a network interface card (NIC) to identify it on a LAN. Because they are so long, MAC addresses are usually displayed in hexadecimal.
- 48-bit binary version: 000000000000100101111100111100011111011110000101
- hexadecimal version: 00-09-7C-F1-F7-85
- MAC addresses are stored as 48-bit numbers $2^{(48)} = 281$ trillion possible unique MAC addresses.



UNIFORM RESOURCE LOCATOR (URL)

- A **Uniform Resource Locator (URL)**, colloquially termed a **web address**, is a reference to a web resource that specifies its location on a computer network and a mechanism for retrieving it.

DOMAIN NAME

SYSTEM (DNS)

- The **Domain Name System (DNS)** is a hierarchical decentralized naming system for computers, services, or other resources connected to the Internet or a private network.



WEB ADDRESSES

- Every website address has a **URL** with an equivalent **IP address**. A web address contains (running from left to right):
 - **http(s)**
 - the domain name - the name of the website
 - an area within that website – like a folder or directory
 - the web page name – the actual page that you are viewing
 - For example: `http://www.bbc.co.uk/nature/life/frog`

In this example from BBC Nature:

- *http* is the **protocol**
- *www.bbc.co.uk* is the domain name stored on a **DNS**
- */nature/life/* is the folder structure leading to where the web page is located
- *frog* is the requested web page

