

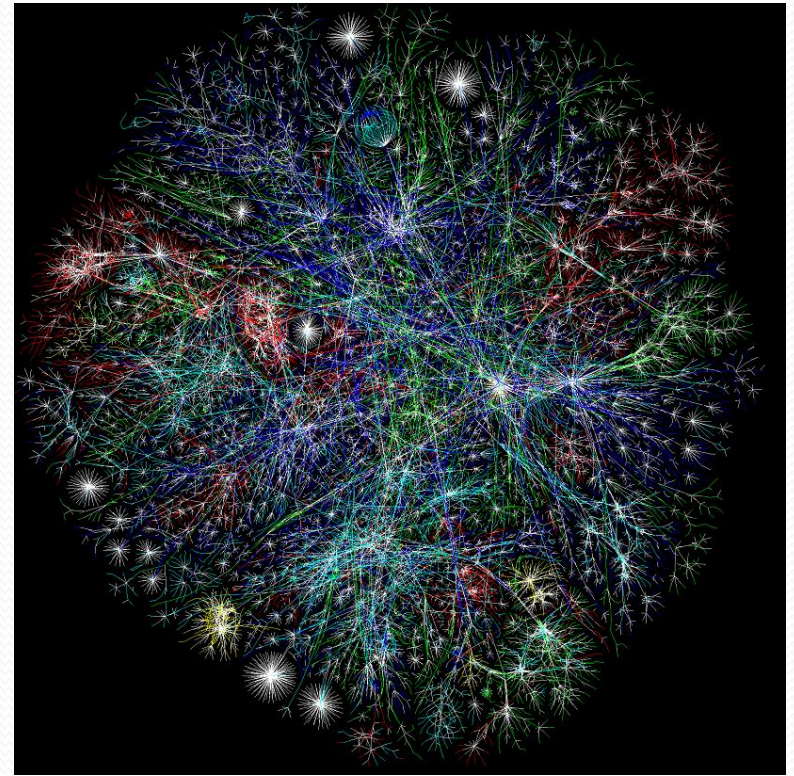
The Internet and the World Wide Web!

What is it all about anyway?

Paul Walsh – CoderDojo Milltown 2014

The Internet

- The Internet is a large group of computers that are connected to each other.
 - It is a network of computer networks of all types; business, educational, recreational and government
 - The internet enables the sharing of information, applications, audio and video between computers, phones and other devices



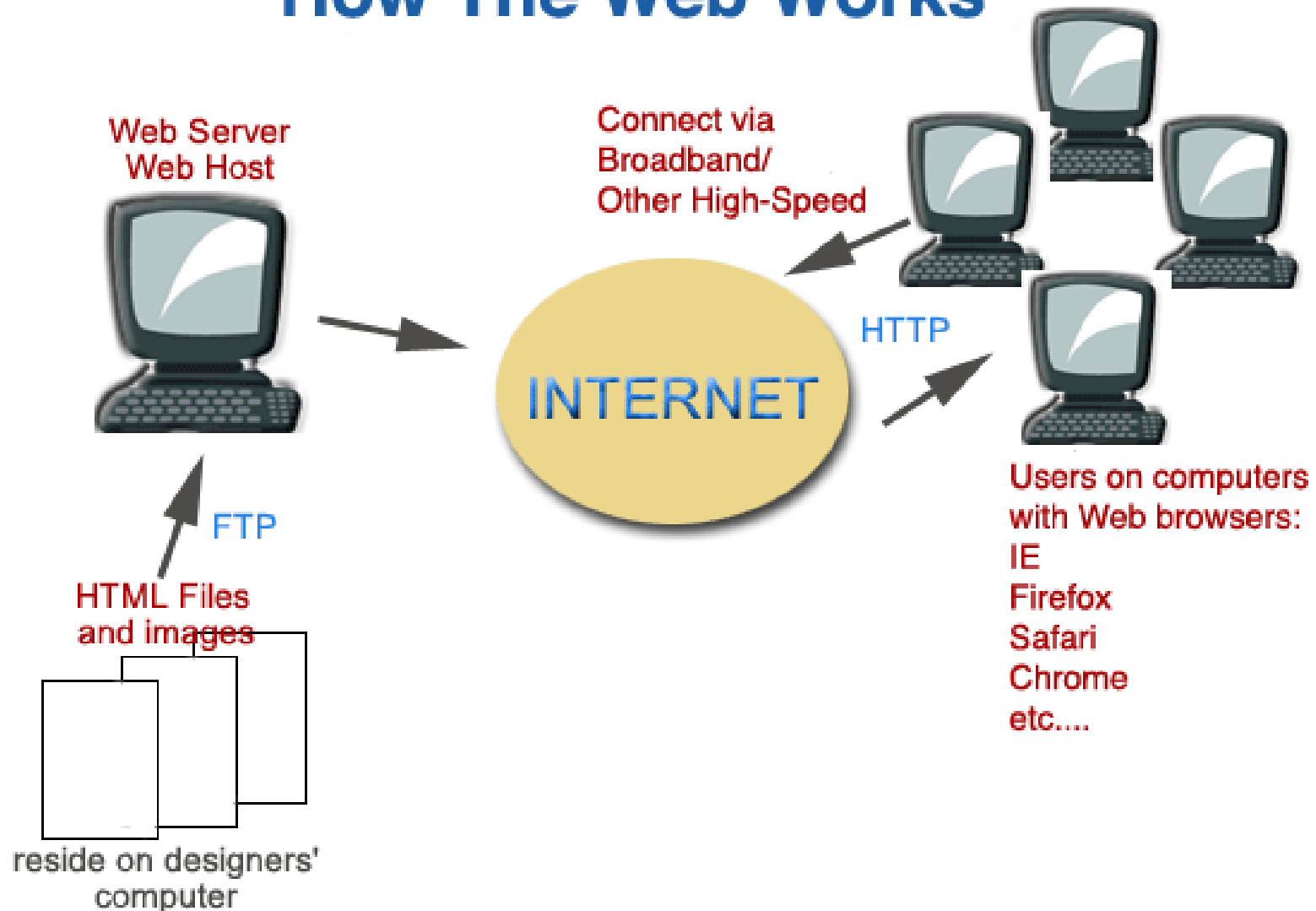
How does it work?

- The Internet Protocol (IP) is a set of rules for sending information between computers on the Internet.
 - Each device or network that uses the Internet has at least one IP address that identifies it to all devices on the planet
- An IP Address is like a postal address on the Internet
 - Format is like **135.231.1.143** (4 blocks of numbers 0 to 254)
 - Only 4.3billion possibilities (we will run out! – IPv6 is replacing IPv4)
 - Special formats **192.168.x.x** / **10.x.x.x** / **172.16.x.x**. reserved for local uses. Home networks generally use **192.168.x.x**
- WWW servers use a public fixed IP address that is mapped to a user-friendly domain name through a service called Domain Name Resolution (DNS)
 - Like Phone Book services on the internet!
 - www.coderdojomilltown.com -> **192.3.149.22**

Services on the Internet

- Different services use different standards or protocols to communicate.
 - These protocols generally use an extra identifier called a port to identify themselves to devices
 - WWW HTTP (Hyper Text Transfer Protocol) uses port 80 and HTTPS (HTTP Secure) uses port 443. All Web browsers like Google Chrome, Internet Explorer and Firefox know this when talking to Web servers
 - So, website for www.coderdojomilltown.com -> 192.3.149.22:80
- Some other examples of Internet Services (Not All!)
 - eMail – POP, IMAP, SMTP to send and receive email
 - File Transfer – FTP (File Transfer Protocol) and SFTP (Secure FTP) to make connections between computers to transfer files
 - Communication and Presence – Session Initiation Protocol (SIP) for voice/video calls via computers and mobile devices (like Skype)
 - Terminal – Telnet and SSH (Secure Shell) for remote access to computers to run commands and install software

How The Web Works



Browsers, Websites and HTML

- Web Browsers and Websites
 - A web browser is a special application that is used to make it easier navigate the world wide web and view/download the documents hosted there
 - Google Chrome, Microsoft Internet Explorer, Apple Safari and Mozilla Firefox are all web browsers
 - Websites are hosted on a web server of a computer connected to the internet and are made up of all sorts of documents, images and media files
 - Any file can be transmitted over HTTP but only some formats are automatically recognised by your web browser
- HTML
 - HTML is Hyper Text Markup Language is type of document standard that Web Browsers recognise and interpret to display formatted documents
 - HTML allows you to format and layout text, images, and forms in an almost unlimited way. Links from texts and other content allow you to create websites which are really just a collection of related HTML webpages.
 - HTML documents are just files to be uploaded/downloaded like any other but when entered/linked on a web browser they are interpreted and displayed.
 - JavaScript and CSS (Cascading style sheets) are other related standards used with HTML to improve layout and interactivity features for web pages

Servers and Databases

- Servers are just computers but they are generally designed from a hardware and software perspective to meet the needs of the server – web server, database etc
- Servers are generally housed in special data centers in racks with special cooling, redundant power and internet connectivity
- All computers including servers run Operating Systems like Microsoft Windows, Apple OSX, Unix or Linux but servers will generally use extra software to a normal computer to run Web Servers or FTP servers
- Most home computers in the world run Microsoft Windows but most servers run Linux. This is due to the history of OS development, cost and efficiency (Linux is free to use and can be installed on cheap powerful servers)
- Apache is the best known web server software
- The more complicated web sites and webservers will use a database to store information captured via the website
- A database is a special application that allows the storage and retrieval of structured data in an efficient way
- Oracle or MySQL are examples of database applications often used with web applications and web sites

Server side programming

- As explained HTML and CSS are used to structure webpages for web browsers to interpret and display.
- Programming languages are also used to generate HTML based interaction, logic and code.
- This is how a website becomes a web application e.g. a banking website that returns your balance
- Examples of languages like this are PHP, Java, Python
- PHP is very common as it is understood by web servers like Apache with no configuration

To setup a public website?

- You need a domain name like myname.com - €10 per year
- A server. Virtual Linux Server - €30 per year (to €1000s)
- A webserver – Apache comes with Linux
- Unless you want to write all the code/HTML most people use content applications to do the hard work
 - Wordpress and Joomla are the best known examples
 - These have prewritten applications and plugins for most scenarios like layout themes, user registration, posting content, linking feeds of news, posting media and pictures.
 - Little to know actual HTML code has to be written unless you actually want to customise
- Content applications like Wordpress depend on databases like MySQL to store the content posted. MySQL comes free with Linux
- Only skills needed to install and configure the server is some basic Linux commands through a SSH terminal and SFTP through applications like Filezilla
- Email can be hosted on the same server

Summary

- Internet – a global super-network of networks
- WWW – public connected web servers and documents
- HTML – browser understandable format on WWW
- Servers – computers designed to serve content or communicate with other computers
- Operating System – software that runs a computer or server like Windows, OSX, Unix or Linux
- Server Programming – turns a website into a web application
- Anyone can create a professional website cheaply in 2014!