

# Web Development

## Module 1 - Introduction

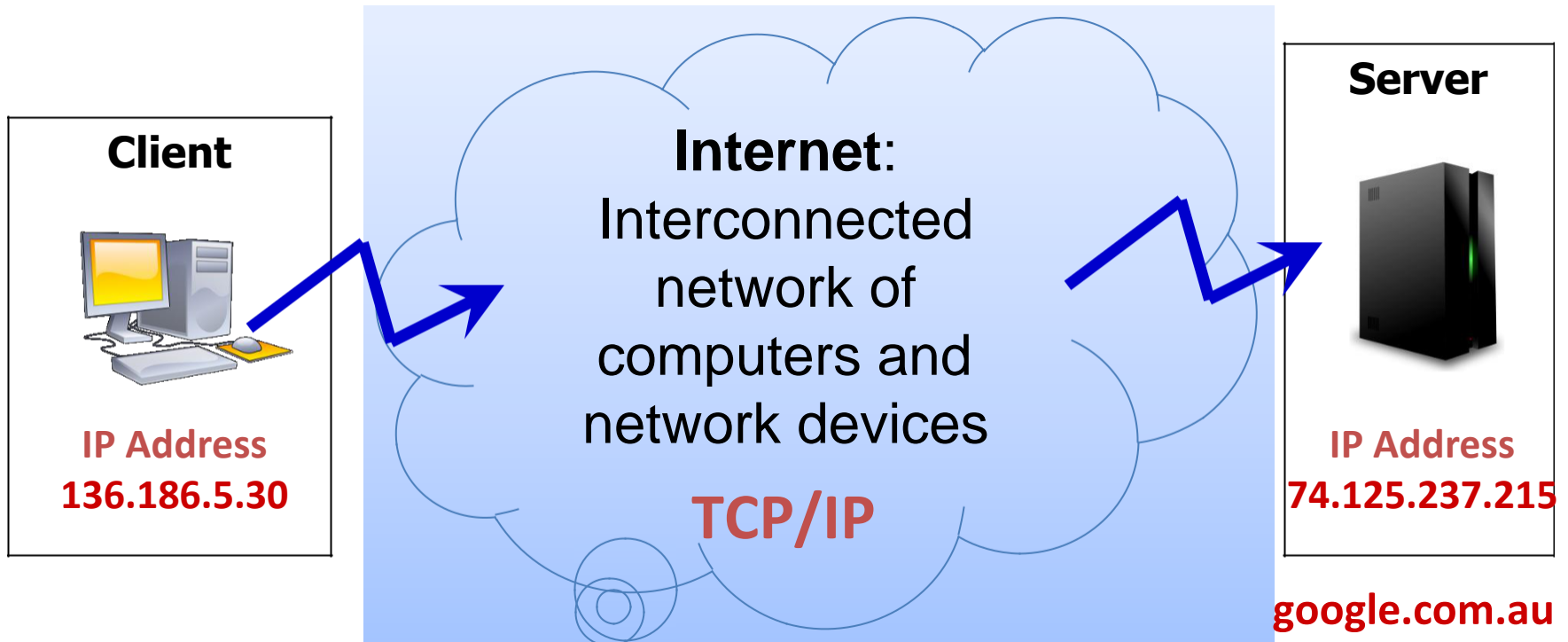
# Contents

- What is the Internet?
- What is the World Wide Web?
- What else is there apart from the Web?
- Understanding Web Development
- Language versions
- Getting Started.

**WHAT IS THE INTERNET?**

# Internet – The Network

It is a massive network of networks



Message interception  
possible!!!

*In simple terms:*



**TCP** handles the messages

**IP** handles the delivery

Question: Do cell phones have IP addresses?

# Internet – Protocols

- To help understand how information travels over the Internet, a knowledge of the **Internet protocol suite** is needed.
- The **Internet protocol suite** is the networking model and a set of *communication protocols* used for the *Internet* and similar networks.
- It is commonly known as TCP/IP, because of its most important protocols: ***Transmission Control Protocol(TCP)*** and ***Internet Protocol (IP)***.
- The Internet has four abstraction layers which are used to sort all Internet protocols according to the scope of networking provided.

# Internet – Layers and Protocols

## Application

- DHCP DHCPv6 DNS FTP HTTP IMAP IRC LDAP MGCP NNTP BGP NTP POP RPC RTP RTSP RIP SIP SMTP SNMP SOCKS SSH Telnet TLS/SSL XMPP *and more*

## Transport

- **TCP** UDP DCCP SCTP RSVP *and more*

## Internet

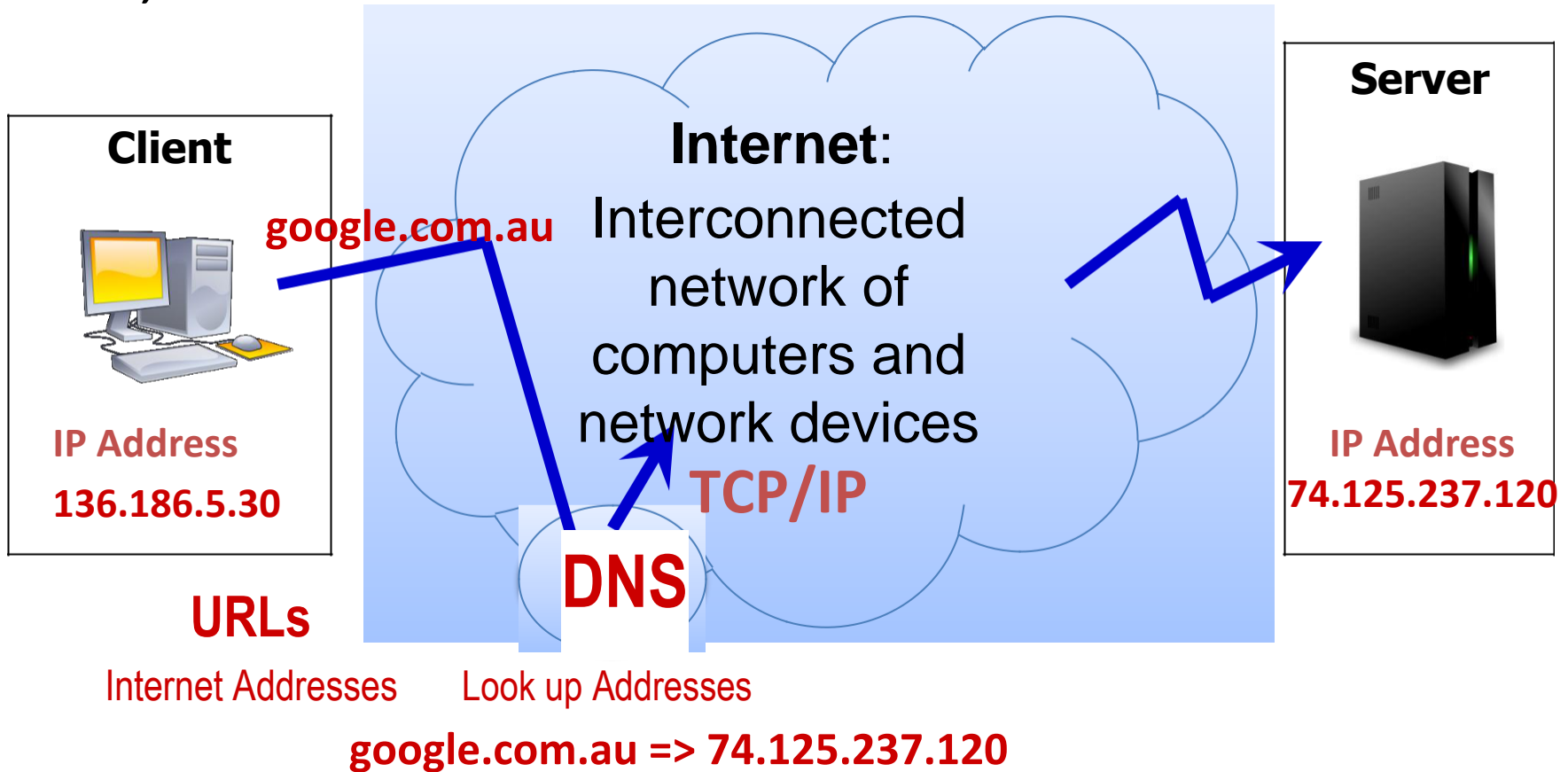
- **IP (IPv4 IPv6)** ICMP ICMPv6 ECN IGMP IPSE *and more*

## Link

- ARP/InARP NDP OSPF Tunnels (L2TP) PPP  
Media access control (Ethernet DSL ISDN FDDI) *and more*

# Internet – Domain Name System (DNS)

## DNS, URLs



# Questions

How do you spy on  
people over the Internet?



# Question

Are [www.google.com.au](http://www.google.com.au) and [www.google.com.hk](http://www.google.com.hk) as a new web site or two different web sites?

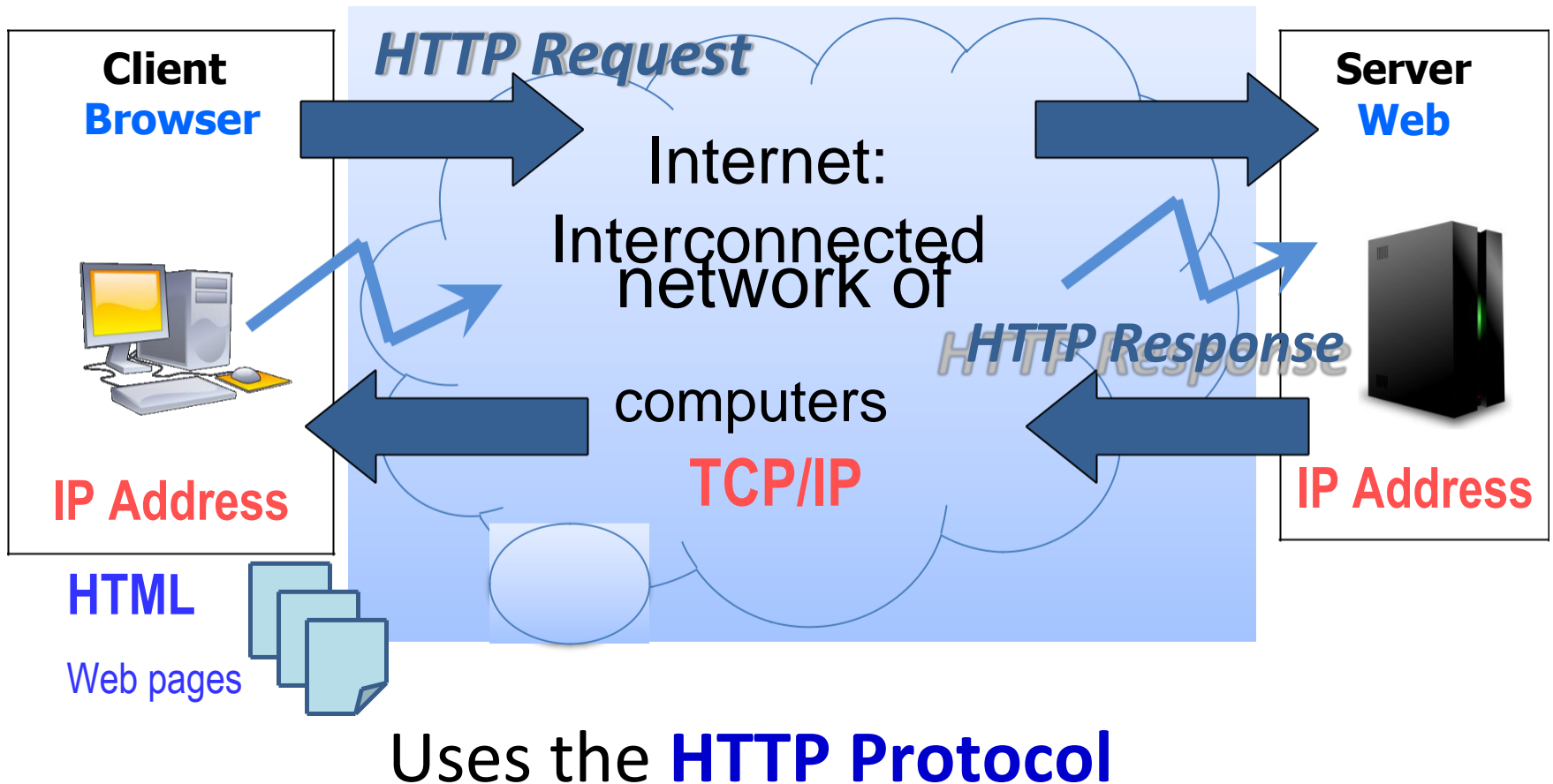
THAT WAS THE INTERNET.

BUT ...

WHAT IS THE **WORLD WIDE WEB**  
OR THE **WEB**?

# The Web – The Method

A way of accessing information over the Internet.

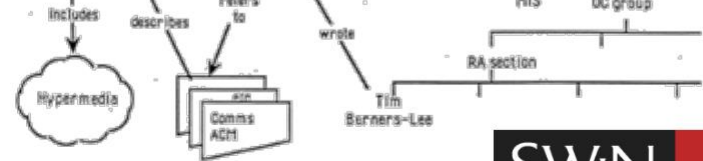


# The Web – Its History

- In 1990 Tim Berners-Lee authored a document outlining fundamentals of the web
  - The ability of links to crossmachine boundaries (URLs)
  - “A simple, commonprotocol for exchanging hypertext documents” (HTTP)
  - A common documentmark-up language (HTML)
  - Web Browsers

## – HTTP Servers

<http://www.w3.org/History.html>



# The Web – Its History (continued)

- In late 1990 and early 1991, Tim Berners-Lee created the **World Wide Web** at the European Laboratory for Particle Physics (CERN) in Geneva, Switzerland
- The original purpose of the World Wide Web (WWW) was to provide easy access to cross-referenced documents that existed on the CERN computer network
- Hypertext allows you to quickly link to and open other pages.
- **Hypertext Transfer Protocol (HTTP)** enabled HTTP requests / responses over the Internet



# The Web – Its History (continued)

- “**Web 1.0**” (1990 to early 2000)  
for **Presentation** generic term used to describe the web as it was, with governments, companies and advertisers producing web content for users to access
  - brochures, reports, lectures(**content display**)
- “**Web 2.0**” (Since 2000)  
for **Communication** generic term involves the users, users create content, and they also help organise, share, remix, critique, and update. It embraces the **architecture of participation**
  - conversations, collaborations, creativity, sharing(**userinteraction**)





# Web 2.0

Web 2.0 tools and sites, users essentially publish content directly to the Internet for access by other users.

# The Web – Its Terminology

**Websites** are collections of related **Web documents**

put together for a specific purpose. The location on the Internet of the Web pages and related files

- *There are many different purposes for Web sites including scientific publication, education, ecommerce, entertainment, social networking, political campaigns etc.*

# The Web – Its Terminology

**Web Pages** (Web documents) are files created using

- ***HyperText Markup Language (HTML)***  
used to mark-up page ***structure*** and ***content***
- ***Cascading Style Sheets (CSS)***  
used to mark-up page ***presentation***
- ***JavaScript*** (for client-side scripting) used to ***enhance*** web user ***interaction***.



# The Web – Its Terminology

**Web Documents** –are **Hypertext** documents.

**Hypertext** is text that can act as a **link** (or **hyperlink**) to another document location.

- With hypertext you can skip from one topic to another in any order that suits ***you*** and ***your objectives***
- Hyperlinks may point to another part of the *samedocument*, or point to *another entirely different document* (on the *same* computer or on *another*computer). [Click](#) to see a web page with two types of links.
- Hyperlinks can trigger specific functions provided by the website.

# The Web – Its Terminology

**Uniform Resource Locators (URLs)** are strings used to identify the locations of unique resources on the web, e.g., web pages and image files.

- To complete the URL, we include the protocol at the start of the URL value.

http://mercury.ict.swin.edu.au/cos10005/qhe/lab01/info.html#ex01

protocol	server	path	filename	id
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# The Web – Its Software

- **Web Browsers** (on a personal device as a client)
  - Send HTTP requests
  - Receive HTTP responses
  - Interpret and render/display completed Web Documents
  - *Popular Browsers: **Chrome, Firefox, Safari, Internet Explorer, Opera***
- **Web Servers/HTTP Servers** (on a remote computer as a server)
  - Receive HTTP requests
  - Retrieve or create Web Documents ([Click](#) for demo)
  - Manage and make HTTP responses
  - *The most popular Web server software is **Apache HTTP Server (Apache)***
  - *The second most popular Web server is **Microsoft Internet Information Services (IIS)** for Windows*



# The Web – Its Protocol

- **Hypertext Transfer Protocol (HTTP)**
  - The key “protocol” that manages the **request/response** exchange between **browsers** and **servers**
- **Hypertext Transfer Protocol Secure (HTTPS)**
  - HTTP secured with data encryption

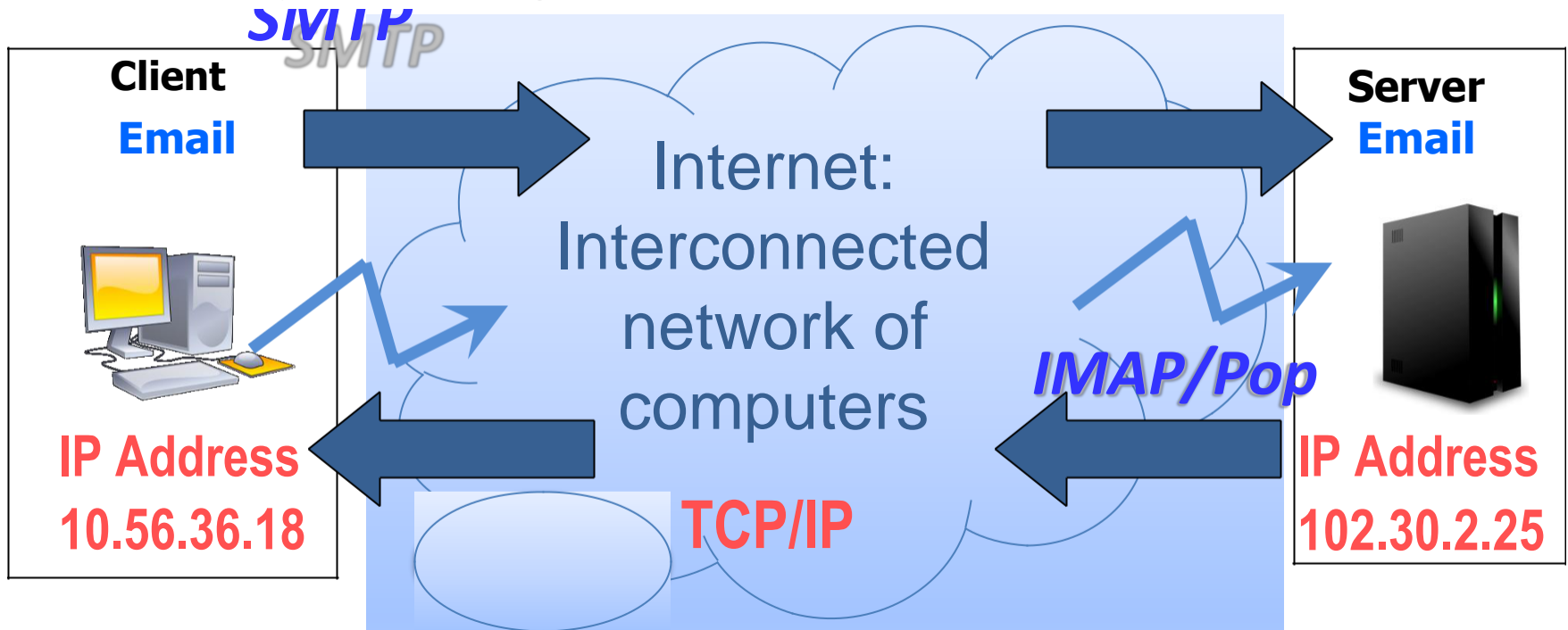
# The Web – Popular Applications

- **Search Engine** - essential to sift through and index the massive amount of content on the web, e.g., [google.com](http://google.com) and [bing.com](http://bing.com).
- **Social Applications** - communication tools and interactive tools often based on the Web, e.g., [facebook.com](http://facebook.com) and [twitter.com](http://twitter.com).
- **Media Streaming** - audio and video that are accessed online via browsers, e.g., [Youtube](http://Youtube) and [Netflix](http://Netflix).
- **Web Services** - a software system designed to support interoperable machine-to-machine interaction over a network, e.g., [Google Maps](http://Google Maps) (<http://www.fortiusflooring.com.au/find-a-store/>).

**WHAT ELSE IS THERE IN THE  
INTERNET APART FROM THE WEB?**

# What else? – Email

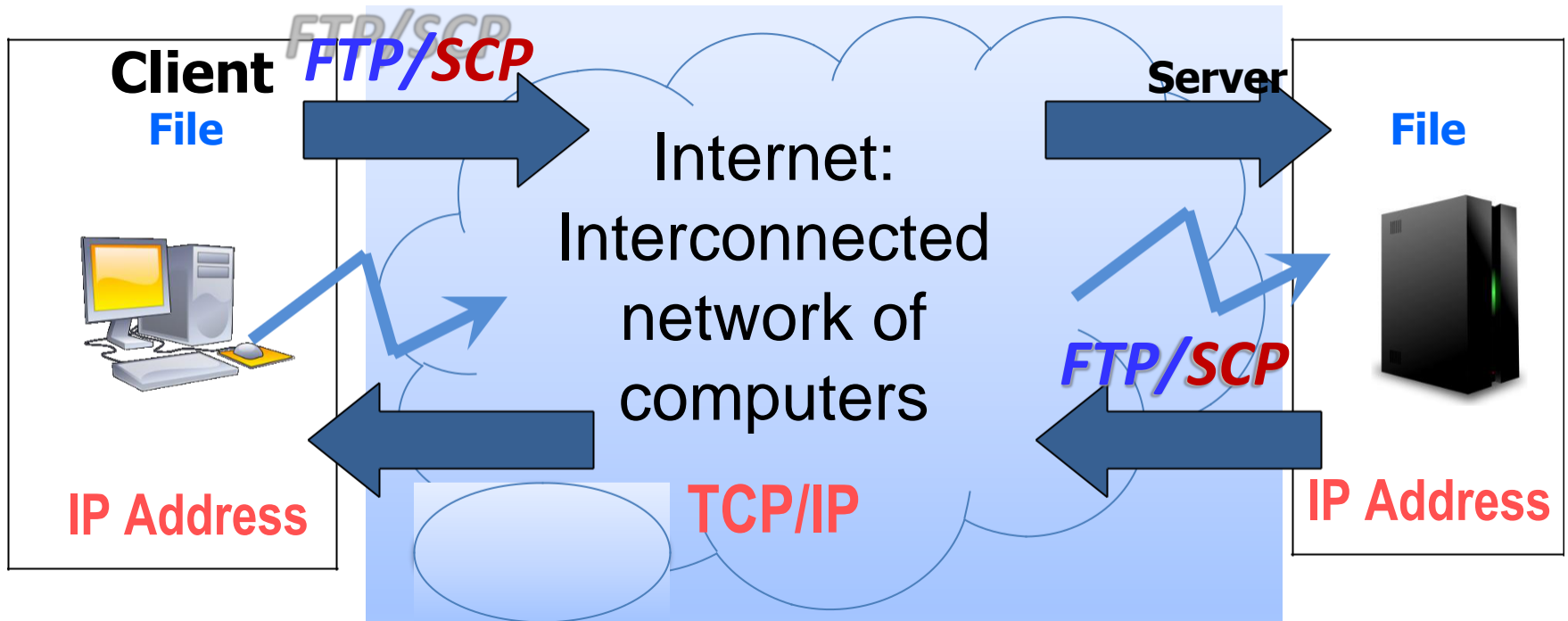
- is a way of doing email over the Internet



- Uses the SMTP and IMAP/POP Protocols
- Popular applications: [gmail.com](https://www.gmail.com) and [outlook.com](https://www.outlook.com)

# What else? – Online Storage

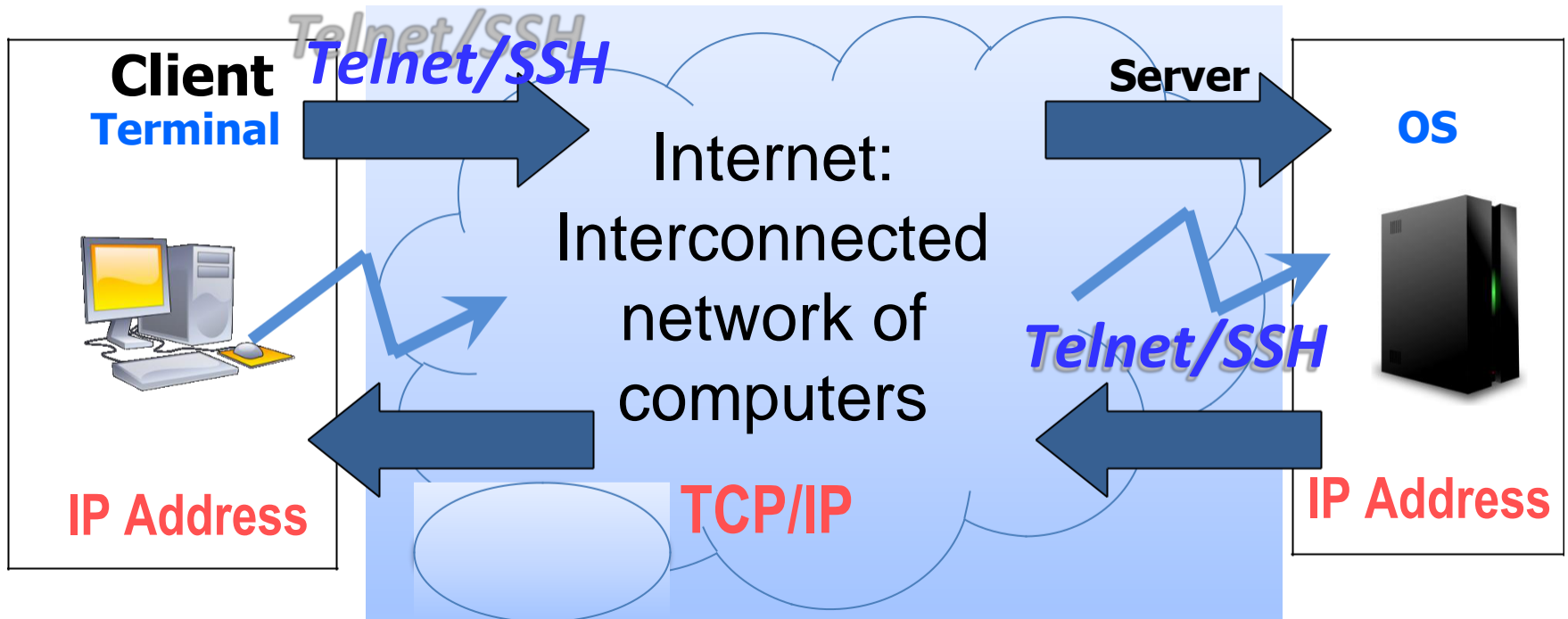
- is a way of transferring files over the Internet.



- Protocols: FTP and SCP
- Popular applications: [Dropbox](#), [Google Drive](#) and [OneDrive](#) (formerly SkyDrive)

# What else? – Remote Access

- is a way of controlling another machine over the Internet.



- Uses the Telnet or SSH Protocols
- Popular applications: [LogMeIn](#), [Microsoft Remote Desktop](#) and [Chrome Remote Desktop](#)

# **UNDERSTANDING WEB DEVELOPMENT**

**WHO SHOULD I BECOME?**

**WHAT HARDWARE SHOULD I HAVE?**

**WHAT SOFTWARE SHOULD I INSTALL?**

**WHAT LANGUAGE SHOULD I LEARN?**

# Web Development

- The People
- The Hardware
- The Software
- The Languages



# Web Development – The People

- **Web developers** are a programmers whospecialise in the development of websites. Their focuses are:
  - Robust backbone
  - Satisfactory performance
  - Technically sound code
- **Web Designers are** people that has knowledge ofdesigning visually appealing websites. There focuses are:
  - Layout
  - Color scheme
  - User-friendliness

# Web Development

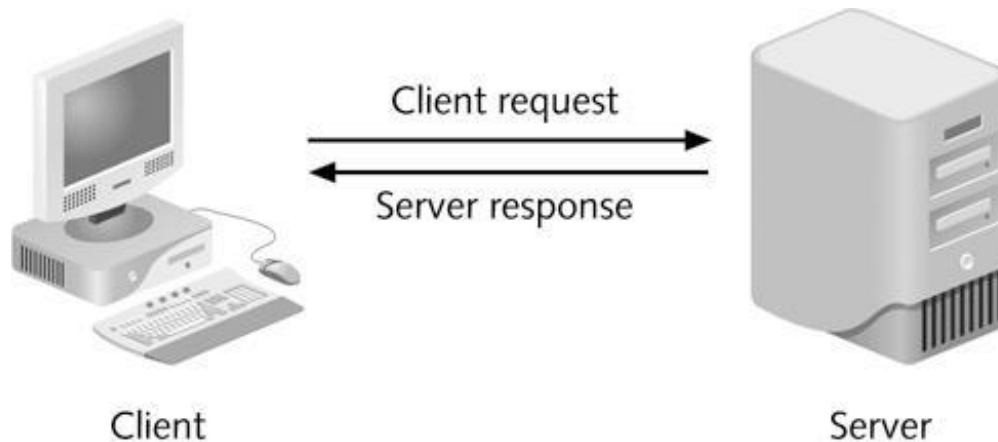
- The People
- The Hardware
- The Software
- The Languages

# Web Development – The Hardware

- **Server** (“back end”) Local vs. Cloud
  - Responsible for data storage and management, often has a database from which a client requests information
  - Fulfills a request for information by managing the request or serving the requested information to the client
- **Client** (“front end”)
  - Presents an interface to the user
  - Gathers information from the user, submits it to a server, then receives, formats, and presents the results returned from the server

# Web Development – The Hardware

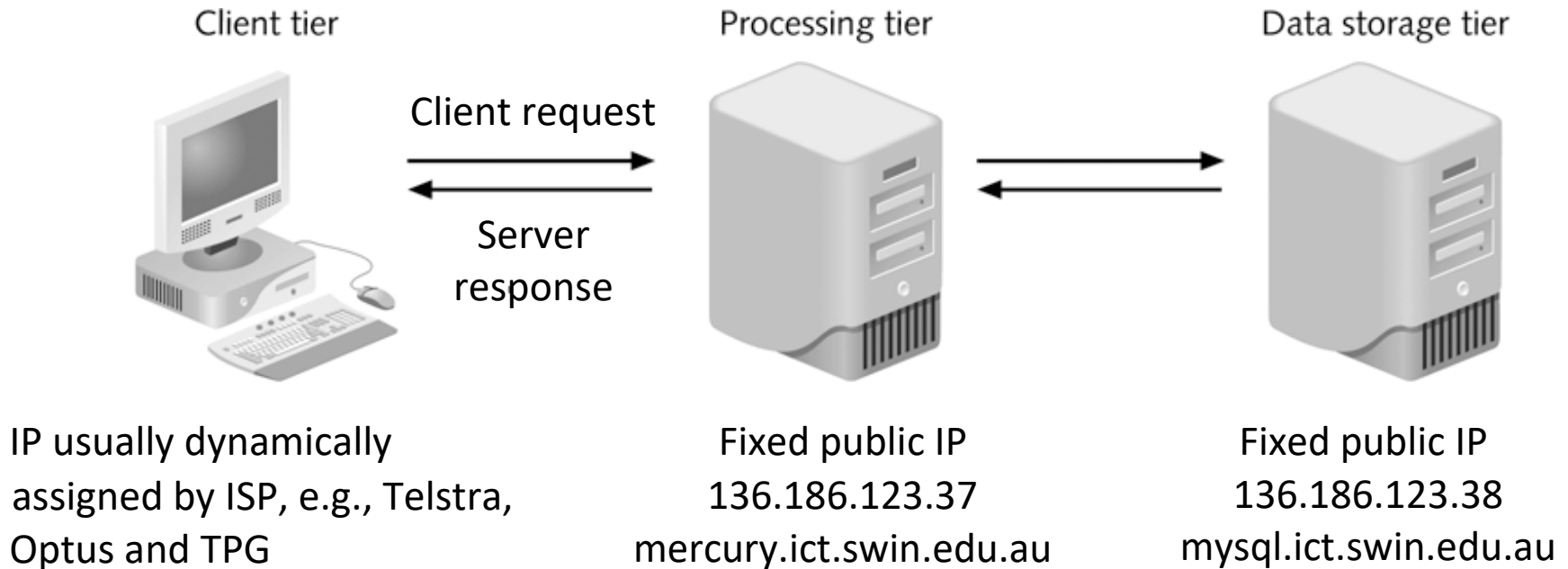
- A system consisting of a client and a server is known as a **two-tier** system



**The design of a two-tier client/server system**

- Note the client and server are referring to the physical machine in this illustration

# Web Development – The Hardware



The design of a **three-tier** client/server system

**Safety, Consistency and Cost**

# Web Development

- The People
- The Hardware
- The Software
- The Languages

# Web Development – The Software

- **Client software** refers to the software that runs on the client machines to communicate with a server, examples are
  - **OS**– (Windows, Linux, OSX)'s telnet, FTP
    - Third party – putty, WinSCP, CyberDuck
  - **Web Browsers**–Internet Explorer, Firefox, Chrome, Opera, Safari

# Web Development – The Software

- **Server software** refers to software that run on the server machines, including:
  - **OS:** Windows Server, Linux Server
  - **Web:** Apache, Microsoft Internet Information Services
  - **Database:** MS SQL SERVER, ORACLE, MySQL
  - **Script Support:** NodeJS (JavaScript), Apache Tomcat (Java Server Pages (JSP)), Microsoft ASP (Active Server Pages), Adobe ColdFusion, Perl, PHP, Python, Ruby



# Web Development

- The People
- The Hardware
- The Software
- The Languages

# Web Development – The Languages

- **HyperText Markup Language (HTML)** is a markup language designed to specify structure and content of a web page
- **Cascading Style Sheets (CSS)** a style sheet language for describing the look and formatting (e.g., fonts, colors, spacing) of Web documents.
- **Client-side scripting (JavaScript)** is a language often used to allow web pages to interact with users.

Content

The diagram consists of three red, rounded rectangular boxes with drop shadows. The 'Content' box is at the top right, the 'Presentation' box is in the middle right, and the 'Interactivity' box is at the bottom center. Each box has a small triangular pointer on its top-left corner pointing towards the left. The 'Content' box points towards the HTML bullet point, the 'Presentation' box points towards the CSS bullet point, and the 'Interactivity' box points towards the JavaScript bullet point.

Presentation

Interactivity



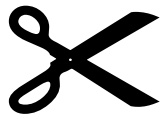
# Web Development – The Languages

- **JavaScript** is a *client-side* scripting language that is primarily used to add interactivity to web pages.
- **JavaScript** allows you to:
  - Turn static Web pages into applications, such as games or calculators. Change the contents of a Web page after a browser has rendered it
  - Create visual effects such as animation
  - Control the Web browser window itself

# Web Development – The Process

## Behaviour / Interactivity

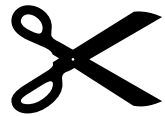
Use **scripting** to control content behaviour



Separate

## Presentation

Use **CSS** to present the content



Separate

## Structured Content

Use **HTML / XHTML** to describe the content

*Click [hereto](#) see the benefit of separation!*

# **LANGUAGE VERSIONS**

# Which HTML?

Timeline		HTML	XHTML
1995		2.0	
1997		3.2	
1997-1998	4.0 Strict, Transitional, Frameset)		
1999		4.01	
2000			1.0
2001			1.1
2008		5.0 (Draft)	
2009			2.0 (abandoned , incompatible with 1.x)
2014		5.0	
2016		5.1	

# Understand HTML 4.01

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML
4.01//EN"
"http://www.w3.org/TR/html4/strict.dtd">
<html>
<head>
<title>Title of
document</title></head>
<body>
</body>
</html>
```



# Understand HTML5

```
<!DOCTYPE html>
```

```
<html>
```

```
<head>
```

```
    <meta charset="utf-  
    8"><title>Title of  
    document</title>
```

```
</head>
```

```
<body>
```

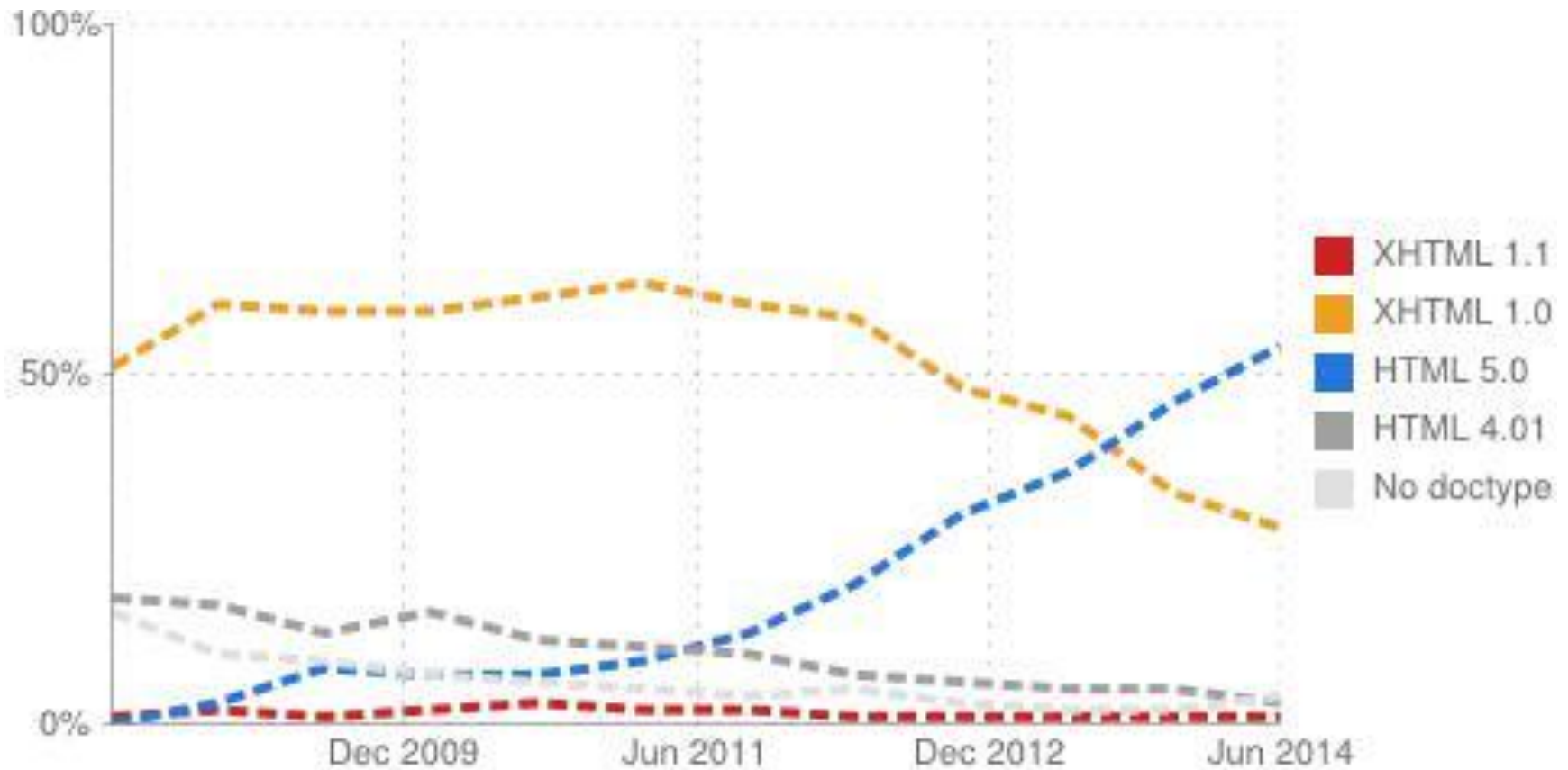
```
</body>
```

```
</html>
```

*You can use it as a template for your web pages!*



# HTML5 vs. HTML4 vs. XHTML1.0



Source: <http://blog.powermapper.com/blog/category/Web-Standards.aspx>

# Reach of HTML5 (continued)

Rank	Site	Type	HTML Version
1	google.com	Search Engine	HTML5
2	facebook.com	Social Media	HTML5
3	youtube.com	Social Media	HTML5
4	yahoo.com	Search Engine	HTML5
5	baidu.com	Search Engine	HTML5
6	wikipedia.org	Reference	HTML5
7	qq.com	Technology	HTML5
8	taobao.com	Shopping	HTML5
9	twitter.com	Social Media	HTML5
10	live.com	Portal and Search Engine	HTML5

# What about CSS?

Timeline	Version	Capabilities
1996	CSS1	Font, Alignment, Margin, Border
1998	CSS2	Positioning, z-index
2011	CSS2.1	fixes errors in CSS 2
2012	CSS3	Media Queries, Namespaces, Selectors Level 3, Colour

CSS4? Not yet.

# And JavaScript?

Timeline	Version
March 1996	1.0
August 1996	1.1
June 1997	1.2
October 1998	1.3
	1.4 (Server side only)
November 2000	1.5
November 2005	1.6
October 2006	1.7
June 2008	1.8
February 2009	1.8.1
June 2009	1.8.2
July 2010	1.8.5

# GETTING STARTED

# Getting Started – Software Installation

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- **Server Software**

- **Web Server**(Apache) to host your web page

- University's web server

- URL: <http://mercury.ict.swin.edu.au>

- **Client Software**

- **Web Browser:**[Mozilla Firefox](#)with[Web Developer](#)add-on to view the web page.

- **File Transfer**([WinSCP](#)or[Filezilla](#))to securelytransfer the web page files to the server

- **Text Editor**([Notepad++](#)or[Sublime](#))to edit theweb page code



**WHAT'S NEXT?**

**– LEARNING HTML**