

CHAPTER II

THE CHRONOLOGIES AND FACILITIES OF INTERNET WITH ITS GROWTH

A. The chronologies and the benefits of internet

In around 1960s computer scientist researched techniques to connect systems on shared network. Few years later, In 1969 internet was created by these computer scientists, the project was called ARPA (Advance Research Project Agency). The project was supported from US Department of Defense (*DoD*). The DoD donated a lot of money to universities and helped universities get connected to each other. Their first mission was to improve network technology that could connect the researcher to the large resources and huge data, so they could interact each other although in far distance. The success of ARPANET helps to cultivate several networks connected to other networks. The computer networks which spread out were to avoid the information that centered, so if there is a war, the information couldn't be destroyed. If one this network was disturbed from the attack of the enemy, the ways that through the channel would be automatically moved to other connection. The internet started at the U.S. Department of Defense (*DoD*), during the cold war era. The DoD needed to create network to link computers in universities, research labs, and government of US to control all across the country.²¹

The success of ARPANET helps to cultivate as much as others networks which then connect to each other. Few years later this system then evolves to an organism which the growth become wider, included the millions of people and millions of networks. In the beginning, the connection from the networks and the production was called DARPA NET, then this name was changed into *internet*.²²

Internet is an universe which keep growing, it has climate, and it has culture. In this globe of cyber, various people from many countries all over the world communicate with different zone of time without seeing each other, of course the information available in 24 hours. The growth of the sources that can be accessed through internet was

²¹ Tracy Laquey. *Op.cit.* p. 2

²² *ibid.* p. 26

sophisticated. Source of information that could be seen in internet could be accessed in any location.²³

Most networks are organized as a series layers or level, each one built upon the one below it. The numbers of layers, the name of each layer, the content of each layer, and the function of each layer differ from network to network. However, in all networks, the purpose of each layer offer certain services to the higher layer, shielding those layer from the details of how the offered services are actually implemented. Layer on one machine carries on a conversation with layer (*n*) on another machine. The rules and conventions used in this conversation are collectively known as the layer protocol.²⁴

Recently, internet protected by multilateral agreement and specification protocol that explain about the moved of data between channel. These protocols were held based on the conversation Internet Engineering Task Force, which were opened to the public. This organization give document which known as RFC "Request For Comment". Part of RFC was used to be standard of internet. The usual protocol are; IP, TCP, DNS, HTTP.

1. The chronologies histories of some invention that relevant to the internet:²⁵

a. 1800s

In 1836, the invention of telegraph and Morse code was patented by Cooke and Wheatstone. By the invention of telegraph, has made revolution of telecommunication between people. Moreover the Morse code has made the telecommunication between people more variant. These invention was a basic of computer invention which using biner code.

b. 1856 – 1866

In around this year, the invention of cable has made the communication between continents more possible. Cable is an important connector in telecommunication

c. 1876s

In 1876s was the invention of telephone by Alexander Graham Bell. This is as a basic connection in internet and the application is using modem. Modem can change

²³ *ibid.* p 2

²⁴ Andrew s, Tanenbaum, *Computer Networks.* (USA, 1996). P.17

²⁵ Wahana Komputer. *Promosi Efektif dengan WEB.* (Yogyakarta : 2003). P.2

digital signal to analog signal. These signal was used in computer to have connection which using telephone line.²⁶

d. 1940s

In the World War II, computer was also growth. In 1941, a Germany engineer, Konrad Zuse developed computer Z3. This was used to design an aero plane and controlled bullet. In 1943, England had succeeded in creating computer in purpose to broke the secret code which used by German, it was called Colossus. In the middle of 1940s, an expert. John Von Neumann developed a concept of computer design so until the next 40 years his concept still used, the creation was CPU (Central Process Unit). Afterward, computer keep growing, until now computer was used as hard connector of internet.

e. 1957

The satellite of SPUTNIK USSR was launched. This was the first satellite on earth and used for telecommunication. Satellite hold an important function in transferring data in this era. As a response from this invention, US Department of Defense tried to have research which known as Advance Research Project Agency (ARPA) to strength their military tools.²⁷

f. 1962-1968s

In this around this year, ARPA tried to improve the networks in switching package to transfer data. The switching package was used first time for military in purpose for security reason in delivering information via networks. Practically the data split into few packages that have many different routes to the destination place. Those routes was differentiated, so if there is one of those routes broke or failed, other route can be used. Furthermore, the data couldn't be recorded.

²⁶ *ibid.*

²⁷ *ibid.*

2. The chronologies invention of internet :

a. 1960s- 1970s

As we have seen above, during 1960, the computer scientist research techniques to connect systems on shared network. Then, in 1969 emerge the ARPANET (*mother of internet*). ARPANET, at the beginning connect the scientist in every computer center in far place to share information. Another net connected to ARPANET, which using technologies network sponsored by DARPA (Defense Advance Research Project Agency). ARPANET connects UCLA, University of California, and University at Santa Barbara, University Utah and Standford Research Institute.²⁸

At the beginning year access to ARPANET was limited only to military, Defense Department and University that was having corporation with the Defense Department. In 1970s USENET (User's Network) exist.²⁹

Each one feature technical discussions on a topic related to computer hardware or software. Here are the hardware and software that related to internet:

| Name | Items |
|----------|--|
| Hardware | CPU, hard disk, mouse, headphone, modem, digital camera, diskette, printer |
| Software | Power point, Micro processor, Microsoft office, windows explorer. |

b. In 1980s – 1990s

At the beginning of 1980s BITNET (Because It's Time Network) begins offering email and list servers for information distribution. CSNET (Computer Science Network) offers dial up service for email. People can now access the internet, but then it was connected to special relation that allows people from any class of society could share information through ions networks.

The development of LAN, PC, and workstation around 1980 makes the networks of internet more growth. TCP/IP has adopted as a defense standard during the beginning year of 1980s. This event enables a new military defense system based on internet

²⁸ Tracy, *op.cit.* p.26

²⁹ Tanenbaum, *op.cit.* p. 671-672

technology. Around 1983 ARPANET had been used by several institution of defense department in networks and some operational organization. The change of NCP protocols to TCP/IP has made separation for the military environment in internet networks. ARPANET was separated into two networks, ARPANET and MILNET (Military Secret Network). However, these two networks still communicated each other.

TCP/IP telah diadopsi sebagai suatu standar pertahanan selama tiga tahun di awal 1980-an. Ini memungkinkan adanya sistem pertahanan di dalam DARPA berbasis teknologi internet dan menyebabkan adanya pemisahan komunitas militer dan bukan militer. Tahun 1983 ARPANET telah digunakan oleh sejumlah lembaga litbang pertahanan dan organisasi operasional. Perubahan ini memungkinkan adanya pemisahan penggunaan jaringan untuk lingkungan lembaga militer, MILNET dan ARPANET.³⁰

In the year of 1985s internet was ready to held up as a technology that able to support environmental community institute research widely and other society community have started to use for daily communications by utilizing personal computer. E-mail has been used widely in various society communities. Interconnection between this various electronic letter systems has made the internet as public communications.

By the year 1987s the National Science Foundation (NSF) signs a \$14million, five year agreement with IBM, MCI and the Michigan Educational Research Information triad to manage the network.

c. 1990s-now

As mentioned above, the management of ARPANET was replaced by NSFNET. Finally the ARPANET was stopped with honor on March 1990. CSNET that were held around 1980s was stopped also in 1991. The scientist was recruited to NSFNET.

Around 1995s, CERN (the European Particle Physics Laboratory for nuclear research in Switzerland) develops the World Wide Web (WWW). CERN has several accelerators at which large teams of scientist from the participating European countries carry out research in particle physics. These teams often have members from half a dozen

³⁰ Wahana Komputer, *op.cit.*, p. 17

or more countries. Most experiments are highly complex, and require years have these large teams of internationally dispersed researches collaborate using a constantly changing collection of reports, blueprints, drawing, photos and other documents. Around this year CERN and MIT signed an agreement setting up to World Wide Web Consortium, an organization devoted to further developing the web, standardizing protocols, and encouraging interoperability between sites. Berner lee become the director. Since then, hundreds of universities and companies have joined the Consortium. MIT runs the US part of the consortium and the French research center, INRIA, runs the European part. Although there are more books about the Web than you can shake a stick at, the best place to get up to date information about the web at <http://www.w3.org>. interested readers are referred there for links to pages covering all of the consortium's documents and activities ²⁹

B. THE FACILITIES OF INTERNET:

The growth of internet as we can see recently as a revolution that dominates every aspect of life. Facilities in internet help us in doing every activity for business, government, education, etc. There are some facilities that we used in every daily life; www, e-mail, ftp, telnet, newsgroups, and interactive communication.

1. The World Wide Web (WWW)

The World Wide Web has become more than anyone ever dreamed. The internet created the basic connections to join us all into a single interrelated system, but the web was made possible by technology called *hypertext*. Hypertext as used on the web makes the internet users friendlier and almost universally accessible. When information is written in *hypertext*, keywords can be highlighted and linked to related text. The reader merely clicks on a highlighted word to jump to linked, related text. Think of the end of an article in encyclopedia that has a listing of related topics. How many times you have actually dragged out all the additional volumes that would be required to see those related topics. In hypertext is a charismatic attraction, it an electronic black hole that can pull

²⁹ Tanenbaum, *op.cit.* p 681

you ever deeper into interesting areas in cyberspace and that attraction is why you may have heard so much about the web.³⁰

The World Wide Web is an architectural framework for accessing linked documents spread out over thousands of machines all over the internet. In five years, it went from being a way to distribute high-energy physic data to the application that millions of people think as being "*The Internet*" Its enormous popularity stems from the fact that it has a colorful graphical interface that is easy for beginners to use, and it provides an enormous wealth of information on almost for beginners to use, and it provides an enormous wealth of information on almost every conceivable subject, from aboriginal to zoology. The web also known as **www** began in around 1990 at CERN, the European center for nuclear research. CERN has several accelerators at which large teams of scientist from the participating European countries carry out research in particle physic. These teams often have members from half a dozen or more countries. Most experiments are highly complex, and require years of advance planning and equipment construction. The web grew out of the need to have these large teams of internationally dispersed research collaborate using a constantly changing collection of reports, blueprints, drawings, photos, and other documents. The initial proposal for a web or linked documents came from CERN physicist Tim Berner-Lee in March 1989. The first (text-based) prototype was operational 18 months later. In December 1991, a public demonstration was given at the *Hypertext' 91* conference in San Antonio, Texas. Development continued during the next year, culminating in the release of the first graphical interface, Mosaic, in February 1993. Mosaic was so popular that a year later, its author, Marc Andreessen left the National Center for supercomputing Applications, where Mosaic was developed, to form a company, Netscape Communication Corp., whose goal was to developed clients, servers, and other Web software. When Netscape went public in 1995, investors, apparently thinking this was the next Microsoft, paid 1.5 billion dollars for the stock. This record was all the more surprising because the company had only one product, was operating deeply in the red, and had announced in its prospectus that it did not expect to make a profit for the foreseeable future.³¹

³⁰ Peter Herson, Robert E. Dugan. *U.S Government or The Web*. (USA:2003). p. 14

³¹ Tanenbaum.*op.cit.*,p.681

The User of Internet in USA³²

| Domain | Full Name | Number |
|--------|--------------|---------|
| .com | Commercial | 572.280 |
| .org | Organization | 38.082 |
| .net | Network | 24.648 |
| .edu | Education | 2.921 |
| .gov | Government | 431 |
| Other | - | 326 |
| Total | - | 638.788 |

The application of WWW is the most interesting in internet, like electronic mail, this application is very important in internet and often used by billion of people. This application called "*The Killer application*" or "*The world is in your fingertip*", because of through WWW we can get information, not only text but also images. In this application, there are a lot of facilities we can do; order or buy some goods in online, register in online, accessing some multimedia, etc. The Information put is called "*Homepage*". Every homepage has its own addresses. The application makes the environment of internet more colorful and cheerful. To attract the attention of users, the design of the homepage should interest as good as possible and there should be some available information. With this, the artistic person will be needed, so the advertisement and business world more glorious.

HyperText Transfer Protocol (HTTP) is the standard Web transfer protocol. Each interaction consists of one ASCII request, followed by one RFC 822 MIME-like response. Although the use of TCP for the transport connection is very common, it is not formally required by the standard. If ATM networks become reliable enough, the HTTP requests and replies could be carried in AAL 5 messages just as well. HTTP is constantly evolving. Several version are in use and others are under development. The material presented below is relatively basic and is unlikely to change in concept, but some detail may be a little different in future versions. The HTTP protocol consists of two fairly

³² Wahana Komputer, *op.cit.* p 101

back the other way. All the newer version of HTTP support two kinds of requests: simple request and full requests. A simple request is just a single *GET* line naming the page desired, without the protocol version. The response is just the raw page, with no headers, no MIME, and no encoding. To see how this works, try making a Telnet connection.

HyperText Markup Language (HTML) is a Web pages which are written in a language. HTML allows users to produce Web pages that include text, graphics, and pointers to other Web pages. Web pages may contain pointers to other Web pages. Now we will see how these pointers are implemented. When the Web was first created, it was immediately apparent that having one page point to another Web page required mechanism for naming and locating pages. In particular, there were three questions that had to be answered before a selected page could be displayed : what is the page called, where is the page located, how can the page can be accessed?. If every page were somehow assigned a unique name, there would not be any ambiguity in identifying pages. Nevertheless, the problem would not be solved. Consider a parallel between people and pages. In the United States, almost everyone has a social security number, which is unique identifier, as no two people have the same one. Nevertheless, armed only with a social security number, there is no way to find the owner's address, and certainly no way to tell whether you should write to the person in English, Spanish, or Chinese. The Web has basically the same problems. The solution chosen identifies pages in a way that solves all three problems at once. Each page is assigned a **URL** (Uniform Resources Locator) that effectively serves as the page's worldwide name. URLs have three parts: the protocol, the DNS name of the machine on which the page is located, and a local name uniquely indicating the specific page (usually just as a file name on the machine where it resides). For example, the URL of (<http://www.vu.nl/welcome.html>), the URL consists of three parts: the protocol (*http*), the DNS name of the host (*www.cs.vu.nl*), and the file name (*welcome.html*), with certain punctuation separating the pieces.

2. Telnet

Telnet is an Internet protocol that lets your PC become a remote terminal to a larger computer. Telnet allows you to establish a connection and log in, so that all of your keystrokes are sent to the remote server. In this mode, you will see the screen output of the server as if you operating a terminal directly connected to that machine. With a Telnet application you can establish a Telnet session using a dial-in modem and have access to the character based Internet services available on the machine to which you have connected.

Windows Telnet application is a snap to use and making the connection is easy, but you are on your own once you are connected. If you want a good Telnet client, visit the Web page at www.state.ky.us/software/windows.html, download the latest version, install it, and configure it. You might want to bookmark this page to get upgrades and for all the other links it contains to various Windows TCP/IP client applications, such as WS, FTP, Eudora e-mail, Finger, ping.

3. E-mail

Electronic mail or e-mail, as it is known to its many fans, has been around for over two decades. The first email systems simply consisted of file transfer protocols, with the convention that the first line of each message, example file contained the recipient's address. As time went on, the limitation of this approach became more obvious. Some of the complaint were :³⁵

- sending a message to a group of people was inconvenient. Managers often need this facility to send memos to all their subordinates.
- Messages had no internal structure, making computer processing difficult. For example, if a forwarded message was included in the body of another message, extracting the forwarded part from the received message was difficult
- If someone was planning to be away on business for several weeks and wanted all incoming email to be handled by this secretary, this was not easy to arrange.
- The user interface was poorly integrated with the transmission system requiring users first to edit a file, then leave the editor and invoke the file transfer program.

³⁵ *ibid.*, p 644

- It was not possible to create and send message containing a mixture of text, drawings, facsimile and voice.

As experience was gained, more elaborate email systems were proposed. In 1982, the ARPANET email proposals were published as RFC 821 (transmission protocol) and RFC 822 (message format). These have since become the *de facto* internet standards.

Email normally consists of two subsystems: *the user agents*, which allow people to read and send email, and the *message transfer agents*, which move the message from the source to the destination. The user agents are local programs that provide a command-based, menu-based, or graphical method for interacting with the email system.

4. FTP

FTP (*File Transfer Protocol*) is one of the application in internet, it is used to take and put file(s) from internet server to computer or in opposite. To run program of ftp you need a certain transfer protocol *TCP/IP* (Transmission Control Protocol/ Internet Protocol). Beside that, of course we need direct link through ISP, which available in Windows facility. TCP/IP has become standard protocol recently, but the age already more than 20 years. The first was used to connect government computers (USA) and now the protocol become a standard for the internet. The main task of TCP to accept electronic message with unlimited length and separated it to the size 64K. The IP took the parts, checking the accuracy every parts, addressed to the destination place, and make sure, was the parts has been sent with the correct sequence. TCP/IP is not a single protocol, but a unity of protocol and utilities. This protocol developed by ARPA for Department of Defense in USA in 1969. ARPA wanted a protocol which a certain characters: enable to connect every type of operations, can be pledged and can support high speed communication, routable and scalable to fulfill a complex and wide network.

The *ftp* protocol is used to access files by FTP, the internet's file transfer protocol. FTP has been around more than two decades and is well entrenched. Numerous FTP servers all over the world allow people anywhere on the internet to log in and download whatever files have been placed on the FTP server. The Web does not change this; it just making obtaining files by FTP cashier, as FTP has a somewhat arcane interface. In due

course, FTP will probably vanish, as there is no particular advantage for a site to run an FTP server instead of an HTTP server, which can do anything that the FTP server can do, and more (although there are some argument about efficiency). It is possible to access a local file as a Web page, either by using the file protocol, or more simply, by just naming it. This approach is similar to using FTP but does not require having a server. Of course, it only works for local files.³⁴

An address of TCP/IP is binary (*biner*) value of 32bit which is addressed to every host in network. The value used to recognize network where the host reside in. The value of IP divided into four parts number of 8bit which called *Octet* (e.g: IP address 202.149.240.66). Through TCP/IP we can get information that can be stored in a computer: software, documents, spreadsheet, maps, photos, a copy of constitution, audio sound, clips, even video clips. The internet has thousand of FTP sites and millions of files.

5. Newsgroups

Newsgroups is electronic community bulletin boards that serve as info central for targeted topics. Messages are posted in the open and anyone who looks at the newsgroup will see all the messages that have been posted by all the group's users. Your internet service provider includes a news server that actually holds messages from all the newsgroups that they receive. Your provider might offer fewer than half the total number of public newsgroups. Newsgroups in the internet are experiencing an unprecedented explosion in growth.³⁵ All newsgroups collectively are called the Usenet. Though you will use Netscape to access Usenet newsgroups, that is about all they have in common.

Newsgroup adalah forum diskusi atau suatu tempat dimana terdapat ruangan-ruangan diskusi yang terpisah, dan tiap-tiap ruangan mempunyai topik diskusi yang berbeda-beda. Di setiap ruangan itu bisa terdapat lebih dari satu orang yang saling bertukar pendapat atau pikiran. Jadi kita memberikan pendapat kita ke semua orang yang ada di ruangan tersebut. Newsgroup bisa juga dianggap seperti bulletin board yang ada di sekolah atau kantor, sehingga setiap orang bisa meletakkan artikel-artikel atau

³⁴ *ibid.*, p. 693

³⁵ Wagner, *op.cit.*, p. 126

*pendapatnya dan dibaca oleh semua orang. Dengan aplikasi ini semua artikel dapat dikirim dengan cepat dan diterima dalam group.*³⁶

Newsgroup sometimes referred to as the Usenet- are electronic discussion forums. Newsgroups are akin to community bulletin boards upon which people can post notices, but they serve the global community and have formal membership requirements, anyone on the internet can read and post messages. No one can accurately count their numbers, but estimates go as high as 15.600 public newsgroup. There also are private newsgroup, but counting them would be impossible.

6. Interactive communication (chat)

Chat is an application program of internet conducive of us converse directly with another user. This application program referred as IRC, here we converse through keyboard and we also have to have a link with IRC server. This application is a kind of conference that can be used by some people in all the world. Do not like teleconferences that enable us to use voice, IRC only presenting text in computer screen. Everyone can read topic and debate in forum.

*Dalam bahasa Indonesia chat ini berarti ngobrol. Chat merupakan program aplikasi internet yang memungkinkan kita berbicara secara langsung dengan lawan bicara. Program aplikasi ini disebut IRC (internet Relay Chat). Aplikasi ini semacam konferensi yang dapat dilakukan oleh beberapa orang diseluruh dunia. Tidak seperti telekonferensi yang dapat menggunakan suara, IRC hanya menampilkan teks di layar komputer. Setiap orang dapat membaca topik dan berdebat di forum tersebut.*³⁷

C. Summary

Computer Network (internet) has existed in around 1960s, where the scientist research techniques to connect systems on shared network. This project supported by U.S Department of Defense (DoD). The DoD donated a lot of money to universities and helped Universities get connected to each other, the project was called ARPANET

³⁶ Wahana Komputer, *op.cit.*, p. 44

³⁷ Wahana Komputer, *op.cit.*, p. 45

(Advances Research Project Agency). The first mission was to improve network technology that could connect the researcher to the large resources and huge data. The computer networks which spread out were to avoid the information that would be centered, so if there was a war, the information could not be destroyed.

Recently, internet and other networks have been used by scientist, engineer, lecturer, librarian, student, businessman, and also congressman to their activities, such as; to communicate to their friends, except journal, receive e-mail, accessing bulletin and current news. Recently, internet was protected by multilateral agreement and specification protocol that explain about the moved of data between channel. These protocols (IP, TCP, DNS, HTTP, etc) were held based on the conversation internet engineering task force, which were opened to the public.

There are several inventions that supported the invention of internet technology. Here are several chronologies of some invention that relevant to the internet technology from the year of 1800s until 1960s: In 1800s, the invention of telegraph, has made revolution of telecommunication between people. The Morse code has made the telecommunication between people more variant and this invention as a basic of computer invention which using binary code. In around 1856 – 1866, the invention of cable was used as an important connector in telecommunication. The invention of telephone (1876s) by Alexander G. Bell. This as a basic connection in internet and as its application using modem. In the middle 1940s, an expert John V. Neumann developed a concept of computer design so until the next few years his concept still used as one of hardware of internet connection. In 1957s – 1960s, the first satellite on earth was launched. Satellite hold an important function in transferring data in this era. At he same time The U.S DoD tried to have research which known as ARPA (Advances Research Project Agency) to strength their military tools. ARPA tried to improve the networks in switching package to transfer data. The switching package was used first time for military.

Meanwhile the chronologies inventions that supported the internet technology are from the year 1960s until 1990s. In 1960, as we have seen in discussion above, the

computer scientist research techniques to connect system on shared network, then in around 1960s emerge the ARPANET, which at the beginning connect the scientist in every computer center in far place to shared information, this was limited only to military. In 1970s USENET (User's Network) has existed. These group are populated by computer scientist, computer professional, and computer hobbyist. In 1980s, BITNET (Because It's Time Network) begins offering e-mail and list servers for information distribution. In 1985s, internet was ready to held up as a technology that able support environmental community institute research widely and other society community have started to use for daily communications by utilizing personal computer. By the year 1987s, the National Science Foundation (NSF) signs a \$14 million, five year agreement with IBM, MCI, and the Michigan Educational Research Information that tried to manage the network. In 1990s, the management of ARPANET was replaced by NSFNET. Finally the ARPANET was stopped with honor, CSNET that were held around 1980s was stopped also in 1991s.

From internet of course there are a lot of benefits we can get: The information is faster and cheaper using the application of internet(e-mail, www, ftp, gopher, newsgroup, etc). lessening the expense of paper and distribution; newspaper, magazine and brochures, as a promotion media (Image Company, Introducing and launching product), interactive communication through e-mail, video conferencing, IRC, Internet phone etc, as a tools for transferring data and as a tools for research and development.