An Internet Project for 100,000 Users in Thailand

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Abstract

The Internet connection was first established in Thailand in 1987 when the Asian Institute of Technology (AIT) was connected to Australia a few times a day. The connection was upgraded to full service in 1991 when Chulalongkorn University became Thailand's gateway to Internet with a 9600 bps leased line to the USA which was later upgraded to 64 Kbps. In 1992, another gateway was established at the Ministry of Science. Assumption University started an UUCP connection with AIT in March 1992 and upgraded this to a leased line connection to Chulalongkorn University in May 1993. The total number of users in Thailand using Internet services in November 1993 was about 6,000, 1,000 of whom were at Assumption University. Realizing the importance and usefulness of a full Internet connection, the Board of Trustees of Assumption University passed a resolution to expand AUnet to provide full Internet service to all Catholic-related educational institutions in Thailand which includes about 300 institutions with the population of over 300,000 students. It is expected that the number of Internet users will be over 100,000 within 2 years.

I. Introduction

On their return to Thailand from the United States of America, Thai students and visitors with Internet addresses could not continue to avail this facility because of the high cost of international telephone connection. In 1987 the Asian Institute of Technology (AIT) in Thailand entered into an agreement with the Department of Computer Science at the University of Melbourne in Australia (with the Internet node name <munnari.oz.au> to operate Internet email service on a regular basis. Munnari would call AIT three times a day to send and collect mail.

In 1988, Prince of Songkhla University in the southern part of Thailand established an Internet node <sritrang.psu.th> connected to <munnari.oz.au> at Melbourne University a few times a day. Two dial-in telephone numbers were made available from 09:00 to 19:00.

In 1991, Digital Equipment (Thailand) Ltd. acquired an Internet address <decth.co.th> for internal and research-related usages. No dial-in number was made available and the users had to use the machines at the company.

A major breakthrough occurred in 1991 when Chulalongkorn University became the Internet gateway in Thailand <chulkn.chula.ac.th>. After sufficient testing, full operation was started in July 1992 with a 9,600 baud leased line to Virginia, U.S.A. and later upgraded to 64 Kbps line. The fees for the leased line is approximately 4.2 millions Baht per year (about US$ 168,000). Initially only one telephone line was made available but by 1993 twenty lines were accessible. The 24 hour full Internet services at Chulalongkorn University are obviously much better than the email-only at AIT.

In January 1992, another important event took place. The National Electronics and Computer Technology Center (NECTEC) establishes the NECTEC E-mail Working Group (NWG) which in February 1992, NWG established a network named ThaiSarn (Thai Social/scientific, Academic and Research Network) with a machine donated by IBM, two dial-in telephone lines available 24 hours a day for NWG <nwg.nectec.or.th> connections, UUCP (Unix-Unix CoPy) hourly with Thammasat University and Prince of Songkhla University, and international connection with Australia <munnari.oz.au> through AIT three times a day. The service was later upgraded to include six dial-in telephone lines, 24 hours per day international connection through Chulalongkorn University <chulkn.chula.ac.th>. Then in September 1993, the second gateway for

Thailand was established at <nwg.nectec.or.th> and it is connected to Virginia, U.S.A. by a 64 Kbps leased line.

In January 1992, when NWG was established, Thammasat University (TU) Information Processing Institute for Education and Development (IPIED) also registered as an Internet node <ipied.tu.ac.th>. One dial-in telephone number was made available 24 hours a day. Internet connections at Thammasat are being upgraded and another node was established at Rangsit campus by the end of 1993.

The Faculty of Engineering at King Mongkut's Institute of Technology Ladkrabang started experimenting with Internet in mid 1992 with the node name <ladwff.kmitl.ac.th> connected to <ipied> at Thammasat. Only about 40 users have been approved and, of course, the senior author got an address there <charm@ladwff.kmitl.ac.th>. Later the Computer Research and Service Center which serves all the faculties established a central node for Ladkrabang by the name of <crsc.kmitl.ac.th>. By October 1993, about 500 Internet addresses have been given by <crsc.kmitl.ac.th>.

ThaiSarn was joined by Digital Equipment (Thailand) in January 1992, Prince of Songkhla University, Hewlett-Packard (Thailand) and Asia Credit Limited in March 1992. In April 1992, AIT joined ThaiSarn, but later installed a direct leased line to Chulalongkorn University. Assumption University started experimentation by initially connecting to AIT in March 1992 and the switched to Chulalongkorn in May 1993. In 1994, it was connected to both gateways from Thailand by 64 Kbps lines.

Additional information about computerization in Thailand can be found in several publications by Charmonman and colleagues [1-15]. The development of Internet in Thailand has been discussed in greater detail in Charmonman [18].

II. Assumption University

Assumption University or ABAC as it is now known, was founded in 1969. It was formally established in June 1972 and accredited by the Ministry of Education and the Ministry of University Affairs in May 1975. The founding fathers of this institution are Brother Philip Aumnuay Pinratana and Brother Bernard Mary of the Brothers of St. Gabriel, a Catholic religious congregation devoted to education and philanthropic activities in Thailand and other countries. The congregation runs about 300 educational institutions in Thailand. By 1994 the University has grown by leaps and bounds with more than 15,000 undergraduates, 1000 graduate students, and a high-caliber full-time and part-time faculty. The latter are drawn from relevant business circles and government offices.

ABAC acquired its first set of computers in 1980. The two Apple II micro computers were supplemented with two Radio Shack TRS 80 in 1981 to be used by the students in the Department of Business Computer. In 1982 two Onyx computers with UNIX operating system was purchased for academic purposes. From 1982 to 1986 many more Apple II and IBM PC's were purchased mainly for students' uses and a few for administrative work. In 1987, ABAC acquired its first IBM 9370 mini computer to be used for students' registration. As the number of students increased, many more 80286 PC's were acquired. By 1989, the IBM 9370 was considered not fast enough to handle student registration so an IBM mainframe 3083 was purchased in 1990 for this purpose and the IBM 9370 was dedicated to academic and research uses. In the same year the Computer Center of ABAC was divided into two sections, the Computing Center to serve the administrative needs and Computer Lab to serve the academic needs. From 1990 to 1994 many more PC's, Macintoshes, IBM AS400, SUNs, HPs computers were purchased by the University. A SUN was used as the Mail server of ABAC <abac.au.ac.th> which was connected to <chulkn.chula.ac.th>. In August 1993, ABAC acquired an HP 9000 model G40 file server and 6 HP 9000 model 715 workstations which are being used as part of the networking project in ABAC.

By the end of April 1994 two SPARC Center 1000 with 512 MB of main memory and 104 GB of disk storage will be installed to facilitate all users of AUnet to access and use Internet. The number of AU Internet users will be 15,000 by June 1994. Computers in general, and Internet in particular has been one of the fastest growing aspect of Assumption University

since its foundation. This growth will continue to be one of the main goals of Assumption University.

III. Internet Project at Assumption University

The Board of Trustees at Assumption University has approved the proposal [16] that all 15,000 students currently enrolled at the University be required to use Internet. Further, it also proposes to include 3 other Catholic Universities, 17 Catholic Colleges and 278 Catholic Schools in Thailand. It should be mentioned here that the majority of students (98%) in theses schools are not Catholic [19]. The main objective of these schools and universities is to provide education for the masses of Thai people. These schools are among the best in Thailand. The student enrollment in all Catholic Schools and Universities in Thailand is as shown in Table 1.

The number of users is expected to exceed 100,000 within the next 2 years to include other Catholic colleges, schools, and hospitals in various parts of Thailand. The plan for the growth of the users for other Catholic institutions is shown in Table 2.

Table 1. Catholic-Related Institutions in Thailand

Institution	Number	Students	Teachers
University (Bachelor's to Ph.D. degrees)	1	15,000	1,000
Colleges (Associate to Bachelor's degrees)	3	2,500	150
Community colleges (Certificate)	17	23,000	970
Schools	278	319,000	13,000
Total	299	359,500	15,120

Table 2. User-Growth at AUnet

Year	Users	Number
December 1993	ABAC - Administrators, Deans, Faculty, Graduate students	1,000
June 1994	All ABAC students	15,000
December 1994	Above plus alumni and other Catholic universities	30,000
June 1995	All Catholic colleges in Thailand	60,000
December 1995	All Catholic schools and hospitals in Thailand	120,000

IV. Purposes of AUnet

The nonprofit AUnet shall be operated exclusively for the following educational, charitable and scientific purposes:

- To educate the students, faculty and staff members and other users about the concepts of local and international networking.
- To prepare the students to enter the world of information where networking will be the norm rather than the exception.
- To provide full Internet access to all students, faculty and staff members and other users.
- To facilitate and support the technical development and expansion of AUnet and the Internet as a research and educational infrastructure and information super-highway.
- To stimulate the involvement of the educational community, government,

industrial research organizations and others in the technical development and expansion of AUnet and the Internet.

- To educate the educational community, government agencies, industrial research organizations and the public at large concerning the technology, use and application of AUnet, the Internet and computer networking in general.

- To promote educational applications of technology of AUnet, the Internet and computer networking in general for the benefit of government, colleges and universities, industrial research organizations and the public at large.

- To provide a forum for exploration of new AUnet, Internet and other networking applications.

- To stimulate collaboration and exchange of experiences among parties interested in the technology, applications and operations of the regional AUnet, global Internet and computer networking in general.

V. Membership Fees

The membership fees for AUnet are:

- Graduate students.	$ 8.00/month
- Undergraduate students.	$ 4.00/month
- Students in other Catholic related educational institutions.	$ 4.00/month
- Alumni of Catholic related educational institutions.	$ 8.00/month
- Other users such as libraries, international organizations, etc.	$ 8.00/month

The initial users of AUnet will be 15,000 students of AU in 1994 to be increased to about 100,000 students (one third of 300,000 students of Catholic-related educational institutions in Thailand) by 1995.

VI. Facilities in AUnet

The following facilities will be available not later than June 1994.

VI.A. The Host Computers

At least two host computers each with at least 256 MB of main memory. The two together must have at least 512 MB of main memory and 104 GB of disk storage with the ability to handle at least 600 concurrent users on-line. Thus each of the 15,000 users could have an average of 5 MB of disk space (15,000 x 5 MB = 75 GB) and about one hour each person each day on the average (600 x 24 hr. x 60 minutes / 15,000 = 57.6 minutes).

VI.B. Campus Network

Optical fiber with 12 cores and V.35 port for WAN connection to the two routers, one at the Computing Center on the 7th floor of C building to be connected to ThaiNet gateway, and the other on the 4th floor of A building to be connected to the ThaiSarn gateway. Then optical fiber with 6 cores connecting all eight buildings on campus with the routers.

VI.C. Terminals

- At least 200 microcomputers dedicated for student uses of AUnet. In the future if the waiting lines are unreasonably long, the number will be increased.

- At least 50 microcomputers dedicated to faculty member uses of AUnet, at least one per department.

- At least 150 microcomputers and workstations in the Computing Center and the Computer Laboratories connected to AUnet.

- About 100 microcomputer installed in academic and administrative offices all over Assumption University will be connected to AUnet.

VI.D. Telephone Lines for Dial-In

At least 160 telephone lines with modems for users to dial in from home and office. The

number of lines will be increased to 240 by December 1995.

VI.E. Worldwide Connection

Two 64 Kbps lines, one connecting AU and chulkn gateway at ThaiNet (Chulalongkorn University) and the other connecting AU to nwg gateway at ThaiSarn (Ministry of Science). Later, if there is a traffic jam, AU may become the third gateway from Thailand.

VII. Local Services

Each user has his individual identification and a password. The user can access AUnet from a terminal at AU. Alternately if a user has access to a microcomputer with a modem, he can also dial in to connect to AUnet from any other office or from his house. If he has a portable or lap-top computer, he can connect to AUnet while traveling.

The local services to be provided by AUnet include both personal and educational. In the personal service area, a student may send mail to invite his local friends to a party, send birthday greetings to his local or international friends, etc. On the educational side, an instructor may send a statement of the assignment to all students in his class and the students can submit the assignment through email. If an instructor wishes to cancel his class, he may enter the message to the system and the system will send the message to all members of the class right away. So, before going to any class the student should check his email first. An instructor who finishes grading an examination may send the grade to a student individually. In the later part of the project the system may be linked with the home banking service at local banks to allow the student to make payments to the University. The registration system would also allow students to register for classes through the network without having to travel to the University.

Like any new technology, it is up to the users' imagination to use AUnet for their benefit. Some examples follows:

VII.A. To Supplement the Postal Service

The postal service has been called "snail mail" because of its slowness. When one returns home he may be told by a servant that a letter has arrived and she knew that it was important and so placed it somewhere for you but she forgot where. Worse still, someone at home, such as a mother, may have opened the letter from a boy friend to her daughter. If e-mail is used, when one arrives home he can open his mailbox which is personal and secret. As a matter of fact, he does not have to wait until he returns home. He can open his mailbox from his school or office or even while traveling if he has a lap-top computer with him or can borrow one from his friend for a few minutes to look at the mailbox.

VII.B. To Supplement the Telephone Service

The first time one tries to make a telephone call, the line may be busy. The second time, the connection may be made, but the other person may be too busy to talk or is interrupted before the intended message is conveyed. The third time may be successful. Thus a telephone call may be only about 33% effective. If e-mail is used, both parties need not be available on the line right at the same time. One can leave a message any time and the receiver can read and acknowledge and/or reply anytime at his convenience. E-mail can also be used anywhere in the world at no extra cost. A user can use a terminal at his location and remotely log on to another host next door or across the world without having to pay long distant phone charges for the computer connection.

VII.C. For Students to Communicate with their Instructors

Unavailability of instructors is a common complaint amongst students. Handwritten messages are often illegible or misplaced. With e-mail, a student may leave a typewritten message in the instructor's mailbox which could be arranged to acknowledge receipt automatically. The instructor could read the message at his convenience. The university may provide the Heads of Departments with individual computers right in their offices and other instructors having easy access to computers to reply to students' requests. Confidentiality is maintained. If e-mail is used to reply, only the intended student with the identification and password could read it.

VII.D. To Communicate with Friends and Relatives Abroad

One of the most popular usages of the Internet is for communication with friends and relatives abroad. For one with a close friend or relative in the US, the phone bill may be a few hundred dollars a month. In addition, e-mail could be used to make an appointment for both parties to be in front of the computers at their own locations at the same time. The they could use the "talk" or other interactive communication features to start an on-line communication session. They can type back and forth for hours without having to pay a steep telephone bill.

VII.E. To Communicate with Electronic Pen Pals

Some people enjoy pen pals through the postal service. An electronic version is now practiced worldwide. An announcement may be made through the electronic bulletin board of the kind of pen pal one would like to have. Someone will answer and then the communication can be taken out of the electronic bulletin board to electronic mail.

VII.F. For Submission of Homework

In a few undergraduate courses at Assumption University, the instructors have been requiring students to submit their homework through electronic mail or electronic file transfer. The assignment can then be graded on the computer with instructor's comments and grade sent back to each student individually. General comments and additional assignments could also be broadcasted or sent by an electronic mailing list to students.

VII.G. To Find Out Grades

At university, a student with no class on a particular day would have to travel to the university to find out if his grades have been released. This information can be found out at his home by reading the electronic bulletin board. As a matter of fact, the university can make arrangements to send grades released electronically to each student individually at home.

VII.H. For Social Messages

At the university or from home, a student may send and receive social messages to and from his friends, such as greetings, invitations, tender love and care notes, appointment requests, etc. The various student-clubs could be in touch with their members through e-mail for exchange of information or schedule for their meetings.

VII. I. To check Class Cancellation and Make-Ups

When an instructor wishes to cancel a class and announce a make-up, he can enter the message into the system which will go directly to each and all of the students in the class as well as to the Registrar's Office.

VII. J. To Analyze Students' Grades

All student records could be downloaded to a host. Thus any or all students can ask to see their own records from a terminal on campus or a micro at home. Packages can be made available for students to make "What If's" analysis of their records. For example, if one course is taken or not taken in the coming term, what will be the consequence, such as the length of time for graduation. If a certain GPA is desired, what are the possibilities on the grades for the individual courses? To get out of probation, what GPA is required in a particular term?

VII. K. English On as well as Off Campus

Assumption University has been promoting English on campus and the use of the Internet will improve students' English not only on campus but also at home because students will use English more often through the Internet.

VII. L. To Register for Classes by AUnet

Upto 1987 the registration process was handled manually. After acquiring an IBM 9370 the registration was computerized and by the end of 1987 the whole process of registration such as student history, grades, pre-registration, prerequisite verification and payment of tuition fee could be handled by the registration software. The registration process has become a

very time consuming process at the moment. It may take hours or even days for each student to register for the courses he selects. The main reason for the delay is for the student to get the right information which is needed for registration and the other reason is the time being spent between students and staff at registrar's office explaining the procedure and other information needed by each party. By using the AUnet, students will be able to easily inquire about their grades, the availability of courses, the class schedules, availability of seats in a class, and so forth and then can decide to register for a given course from a PC at their homes or at any of terminals available at ABAC.

VII.M. Electronic Publishing

The ABAC newsletters and journals will be distributed through AUnet to the intended faculty, staff, and students. The idea of electronic publishing will be a cost saving process in terms of printing cost and the environment conscious people would greatly appreciate the idea of using less paper.

VIII. Worldwide Services

With access from AUnet to the Internet, a user may use any and all of the following main services:

VIII.A. Electronic Mail

Each user has a private mailbox and a password and therefore all his mails would be private and confidential. A software system called "pine" or "elm" could be very useful for electronic mail.

VIII.B. Electronic Discussion Group

Any group of persons with similar interest may establish an electronic discussion group ranging from a group interested in apple, another group interested in the bible, another group interested in computers, and so on.

VIII.C. Electronic Bulletin Board

All kinds of bulletin boards have been established for users to post a message for public reading as well as responding. Users do share and exchange their ideas on these Bulletin Boards.

VIII.D. File Transfer

A user may use the system to transfer a file to (uploading) or from (downloading) his computer and any other computer in the Internet with 30 million computers in 1993.

VIII.E. Interactive Communication

Through the Internet a user may communicate interactively with another user in front of another terminal either in the same town or across the world.

VIII.F. Network News

Seven major news categories have been established. They are computer science and related topics; news network and news software; hobbies; recreational activities and the arts; scientific research and applications; social issues including political as well as simple socializing; debate on controversial topics; and miscellaneous which include jobs wanted and offered as well as for sale.

VIII.G. Electronic Journals

Several learned societies have included electronic journals. For example, the American Mathematical Society has all its journals in electronic form available through the Internet free of charge. Other journals may be later available at cost.

VIII.H. Library Search

From an Internet connection from one's home or office, the Library of Congress in the United States as well as many other libraries all over the world can be accessed by use of "hytelnet" or "World Wide Web".

VIII.I. Database Search

Many databases can also be searched from any connection to the Internet through the "gopher" and "wais" systems. Some of the popular databases such as health information and book-stores are free to access.

VIII.J. Remote Log-in

From an Internet terminal anywhere, a user can log in to any other computer any where else if he has an account. Several computers in the system also allow guest or anonymous log in for any user with no account. This is done by use of "telnet".

VIII.K. Finding Software

With the emergence of the copyright law making it illegal to copy proprietary software, a user may want to find a freeware or shareware which may be located and copied through the Internet. As of 1993, there are 2.1 million files available in the Internet by use of the "archie" system.

VIII.L. Finding Someone

If the user does not know the Internet address of someone he would like to communicate with, he can use "lid" on the same host, or "fred" which is like a white page telephone book. Another White Page Directory is WHOIS database available on line. As of March 1994, NetPages is an Internet email address directory based on the phone-book concept and available on line as well as in book form from <netpages@aldea.com).

IX. Concluding Remarks

Assumption University is one of the premier universities in Thailand and by providing Internet services to its faculty and students, it seeks to build up fresh momentum and perspectives for academic breakthroughs and research study schemes.

Besides being the biggest Internet user of the academic purposes in the country, Assumption University is poised to extend this range of information technology to other Catholic schools/colleges around the country. It is our fond belief that this undertaking would prove to be a lasting blessing to all the beneficiaries.

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