Unit 8: e-Commerce

P1 - Technologies

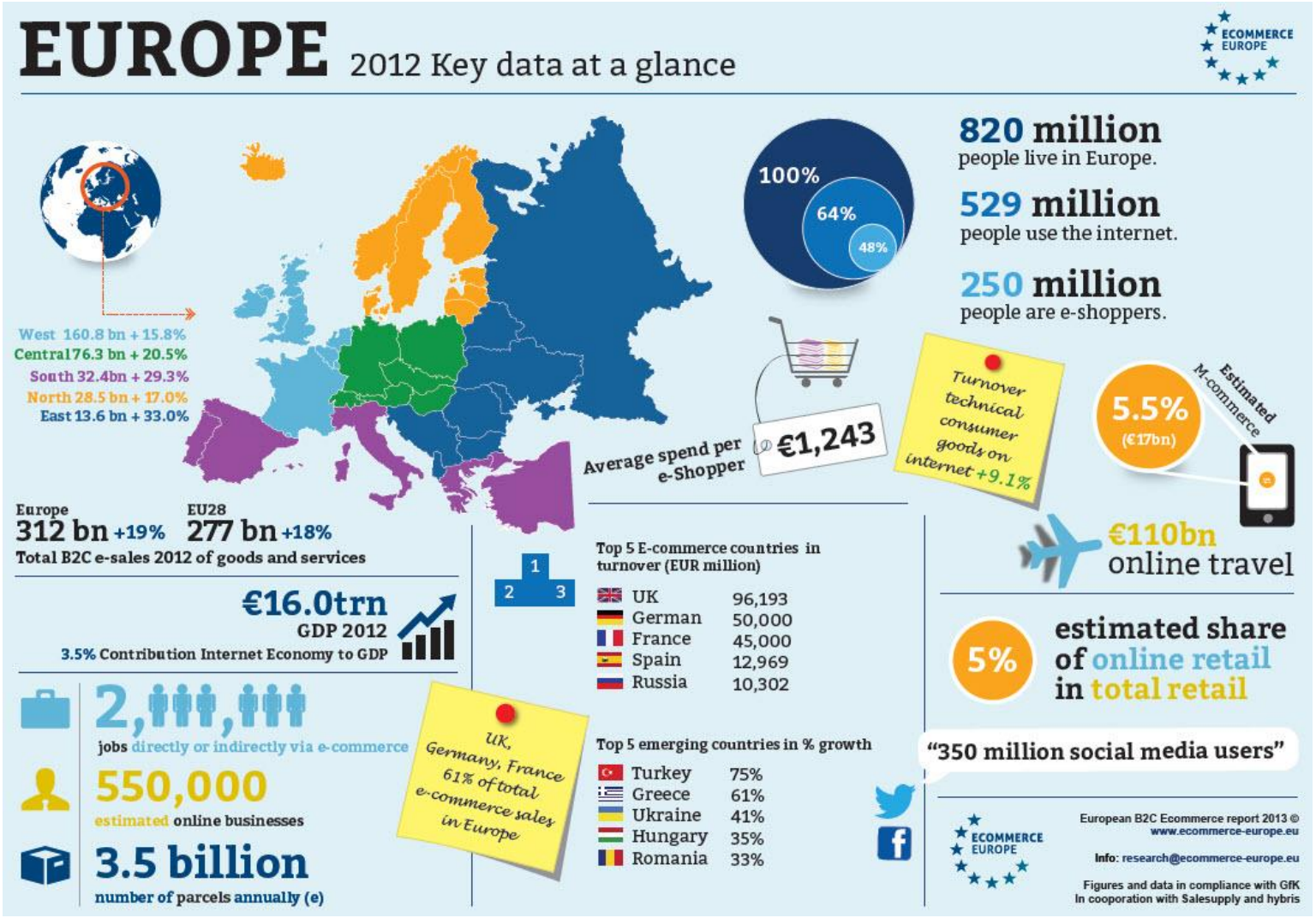
Objectives

- Understand the need to study e-Commerce
- Understand the technologies involved in e-Commerce
- Understand what hardware, software & networking is involved in e-Commerce

What is e-Commerce?

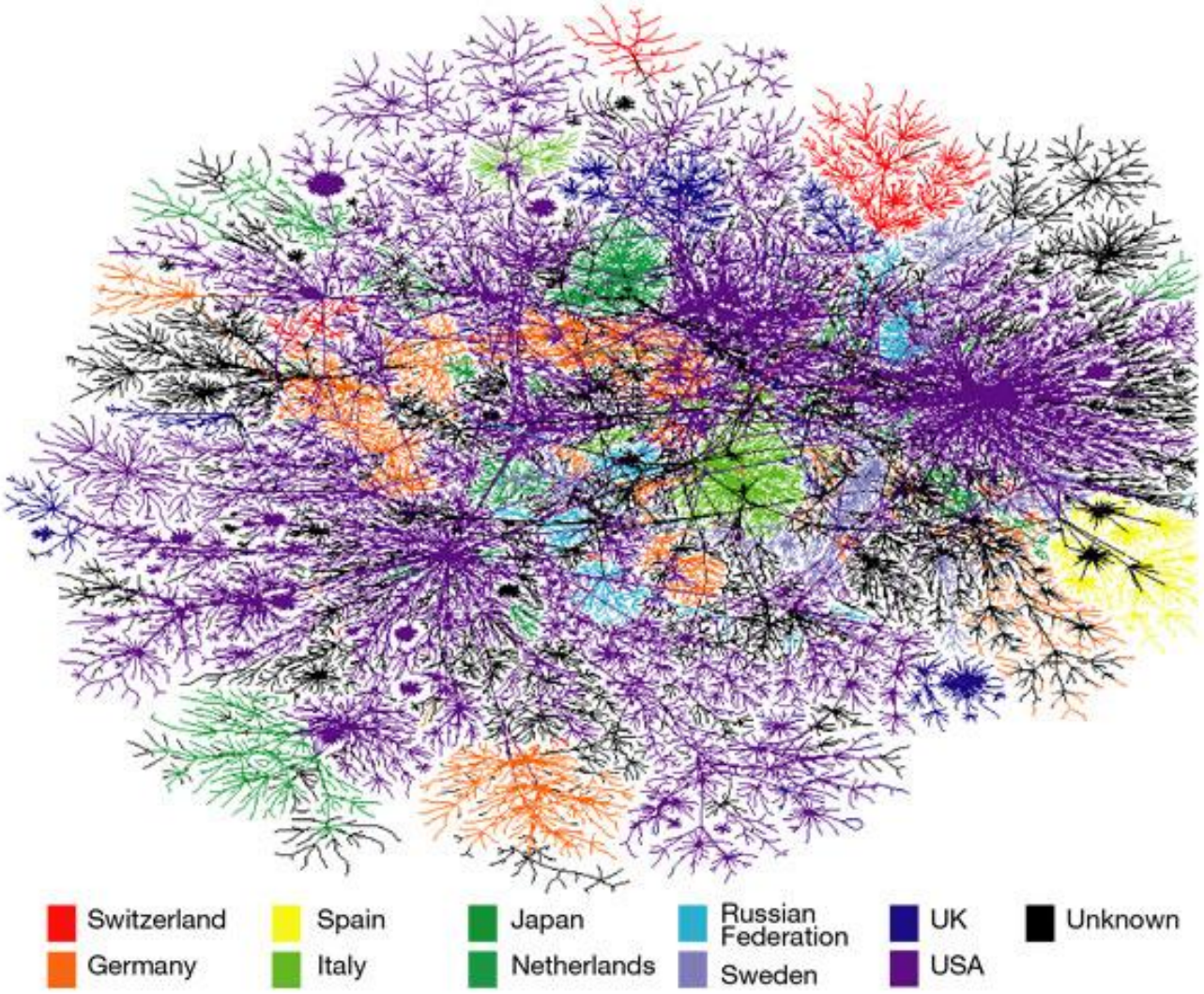
Who uses e-Commerce?

e-Commerce Sales - Europe



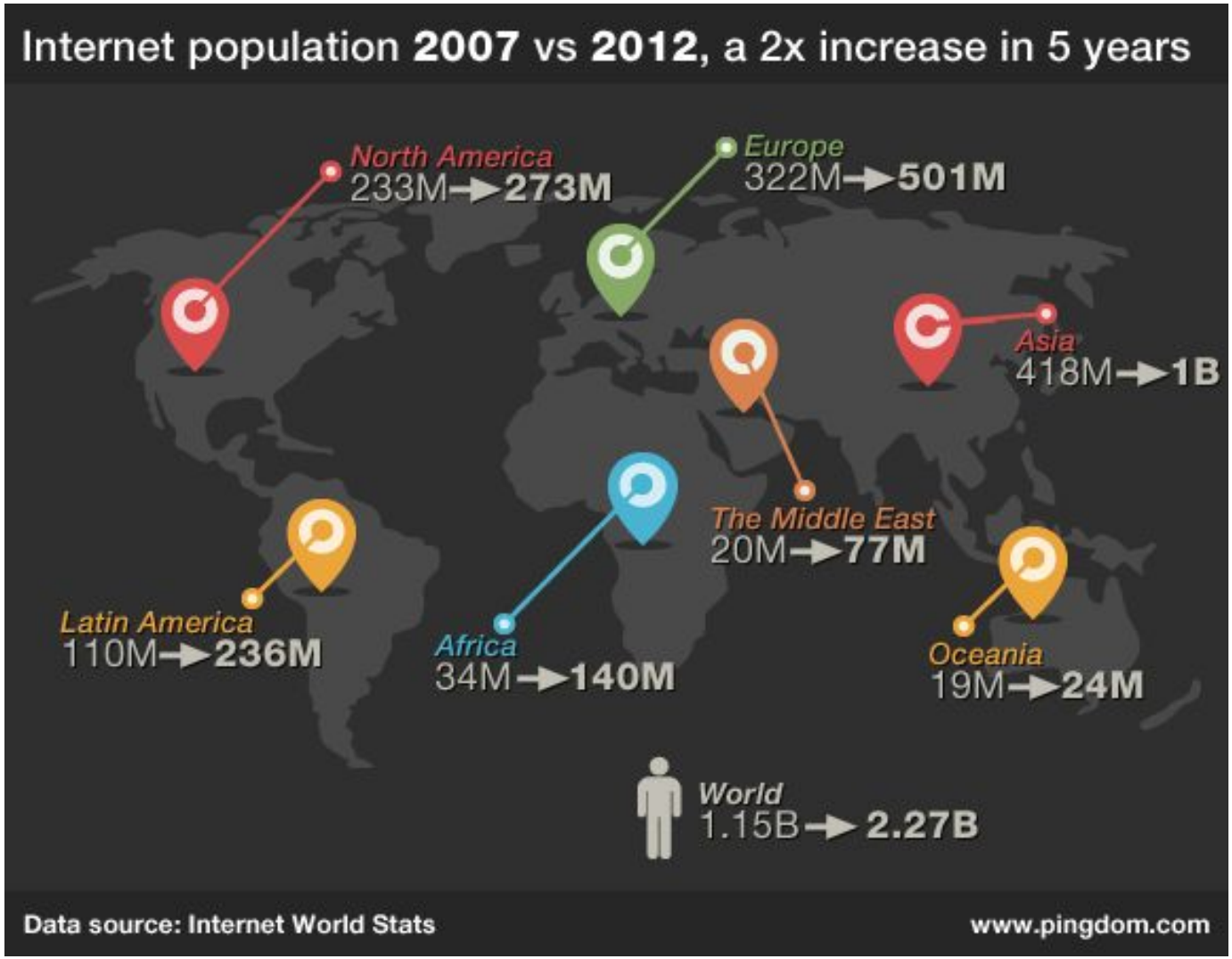
Global Revenues

What is the Internet?



Evolution of the Internet

Why has the Technology developed?



What do we do Online?

- If we did not understand the hardware, software and networking equipment that allows websites and the internet to function how would that impact us?

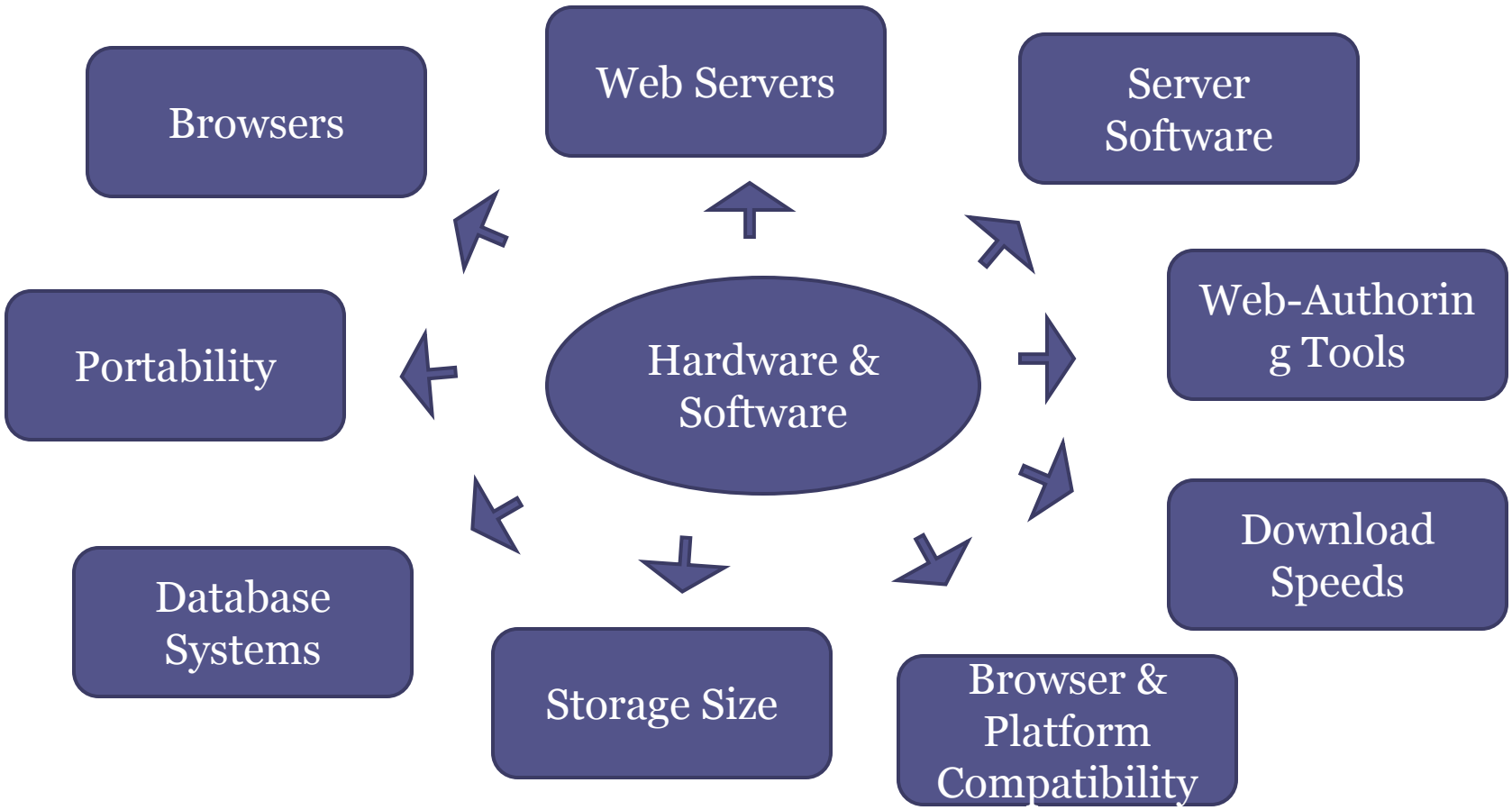
- What happens in one minute on the internet?

What do we do Online?

Activity

- **In Groups**
- What technologies do you think we need for an e-Commerce Website?
- Report back with your findings.

Technologies involved in e-Commerce



Hardware & Software

- Web Servers
- Browsers
- Server Software
- Web Authoring Tools
- Database Systems

Web Servers

- A Web Server is a computer that stores and organises website content written in HyperText Markup Language (HTML)
- Users will access this material via a web browser
- Web Servers are sometimes referred to as a HTTP Server or an Application Server.

Components

- **Hardware**
- Web Server

- Main function to deliver requests to client. A Web server would deliver HTML documents and all associated files such as video, images, style sheets etc.

- A Web servers main purpose is to serve content, a full implementation of HTTP also includes ways of receiving content from clients. This feature is used for submitting web forms, including uploading of files using FTP.

- Many web servers also support server-side scripting such as Active Server Pages (ASP) and PHP. This means that the behaviour of the web server can be scripted in separate files, while the actual server software remains unchanged. Usually, this function is used to create HTML documents "on-the-fly" as opposed to returning fixed documents. This is referred to as dynamic and static content respectively. The former is primarily used for retrieving and/or modifying information from databases. The latter is, however, typically much faster and more easily cached.

Components

- **Hardware**
- Web Server

- Web servers are not always used for the world wide web. They can also be found embedded in devices such as printers, routers, webcams and serving only a local network. The web server may then be used as a part of a system for monitoring and/or administrating the device in question.

Browsers

- In order to access the content of internet sites, users need to have a web browser client.
- A browser is a specialist software application which locates and then facilitates the display of the hypertext (stored on the server) on your computers monitor
- Through the browser the user is then able to interact with the web content

Browsers

- Examples include:
  - Microsoft IE, Mozilla Firefox, Avant Browser II, Smart Bro 2.6, Netscape 8.1.2, Safari RRS
- Common components include:
  - Address bar, search engine, search bar, bookmarks, done
- Search engine (google)
  - Web, Images, Groups, News, Product Search

Server Software

- Two main server software solutions are:-
  - Microsoft IIS (internet information server)
  - Apache HTTP Server
- Apache has 60% of the web-server market
- Microsoft IIS has 30%
- Remaining server software coming from Sun and Zeus
- Contains utilities, services specifically directed at managing the serving of web-page content to remote clients

Server Software – Utilities & Services

- Organising multiple web sites
- Logging requests and resources successfully served to clients
- Logging faults and errors
- Filtering requests based on client IP addresses
- Interfacing with server-side scripting languages to provide automation and user interaction
- Interfacing with server-side database systems to provide dynamic content

Web-Authoring Tools

- A web-authoring tool is basically a software application that is used to generate web pages
- This software includes HTML/text editors such as:
  - Adobe Page Mill, Adobe Homesite, AOL Press, Coffee Cup HTML Editor
- And combined site management and editing products such as:
  - Adobe Dreamweaver, Microsoft FrontPage, HoTMetal Pro
- The most common web-authoring techniques are text and html editors

Database Systems

- Developers of websites, where a database is essential, have a number of options in terms of how the database can be integrated with the web-site
- The simplest and probably most easily understandable solution would be to create a database using Microsoft SQL Server, then manipulate the database using, Adobe Dreamweaver
- Dreamweaver will be using the database as the data source to generate the dynamic content of the web-pages

Database Systems Cont...

- Alternatively, the database can be developed using a combination of open source tools like PHP and MYSQL
- PHP (PHP hypertext pre-processor) is a server-side scripting language that can be used across different platforms (Microsoft Windows or Linux)
- MYSQL (SQL stands for structured query language), is a database system based on relational principles
- This requires heavy coding, these products are generally classified as non-WYSIWYG

Database Systems Cont...

- So, the range of alternatives for creating dynamic web-based database solutions include:

Tool	Description
ASP, ASP .NET	Active Server Page From the Microsoft stable. ASP creates web pages dynamically using scripts, HTML and ActiveX components
JSP	Java Server Page Developed by the Sun Corporation, uses servlets to modify the HTML content of a web page once it has been requested and before it is sent to the user
CGI	Common Gateway Interface This is relatively standard technology that extends web-server utilisation capabilities

Networking

- TCP/IP addresses
- Ports & Protocols

Why is it important to have standards for communicating?

- To enable devices to communicate together
- To allow devices to be guaranteed as reliable
- To allow purchasers to know the device will work

Networking

- Many Internet users are familiar with the higher layer application protocols that use TCP/IP to get to the Internet. These include the World Wide Web's Hypertext Transfer Protocol (HTTP), the File Transfer Protocol (FTP), Telnet (Telnet) which lets you logon to remote computers, and the Simple Mail Transfer Protocol (SMTP).

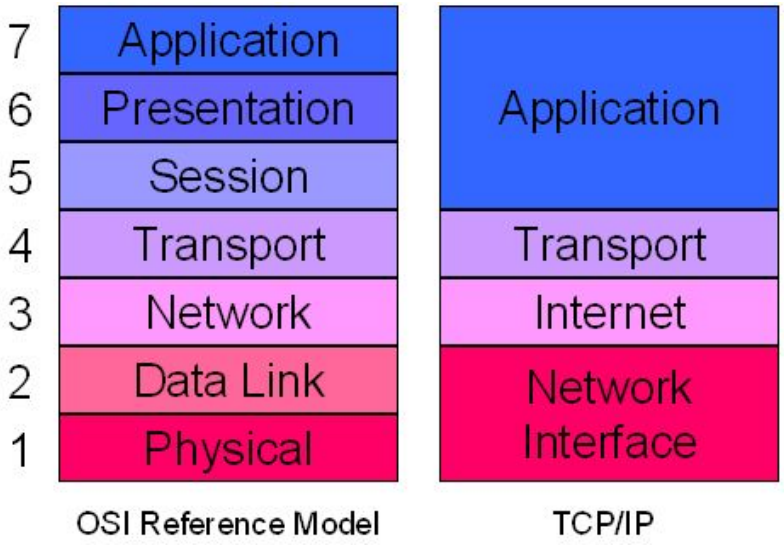
  These and other protocols are often packaged together with TCP/IP as a "suite."

Components

- **Protocols**
- TCP/IP (transmission control protocol/Internet protocol) is responsible for transporting data and making sure it reaches the right address. This is included in every data package that is sent across the internet.

- It consists of four layers

- - link layer
- - Internet layer
- - Transport layer
- - **Application layer**



Components

- **Protocols**
- Each layer deals with a different purpose.

- **Link Layer/Network Interface Layer** – lowest layer, deals with hardware, navigating through the myriad of routers, servers and other machinery to reach its destination.

- **Internet Layer** – focuses on the targeting of the IP address.

- **Transport Layer** – Establishes communications between hosts and moves the package towards its destination.

- **Application Layer** - the application layer is used by network applications. These programs are what actually implement the functions performed by users on the network such as HTTP, FTP, SMTP etc

TCP/IP Addresses, Ports & Protocols

- TCP/IP (Transmission Control Protocol/Internet Protocol) is the basic communication language or protocol of the Internet.

- It can also be used as a communications protocol in a private network (either an intranet or an extranet). When you are set up with direct access to the Internet, your computer is provided with a copy of the TCP/IP program just as every other computer that you may send messages to or get information from also has a copy of TCP/IP.

TCP/IP Addresses, Ports & Protocols

- TCP/IP is a two-layer program. The higher layer, Transmission Control Protocol, manages the assembling of a message or file into smaller packets that are transmitted over the Internet and received by a TCP layer that reassembles the packets into the original message.

- The lower layer, Internet Protocol, handles the address part of each packet so that it gets to the right destination. Each gateway computer on the network checks this address to see where to forward the message. Even though some packets from the same message are routed differently than others, they'll be reassembled at the destination.

TCP/IP Addresses, Ports & Protocols

- TCP/IP communication is primarily point-to-point, meaning each communication is from one point (or host computer) in the network to another point or host computer.

- TCP/IP and the higher-level applications that use it are collectively said to be "stateless" because each client request is considered a new request unrelated to any previous one (unlike ordinary phone conversations that require a dedicated connection for the call duration). Being stateless frees network paths so that everyone can use them continuously.

Transmission Control Protocol (TCP)

- Is a connection-oriented transport protocol
- Its primary job is to verify that data has been correctly delivered from source to destination
- In addition, TCP can:
  - Detect errors
  - Detect duplicate messages, discarding them as necessary
  - Detect lost data
  - Request retransmission of data until satisfied that it is both correct and complete
  - Use flow control to slow data transfer if the receiving node cannot keep up

Protocols

In URLs there are a range of protocols that allow users to access different aspects of the Internet

Protocol	Accesses
http://	Web servers
https://	Secure web servers (often used when you are trying to gain remote access to secure web content) for example when someone accesses their organisation's email systems remotely, transmitting credit-card information or logon details
news://	Newsgroups (as long as the user has subscribed)
ftp://	File transfer protocol servers and related files
file://	HTML documents stored on your local hard drive (although the full path does need to be defined)

Internet Communication

- Internet communication relies on a number of different technologies, each bringing its own terminology and jargon

- HTTP (HyperText Transfer Protocol)
  - Performs the requests and retrieval functions when a web browser tries to load a particular web page

Internet Communication

- URL (Uniform Resource Locator) is the address of a resource available on the internet
- HTTPS (HTTP Secured) is used for security-sensitive communications such as:-
  - Online payment transactions
  - Online banking
  - Corporate log-ons

Internet Communication

- File Transfer Protocol (FTP) is a common method of moving files over a network
- Simple Mail Transfer Protocol (SMTP) is a protocol used to send and receive mail messages between servers

Considerations

- Domain Names/Structure
- Multiple registration of domains
- Download Speeds
- Browser & Platform Compatibility

Domain Names/Structure

- Each website is identified by the **IP address** of its web server.
- A website purchases a domain name on the internet as an IP address are often complicated to remember. The IP address and domain name are then linked.
- A domain name is the characters that appear between the prefix (eg:www.) and the suffix (eg.com). An example is google.

Domain Names/Structure

- A domain name is part of a larger Internet address called a "URL". A URL goes into much more detail than a domain name, providing much more information, including the specific page address, folder name, machine name, and protocol language.

- Example Uniform Resource Locator pages, with their domain names in bold.

http://www.**nytimes.com**/2007/07/19/books/19potter.html
http://www.**gamesindustry.biz**/content_page.php?aid=26858
http://www.**spain.info**/TourSpain/Destinos/

Domain Names/Structure

- Trying to remember IP addresses is as difficult as trying to remember people's phone numbers. Not many people do it well and you are far more likely to be using a domain name to access a website.

- A domain name allows us to link to servers and other computers using easily remembered names. The domain name also tells us a bit about the location we are visiting through the use of top level domain names

Domain Names/Structure

- **Domain Structure**
- Domain names are used since they are easier to remember than IP addresses
- Domain name acts as a type of alias to the actual IP address
- The domain and IP address pairs are linked so that customers looking for a particular domain, is converted to a target IP address
- Domain names should be:
  - Easily remembered
  - Reflective of the business they represent
  - Unlikely to cause offence in other countries

Web architecture

- **Domain Structure**
- An Example

- http://www.bbc.co.uk/

- The IP address is 212.58.251.195

Web architecture

- **Domain Structure**
- A Domain name can be broken down into the following sections.

- Top-Level Domains (“TLD”): also called “First-Level Domains”

  -Sub-Level Domains (“SLD”): also called “Second-Level Domains,” “Third-Level Domains,” etc.

Web architecture

- **Domain Structure – Some examples**

Web architecture

- **Domain Name Registrars**
- A domain name should be easy for a user to remember, simple to type and meaningful, reflecting the sites content. Examples of words used together to form a domain name is webuyanycar.com

- Many companies also buy similar sounding domain names such as

- www.edexcel.com
- www.edexcel.co.uk
- www.edexel.com

Download Speeds

- Download speed of narrowband solutions like dial-up will be much slower than for broadband access through cable or ADSL
- Websites achieve this by providing graphic and text-only versions of their content, enabling customers to choose which is most appropriate to their download capabilities

Browser & Platform Compatibility

- Care should be taken when building websites as, despite firm standards being laid down by the World Wide Web Consortium (W3C), many browsers interpret and render HTML and cascading style sheets (CSS) differently

- Even though Microsoft IE is by far the most popular browser used, potential web-page content should be tested with other browsers and different computer platforms (i.e. hardware and operating system combinations)