A·P·U
ASIA PACIFIC UNIVERSITY
OF TECHNOLOGY & INNOVATION

AAPP012-4-2 Responsive Web Design & Development

INTRODUCTION TO INTERNET & WWW

Lecturer Information

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Pre-requisites for this module

- None

Aims of this module

- The module provides students with an overview of the Web environment, principles of Web design and offers opportunities for students to develop their client side scripting, server side scripting, and visual design skills along the way.

- In addition, through practical work, students will develop knowledge and enhance their skills for designing and developing dynamic web pages using these technologies.

Web Technologies

Development & Platform Tools

- Any web editor - Visual Studio Code, Notepad++, Atom, Brackets, Sublime or any editor that can write web page.
- Any web browser

Topic & Structure of The Lesson

- History of the Internet
- Growth of Internet
- Internet Technology
- Why Internet?
- How the Internet works?
- What is World Wide Web?
- How the WWW works

Learning Outcomes

- **At the end of this topic, You should be able to**
  - To understand the history of the Internet.
  - To identify the main components of the Internet technology.
  - To list the advantages of the Internet.
  - To understand how the WWW works.

Key Terms You Must Be Able To Use

- **If you have mastered this topic, you should be able to use the following terms correctly in your assignments:**

  - ✓ **Internet**
  - ✓ **ARPANET**
  - ✓ **TCP/IP**
  - ✓ **Email**
  - ✓ **Instant Messaging**
  - ✓ **ISP**
  - ✓ **IP Address**
  - ✓ **DNS**
  - ✓ **Type of Organization**
  - ✓ **WWW**
  - ✓ **MIME**

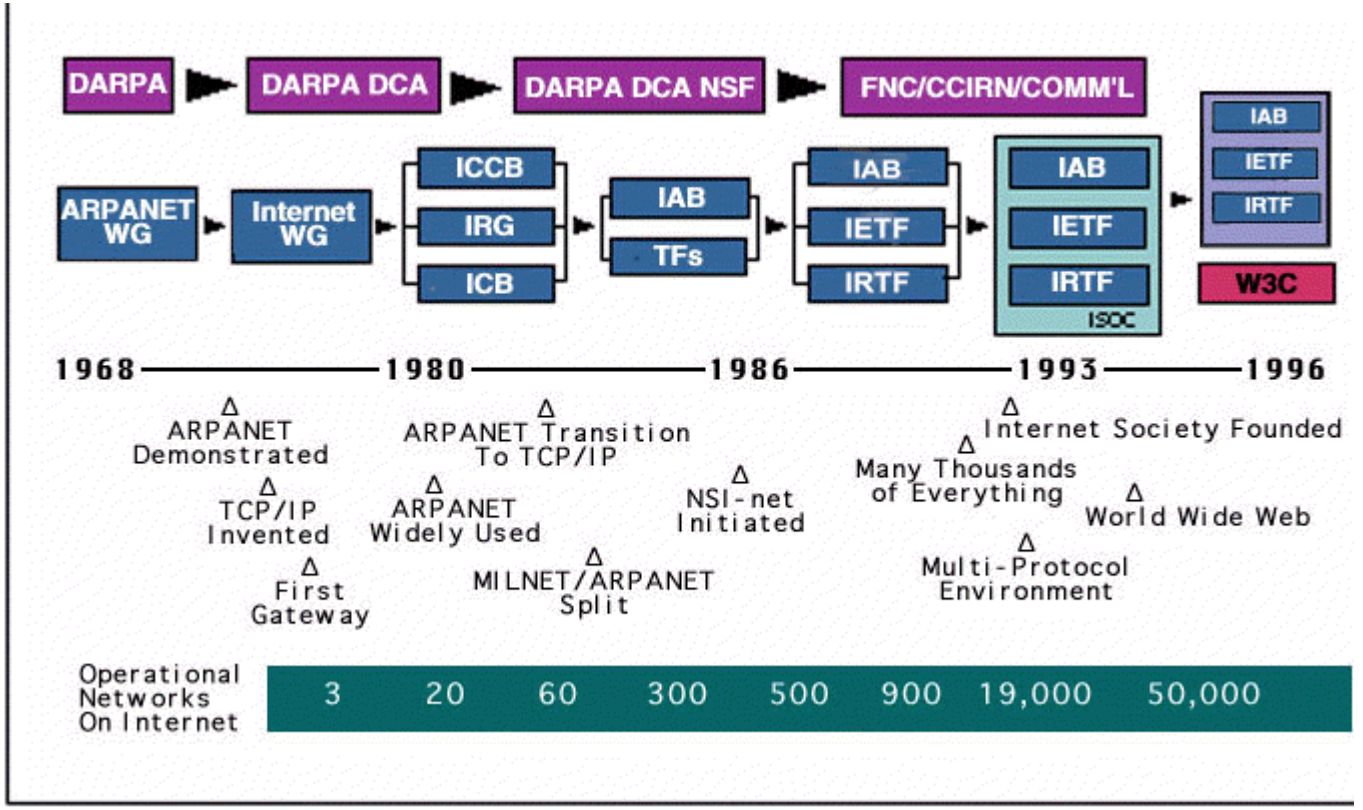
History of the Internet

- The Internet was created in 1969, in the form of a small network called ARPANET (Advanced Research Projects Agency).
- ARPANET was initially a network of 4 computers
- After ARPANET was established, many computers were quickly added into it.
- In 1972, there was a successful introduction of ARPANET to the public.
- It was also in 1972 when the initial “hot” application and Email was introduced.
- Email was created as a need for the developers at ARPANET for quick and easy coordination.

Concept of TCP/IP

- TCP/IP allowed individual networks to be connected to the Internet without any reference to a higher authority.
- Users of the Internet need not understand the underlying principles that drive the Internet.
- Because of these fundamental rules, the Internet became to what it is today.

Concept of TCP/IP



Growth of Internet

- **What drove Internet usage?**
  - Email
  - Instant Messaging
  - Real time broadcasts
  - Long distance telephony

- **What does Internet provide:**
  - Widespread of Integrated Services
  - More information channels (Tablet, Mobile, PDA, Handhelds, etc)

Growth of Internet

- The large and growing population of the Internet led to many commercial players to join in the development of the Internet.
- Consider the number of companies that would not exist if there was no Internet.
- Consider the number of industries that are based on the Internet.

Growth of Internet

- As a marketing tool, the aforementioned forms usually does not work.
- The major revenue generation models on the Internet are these:
  - E-Banking
  - E-Commerce
  - Online Image Editing Tool (e.g. picnik)
  - Website Development Studios
  - File-sharing (e.g file4shared)
  - Document Management (e.g Google Docs)

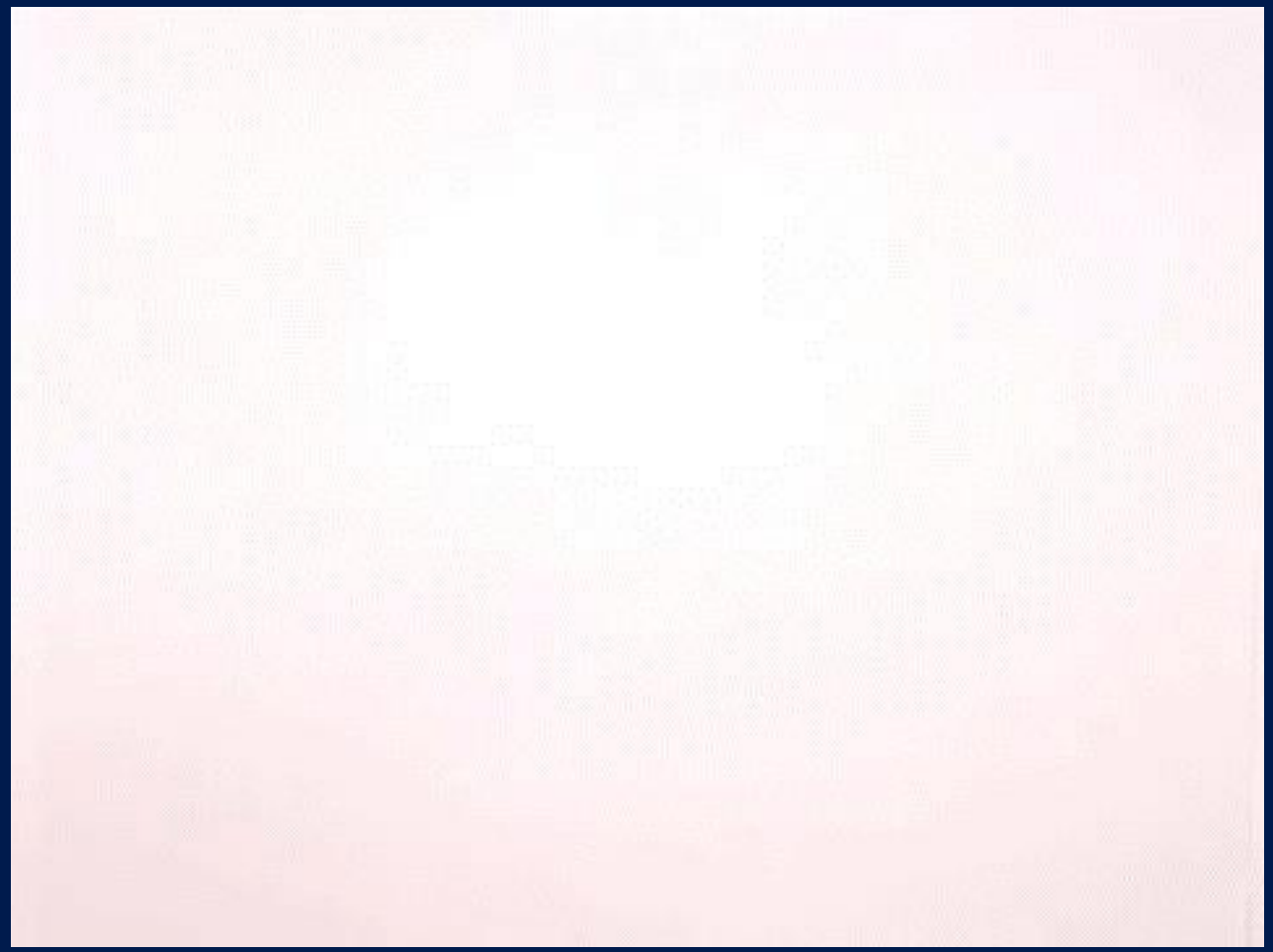
Growth of Internet

With the advent of more value-added services, the Internet will become a one stop center for many things:

- Education
- Entertainment
- Medical
- Commerce
- Law

Who knows what will go online next?

How Internet Works?



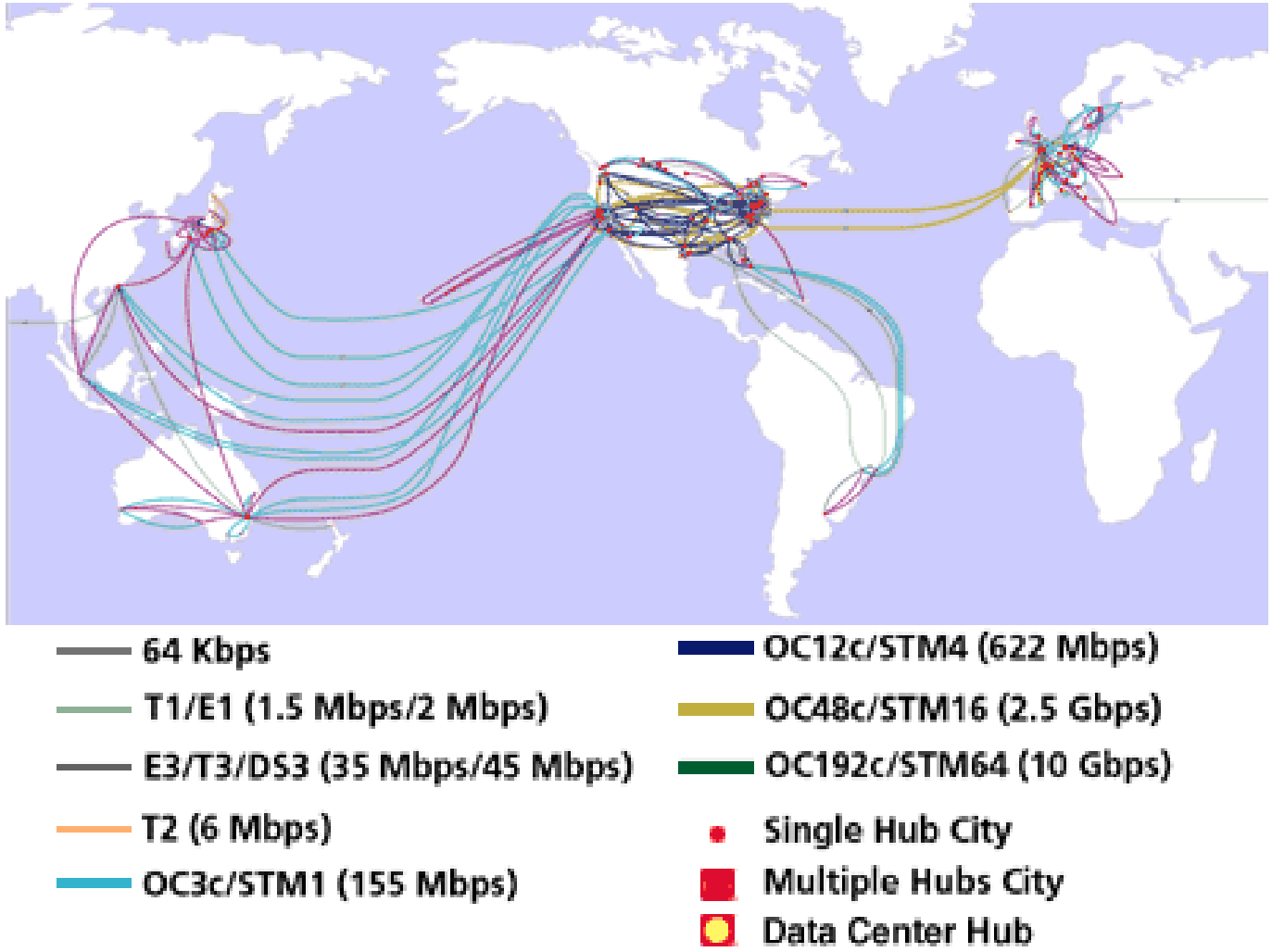
Internet Technology

- The Internet is a global collection of networks connected together through many different types of devices.
- The ‘Net offers its users an avenue to exchange information in many different formats.
- Information on the Internet comes in many different formats (e.g. text, video, hyperlinks, etc)

The Technology Behind It

- Every computer that is connected to the Internet is part of a network
- A computer connecting to an ISP becomes a node in their network
- The ISP may then connect to a larger network and become part of their network
- The Internet is simply a network of networks.

Internet Technology



Internet Technology

- Every machine on the Internet has a unique identifying number, called an **IP Address**
- IP stands for **Internet Protocol**, which is the language that computers use to communicate over the Internet
- A typical IP address looks like this:**198.55.151.2**
- The system which maps an IP address to a name is known as a DNS (Domain Name System)
- Every time a user keys in a domain name (i.e. apiit.edu.my), the Internet DNS would convert the human readable domain name (apiit.edu.my) to a machine readable IP address (192.228.210.1).
- Using the IP address, computers can communicate with each other.
- Think of the IP address as an “Internet phone number.”

Internet Technology

- Whenever a domain name is keyed into a machine, machines on the Internet would use their DNS functions to convert it to an IP address.
- This allows the **client** machine to connect directly to the **server** machine (i.e. a web server to get a web page)
- The server would then find the requested page and sends it to the user.
- The Internet works through the orchestrated efforts of millions, if not billions of computers.
- Each device connected to the Internet serves a particular purpose.
- From the FTP servers which provides us with downloads to the mail servers which handles our e-mails, the Internet is not a centralized node.

Why Internet?

- What would our lives be without the Internet?
- Information transfer would be one dimensional.
- Information would travel much slower.
- Research and technology would be slower overall.

How Internet Works?

- Domain Name System (DNS)
  - an Alphabetical parallel to the IP number system, managed by InterNIC
  - usually appear in the ***name.type.country*** format
    - ‘name’ refers to the ISP’s name
    - ‘type’ refers to the type of organization the ISP is

How Internet Works?

Code		Type of Organization
.edu	--	educational institution
.com	--	commercial organization
.gov	--	government body
.org	--	non-profit organization
.mil	--	military

How Internet Works?

- ‘country’ refers to the country from which the ISP operates.

au -- Australia	my -- Malaysia
ca -- Canada	sg -- Singapore
hk -- Hong Kong	jp -- Japan

- URL with IP address → http://238.17.159.4
- URL with DNS address → http://webspace.apiit.edu.my

World Wide Web Applications

- The Internet is host to a number of services which its users use to communicate with one another.
- The World Wide Web is one such service, it deals with information and how it is accessed.
- The WWW service of the Internet is the most popular amongst all, next to e-mail.
- The reasons for its popularity is because of:
  - The Web is relatively easy to use compared to most of the other services.
  - The Web is one of the first graphical interface to the Internet.

How the WWW works

- Whenever a user types a URL into a browser, the user's computer would send out a query onto the closest DNS.
- Once a DNS returns the IP address of the URL, the user's computer (client) will establish a direct connection to the IP address's physical computer (host).
- When a connection is established, the client computer will send a request for a piece of information, usually a .html file.
- The host would, then, process this request and send the file back to the client.
- The time taken to complete the entire process varies according to Internet traffic and the number of requests the host is processing.

Electronic Mail

- Electronic mail, or e-mail, is the most prevalent service on the Internet.
- Similar to how the Web works, the e-mail process functions through a client server process as well.
- The primary protocols that handles e-mail are SMTP, POP3 and MIME.

Electronic Mail

- Unlike a normal web server, an e-mail server keeps a list of email accounts.
- An email server has a distinct name; with the accounts residing on it marked by an @ sign.
- In addition to the account names, the server would have a text file associated with each account name.

Electronic Mail

- When a new mail arrives, the server appends the mail in the appropriate text file.
- When the client connects to the mail server, he/she would be able perform a few functions on the list:
  - Ask the server to send a copy of the text file
  - Ask the server to erase and reset the text file
  - Save the text file on client's local machine
  - Parse the file into the separate messages (using the word "From:" as the separator)
  - Show me all of the message headers in a list

Electronic Mail

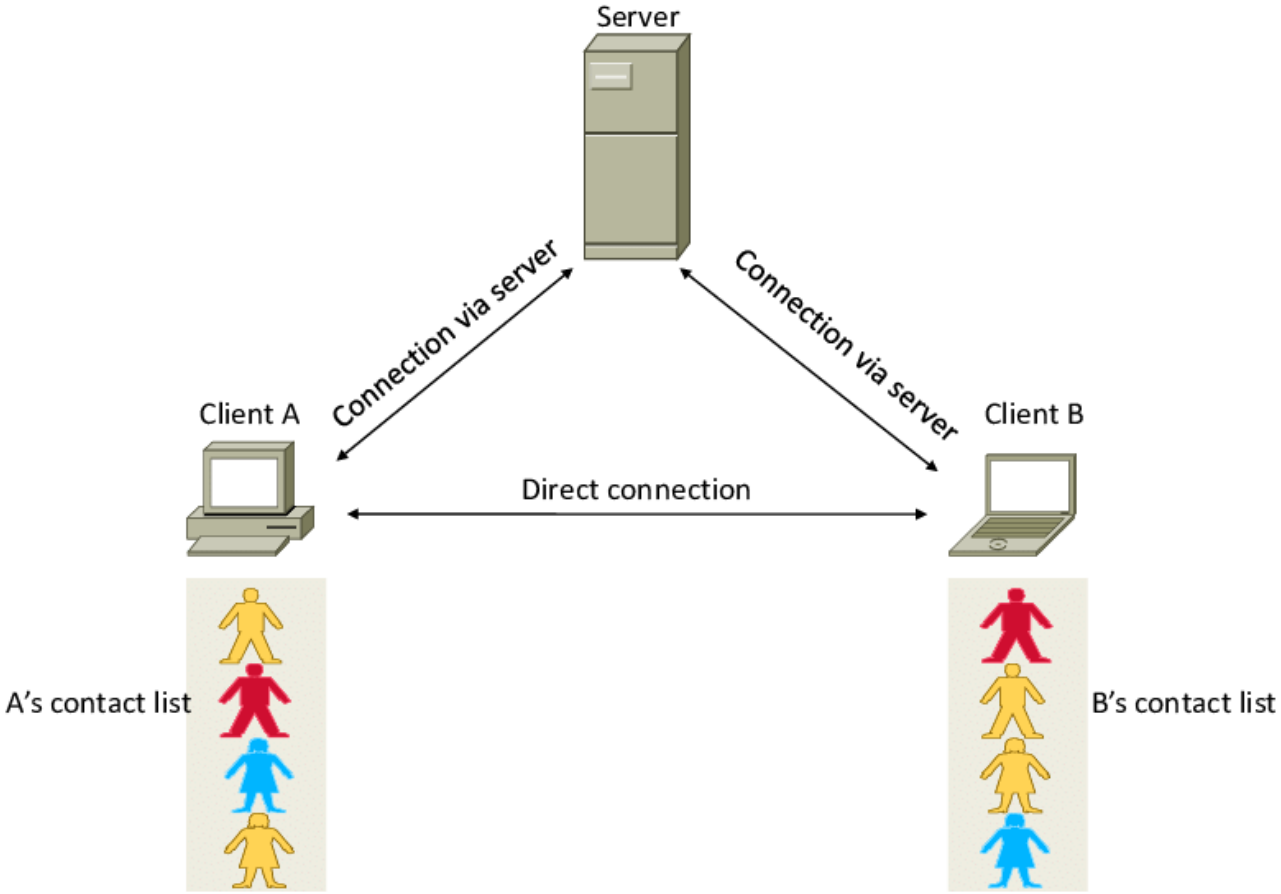
An e-mail server runs two separate programs on its machine.

- The first is called the SMTP Server. SMTP stands for **S**imple **M**ail **T**ransfer **P**rotocol.
  - SMTP handles all outgoing mail.

- The other program is called the POP3 Server.
  - POP stands for **P**ost **O**ffice **P**rotocol.
  - POP3 handles all incoming mail.

Instant Messaging

- Real-time text transmission over the Internet or another computer network.
- Can store messages with either local-based device storage (e.g WhatsApp, Viber, Line, WeChat, Signal etc.) or cloud-based server storage (e.g Telegram, Skype, Facebook Messenger, Google Hangouts, Discord, Slack etc.).



Instant Messaging Model

Future of Instant Messaging?

Summary of Main Teaching Points

- We learned the history of the Internet.
- We learned how the internet works.
- We also learned what the differences between internet and world wide web.

Q & A