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On Network Services

The focus of our next issue will be on Electronic Mail and other network services. Users are welcome to write articles to share their experiences and express their ideas on using our network services.

Editor's Notes

Channel is a bi-monthly publication of the Centre of Computing Services and Telecommunications (CCST) of HKUST. Prepared by the Computing Information Centre (CIC), Channel provides valuable information about CCST plans, developments and services. Topics on new trends in computing technology or other related topics of interest are also included. User contributions to Channel are welcome and should be sent to the Editor along with the author's name and department.

Channel is distributed to all University members who are registered users of the CCST services. Other parties who would like to have their names added to our mailing list for Channel may complete and return the form on the last page to the Computing Information Centre.

Esther Chan, Editor of Channel CIC cesther@ustHK.BITNET
Information Systems . . .
A User’s Perspective

The fact that I was asked to contribute an article to this issue of Channel probably means that my own addiction to computers has become rather notorious. I make no secret of the fact that I believe information technology is in the process of revolutionising the way in which managers do their jobs. However, most of those folks who are still afraid to touch a keyboard for fear of having it bite them probably do not read this publication, so I won’t use this space to argue the case.

The incredible, and by all signs still accelerating, development of information technology has created a number of challenges for computer professionals and users alike. Twenty-five years ago I began learning FORTRAN so that I could write a simple program to fit some physics data to a simple model. The program and data were fed to our campus computer in the form of holes in what were then called IBM cards. The computer was, indeed, an IBM mainframe and had cost the University of Hawaii plenty. Today, I am in regular contact by electronic mail with former colleagues in Hawaii and staff at other tertiary institutions in Hong Kong. No stamps or envelope needed, and there is still a whole world out there I haven't sent messages to yet.

It seems to me that a first critical step is networking. If the users at least have access to the central resource through the same device (the PC on the desk), a major battle is already won. In this respect, CCST has already delivered a very good, and apparently still improving, product. The newest additions, such as PCMail and the on-line Phone Directory, give users a real incentive to hook up to the network and make use of it. Since the facility became available, I am in regular contact by electronic mail with former colleagues in Hawaii and staff at other tertiary institutions in Hong Kong. No stamps or envelope needed, and there is still a whole world out there I haven't sent messages to yet.

This is mostly a blessing, but not an unmixed one. One of the main problems that can occur is the creation of multiple and inconsistent sets of data being used by different people and offices to represent the same set of facts. The challenge for CCST and other similar offices in all sorts of organisations, is to provide a system that meets user needs so well that the convenience of having a local database does not offset the benefits of centrally maintained data accessible to all who may need it. That is what Information Systems is all about.

First of all, what would be the ideal “dream” system for me as a user? Well, I have invested a lot of time learning how to make my PC do tricks, so ideally I would like to have central services available as an extension of what I can already do. In the best of all possible worlds, the local and host systems would be integrated seamlessly. That means that I, as a user, would hardly know whether a function was being performed right on my desktop or on CCST’s computer. Sound impossible? Full-scale implementation may be a bit in the future, but the fact is that the CCST network already hides its seams rather well. For instance, if you are using Word Perfect and print a document, it will go to a remote printer through a network or to a local printer hooked up to your PC based on your selection of the printer in WordPerfect. From the user’s viewpoint, you really do not have to be aware that in one case the output is going to the host computer on the 13/F, being queued up with other print jobs, and then sent back to wherever your network printer is located. It’s just plain Shift+F7 (Print) and 1 (Full Document).
Getting back to my idea of "dream" system, a truly seamless system would allow a user to load up a programme he or she was really familiar with, dBase III say, and have access through it to a data file on the central system. And I don't mean just downloading data from the central database into a separate dBase file. That approach is subject to the same problems as any form of decentralised data. There's nothing to guarantee that a user will regularly update his or her local file to keep it current with the centrally maintained database. The ideal would be a kind of translator that would allow the dBase user to see references in the directory of dBase files to data stored centrally.

This data would be transmitted in a dBase-usable format when accessed.

I have attended a presentation on the Information Systems being developed, and they have not quite reached the level of integration I have dreamed of -- at least not at this time. However, it seems to me the new systems will be very useful and I am looking forward to their introduction.

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Information Systems At the HKUST

What is QUODATA?

Do you know what it is? Some people in our University might have heard of it, others may not know what it is.

QUODATA is actually an American software vendor which offers a wide range of application systems for education and non-profit making institutions. Among their many product offerings, our University had acquired the following:

- ADMISS - Student Admission System
- BILLS - Student Billing System
- FRS - Financial Reporting System
- PAY - Payroll System
- STUDENT - Student Record System

These application systems were developed using a software called QDMS, which is a general purpose data management system with screen and report generation/manipulation facilities.

Why QUODATA?

As we all know computers have now become an indispensible tool in almost every organization.

A newly established university like ours of course will require some computer application systems in no time. On the other hand, a typical application system (such as a financial system) will normally take months and even years to develop. In order to deliver computer application systems within a very short time frame, we had to search some off-the-shelf, ready-made software.

Overseas and local software vendors had been invited to submit proposals for such systems around March last year (1989). After careful consideration of the functionalities and the cost, QUODATA had been selected for award of this tender.

How much have we done with QUODATA?

In November 1989, we have started off with customization of FRS which has now become the core of our Financial systems.

Over the past 9 months, we have also made extensive use of QDMS, the data management system, and developed the Personnel and related systems. Development/customization of the Admission system is also currently underway.

During the development and implementation of these application software, our users (staff from the Finance Office, Personnel Office and Admission Office) will probably have found that there have been certain limitations and constraints imposed by using ready-made systems.

We have tried our best to customize the software in order to work around these limitations and constraints, but still there are some built in characteristics of systems of this kind which cannot be changed. This often means that our users have to make compromises regarding flexibility and way of doing things.

While this is not a long term strategy, QUODATA has helped to achieve our goal of providing computerized support for the essential administrative functions of our university within a very short period of time.

Future with QUODATA?

Our university and our users are very progressive. We would expect the same from our information systems. The QUODATA systems filled a 'void' in the founding stages of the University. As we grow and develop, however, we begin to feel the need to explore other more versatile development tool(s) for our environment to satisfy the demand. At this time we are looking into the possibility of setting up a long term system development environment which will be comprised of integrated CASE (Computer Aided Software Engineering) tools. QUODATA will be part of this environment but our reliance on it is expected to diminish over time.

Mrs. Ophelia Yao, Principal Computer Officer & Project Manager
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Activities in IS - A Progress Report

The main responsibility of the Information Systems (IS) team is obviously to develop the necessary information systems for the University. This report briefly describes the strategies and activities of the IS section in developing the necessary information systems and in building the necessary system environments.

Information Systems Development

The Unique Situation In The HKUST

One of the difficulties in software development is visibility. It typically takes months (and even years) from the time a system is conceptualized to the time it is in usable form.

At the HKUST the problem of development lead time is further complicated by the 'newness' of the University. Typically, administrative information systems have to be developed on the premises of corporate policies and procedures. However, being a new university, many administrative policies and procedures are still in the process of being formulated, and (as one would expect from a dynamic organization) continuously being reviewed, and refined.

For both the staff in the Information Systems area and in the administrative departments, this evolving process means that system development work may not always proceed smoothly and be free of interruptions. Often it is necessary to suspend a piece of work and awaits policy decisions at a higher management level. It is also not unusual that previously completed work has to be modified at times, to adapt to newly established procedures.

In view of the difficulties mentioned above, the IS team develops prototypes of the eventual systems so that users can identify system inadequacy and review their needs at an early stage. In this case, the QUODATA systems (see the article on QUODATA in this issue) are used to develop prototypes from which many of the systems currently under development were evolved. The IS team takes 'pro-active' participation to make recommendations, indicate general needs (based on their professional experience and judgement), so as to stimulate user thinking and so on.

Current Status

System development work is currently in progress in 4 major administrative areas:

Financial Related Systems

The General Ledger System is one of the first information systems that was implemented. It has gone through a few iterations of refinement/enhancements since its introduction in April 1990 and is still evolving.

Budget allocation and monitoring is another area of development. The basic budget allocation and budget position reporting functions are in place and are currently in use by the Finance Office. On-line enquiries of budget positions by end-user departments are under development and expected to be ready by the end of October. An on-line Budget Requisition System is at present undergoing design review.
While the budget allocation and budget clearance functions are for the exclusion use of the Finance Office, all other functions (enquiries and requisitions) will be accessible to authorized departmental users.

The last system that is being worked on in the financial area is a Payment and Cheque Writing System. The prototype has been reviewed with the users and modifications have been identified.

**Personnel/Manpower Related Systems**

The Staff Information and Establishment Systems were first implemented in April 1990 and have undergone a number of minor enhancements since.

Recently (in September) a Recruitment System has been put into production after running in prototype/acceptance test mode for about 6 weeks.

A prototype Advertisement Tracking subsystem is currently under review by users in the Personnel Office.

Also, a Benefits System is currently under study, the initial focus here is currently on the Leave subsystem.

**Procurement and Purchasing Related Systems**

This is an area which is being developed closely in conjunction with the procurement (for teaching and non-teaching equipment/supplies) activities leading up to the opening of the University in 1991.

Work is currently underway in developing the system interfaces between the University information systems and systems provided by SERCO (the procurement contractor of the University).

Design for the eventual University Procurement/Purchasing and Inventory system is also near completion at the time of writing.

**System Environment**

The environment in which information systems are developed and operated has direct implications on the productivity of both the staff in IS and the staff in user departments.

Paralleling developments in information systems, the IS section has also been working closely with Systems and Operations (S&O) section in creating the necessary environments for both IS staff and users.

Activities here basically fall into 3 areas:

**Developer Environment**

Basic provision of PCs, printing services, access to the central VAX System, etc. for development work is easy. But a good developer environment goes much beyond the basic necessities. In our situation, when a lot of development work has to be done within a relatively short time, the developers need to have all the ‘tools’ available to help them get their jobs done, quickly and as automated as possible.

Up to this moment IS staff have been relying almost solely on the facilities of the QUODATA/QDMS for their development work. QDMS is fine but nevertheless is designed for applications with specific operational characteristics (eg. the QUODATA products) and as such imposes quite a number of constraints on the developer when used for applications of a different nature (see the article on QUODATA in this issue).

Over the past 6 months the IS team has been formulating the requirements of a long term software development environment and has been examining CASE (Computer Aided Software Engineering) products in the market. Basically we are not just looking for tools, but for tools that can be integrated into an ‘active’ environment which is responsive to, and indicative of,
ongoing development activities. They should not be individual tools but tools that together support a sound software development philosophy/strategy.

The study is now complete and a set of requirements specification has been prepared. The next step will be to acquire the necessary tools, develop the necessary procedures and routines, and implement this environment/strategy.

**Operational Environment**

![Diagram of Operational Environments]

Three operational environments have been established on the central VAX machine to support the systematic transition of information systems from initial development/prototype to final production use.

The DEVELOPMENT environment is where IS staff carry out their development or initial prototyping work with users.

The TEST environment is the testing ground. Here users will experiment with the application and determine if it is acceptable for production use. This is basically a 'controlled' environment for the exclusive use of acceptance testing.

The PRODUCTION environment, as denoted by its name, is where the final application systems are used in support of actual operations. This environment is highly restricted and accessible only to authorized users.

Together with the staff in the S&O section, a complementary set of operation procedures, encompassing movement of systems and programs, access authorization and control, backup and recovery, off-site storage of backup tapes, etc. have been developed for each of the three environments and is continually being reviewed and enhanced.

**User Environment**

Three operational environments have been established on the central VAX machine to support the systematic transition of information systems from initial development/prototype to final production use.

There are many things that are needed in a user environment. At this time we are focusing on two major aspects:

**Support for Ad Hoc Query/Reporting**

This involves providing the necessary facilities (e.g. user friendly query processors and report generators) by which users can retrieve information from the various systems, in the form of hardcopy reports and/or screen displays.

The QUODATA/PDQ Reporting facility has been the major tool in use up to this moment.

**Open (Authorized) Access to Information**

Authorization scheme is in place for the access of information in the systems by authorized users within a particular central administrative department (e.g. financial data to staff in the Finance Office).

Supporting access of data by other departments (e.g. access by departmental users to central personnel data base) is more complicated, as it involves careful data segmentation and the set up and manipulation of complicated authorization matrices. A proposed access scheme supporting distributed access by any authorized users (to information that they are authorized to retrieve) is currently being developed and will be available in about a month's time for review.

By the Information Systems Section
The Ultimate Information System - A Dream or Vision

To be able to develop a complete information system from nothing, without having to contend with, and be constrained by history is a dream in itself, at least for a young chap (well, relatively young anyway) like me.

Ever since I started my career in the computing profession, I have to develop system after system that fit into somebody else's work. At the beginning they called it 'interfacing'. When I got really tired of the word, they changed it to 'integrating', just to confuse me. Now I may be slow, but it did not take me long to realise that, regardless of what you call it, the message is essentially the same - some (usually that means 'a lot') previous work had been done to record/deliver information in a particular manner, and any work you (meaning newcomers like me) do had better behave within the context and confines of the existing environment.

I do not particularly object to conformity. The trouble is when you have to conform to something that is archaic in design, clumsy to operate, and impossible to trace when it goes wrong. In this respect, I have been very unlucky (and many others of my generation probably have the same problem). I have continually had to develop 'new' software that conforms to systems of the type I just described. Some of these systems were written 20 years ago and behaved/ran like they were 100 years old (one reason being that they had been patched up so many times to enable later systems to conform to them). And then there were systems that were written only 5 years ago and behaved/ran like they were 150 years old (for less obvious reasons).

Many system developers will envy the unique opportunity available at the HKUST. The challenge before us is to make the very best use of this opportunity - to properly plan our information strategy, to lay out the steps/stages by which we can accomplish the mission, and to design and develop information systems that implement and deliver what we want to accomplish.

So what kind of information system should we develop at the HKUST?

It may be easier to answer the question first by eliminating the kind of systems that we do not want. Here I cannot help but to be reflective again and to look at some of the systems that have been developed in the past. Many of these take a lot of people to key a lot of things into the computer. Often the things being entered are the same but in different formats. Some systems even require that users copy data from one kind of paper (called a 'form') onto another kind of paper before the data can be keyed in. (Note: the latter kind of 'form' typically has tiny boxes and dashes neatly laid out to help users who write big/untidily control their handwriting). Sometimes users may have to copy what they write onto more than one form. To make things easy, though, the data is always the same.

After a lot of things are recorded, then an equally large number of people will write an equally large number of programs to extract a lot of data to go onto a lot of reports, often for nobody to read. A commonly cited reason for this phenomenon is that, because the 'information' on the reports comes from so many different sources, it has to be reconciled before it can be used. Users are therefore busy reconciling and arguing with one another (rather than using the reports) to ensure that the reports can be used meaningfully. It all sounded pretty logical, I guess.

Irrespective of how information is captured, recorded, and presented, to me this kind of systems are merely recording and reporting systems. At best they are information systems in their 'crudest' form. If they provide any information at all, they do so in a totally 'passive' manner. The human effort involved in supporting such a system can be tremendous. It is embarrassing that some people actually called this type of recording/reporting systems 'management' information systems. The system does little to help you manage, but it imposes heavy demand on people to service it (and more people for you to manage - hence the name?!). People are driven by the system, rather than the other way round, as it should be.

I do not know about you, but this is definitely not my kind of information system (let alone being the 'ultimate' information system).

My ideal information system (perhaps yours as well?) is one which captures data at its source (ideally a 'single' source), by means of friendly, easy to use interfaces. It will ensure that data is captured and stored only once and is then available and accessible to everyone (authorized ones, of course) from anywhere (inside and outside the university), using (ideally) any reasonable electronic device and software.

It should also 'actively' provide information. Here we are not just talking about exception reporting, tickler lists (BU's as some people call it), and the like. We will expect the system, through its knowledge of relation-
ships among the stored information, to be able to access and assess the impact of a particular action on all related and affected information and either bringing it to the attention of the user as appropriate, or to act on behalf of the user as specified.

The above scenario may sound rather trivial. Indeed many information systems may claim that they are already providing most of what was being said. I guess the difference lies in the level of attainment - how well, how much, how transparent, etc.

To realise this dream of mine, the information system must have a number of basic ingredients:

First we talked about capturing data at its source using friendly, easy to use interfaces. The 'source' could be a simple data entry screen, or screens utilizing fancy WIMPS techniques; it could be optically scanned, or bar coded data; it could be a Lotus spreadsheet; and so on. The system should be able to support all these different sources and methods of input, and to do it in such a way that users will not prefer filling out little boxes on forms.

Then comes the task of data storage and retrieval. Here sharing and integration are the two key elements, each with its own set of problems (I mean... challenges).

A central data base will be an essential component of such an information system, but will not meet all our requirements by itself. It must be supplemented by facilities that ensure accessibility and availability. Otherwise users will start keeping their own copies of information and we are back to square one.

The central data base must therefore be built on a good transport mechanism (often this is called a network), complemented by a set of friendly interfacing routines for the specification of information requirements (definition and manipulation). Then a set of authorization and access control procedures must oversee all initiated storage and retrieval activities. How well the system hides its transport, manipulation, and control facilities will separate the ultimate system from the average. Ideally they should all be totally transparent.

Then comes the information itself. It will be awkward and improper to segregate data into artificial departmental boundaries. Instead of looking at data as 'this is accounting data' the data base view should be that 'this is data that can be used in accounting (because it may also be used in, say, planning'). An information system which builds on a data base designed only with specific user departments in mind will have three times (make it four or five times if you like) as much obstacles to overcome in achieving its information objective. Here both users and developers must realise that information is a corporate resource, it does not belong to another particular department. It is only with this view that information can truly be integrated and shared.
On the technical side, the ideal information system must cater for the fact that information exists in many forms - text, image, graphics, Chinese, and so on. The information system should ideally provide the necessary functions to establish and maintain the relationships among information of these various forms. It is then that information can be truly integrated.

How can it be done? It may take many more pages for me to explain the specific parts which make up my 'ultimate' information system. I have therefore portrayed the 'conceptual' layers of my ideal system in the diagram on page 10.

To develop such an information system is not the task for one person. Nor is it the task for system development staff alone. It will have to be a university wide effort. It is going to take not just advanced technology but also progressive thinking by both the people who develop the system and the people who use the system.

First of all we must abandon the traditional attitude about 'ownership' of information. As mentioned above, information should be viewed as a corporate resource and therefore to be shared and used to the benefit of the entire organization. Without this attitude, any information strategy can only at best be partially successful.

Secondly, the 'we have always done it this way' thinking will need an extension, to 'but if there is another way we should see if it is better, and if it is we should consider doing it'.

A good information system (let alone the ultimate) is not going to be developed in a day. There may also be circumstances under which we need to take a detour (or several detours) along the way. The important thing is that we know what we want to get at the end.

A dreamer can always dream, but it takes people with vision to make a dream come true. At the HKUST we have the user, the staff, the underlying technology, and the enabling environment to develop and maintain an advanced information system. We also have the unique opportunity of doing it from the start.

I do not know if the information system we are now building will ever be the 'ultimate', but I am certain that if we have the vision and the will to do it right, it will benefit us for a long time to come.

Mr. William Tung, Manager of Information Systems cc:bung@usthk.BITNET

Who's Who in IS

How They Got Here - A Bit of a Short History

The Information Systems (IS) section of the Centre of Computing Services and Telecommunications (CCST) has grown to its current size of 10 professional staff since the arrival of William Tung, Manager of the section, just over a year ago (in July 1989). He was joined shortly after by Ophelia Yao, Principal Computer Officer and Project Manager, and then, in August, by Sylvia Lau, Senior Computer Officer and Project Manager.

For a 'long' eight months the three of them 'were' the IS team. Despite limited resources, the 'team' (with the assistance of users in the Finance and Personnel Offices), were able to put together the initial General Ledger and Personnel Information systems.

The first much needed relief came around March, 1990, with the arrival of Wallace Wong and Sunny Siu (better known later as WW and SS). Their arrival was very timely as the two systems (GL and Personnel) were both in their final stages of development at the time. Sensing the heat of activities and not wanting to be left out, the two of them went to work right away. Together, the 'gang of five' put the final touches to the two systems under development. Both systems went into production in April 1990.

The need for more information systems obviously did not stop here. There were requirements for more accounting and personnel functions; the need for budget monitoring, admission, procurement and purchasing systems were becoming more urgent as time elapsed; it was also increasingly apparent that it is important for access and security measures to be designed and implemented in order that the information captured can be made available to a broader group of users ... Because of delays in recruitment, these are things that the 5-people unit has to tackle for the several months after April.

The final relief came during the summer months, when the remaining 5 of the current team gradually began to assemble - Annie Au in mid-June, Peter Au in July, Florence Lo and George Chan in August, and finally Wayne Yung in mid-September.

The rapid growth of the HKUST and the delays in recruitment have obviously resulted in quite a backlog of information systems to be developed. Fortunately the section has finally got enough people resources in place to start sorting it out.
What Are They Doing Now?

Depending on how a 'system' is defined, there may be as many as 10 'systems' in various stages of development at this time in the IS (with another 10 waiting to be started). The situation is very dynamic and it is difficult (and impractical) to designate an individual to a specific application area. Instead, a project team approach is taken and it is common for an individual in IS to be associated with more than one project at a moment in time.

If some association of individuals to 'primary' application areas is necessary, then perhaps four 'generic' areas may be identified:

1. the student related systems (focusing on the Admission System at this time), with Annie, Wayne, and George;
2. the financial related systems, with Ophelia, Wallace, and Peter forming the core;
3. the personnel related systems, with Sylvia, Sunny, and Florence as the primary developers;
4. the procurement and purchasing related systems, being worked on by Bill and Sylvia.

In addition to the main application areas, there are also 3 specialist functions in the section - data base administration, system administration, and quality assurance. These roles are currently being filled by Peter, Wayne, and Bill respectively.

It's No Coincidence . . .

We Planned It All Along . . .

Ophelia Yao (of CCST) got a phone call from someone one day. After talking for about half an hour on the phone about financial procedures she found out that the call was actually intended for Ophelia Chung (of the Finance Office). Ophelia (Yao, in this case) did well in answering the questions. After all she oversees the development of financial systems.

It's no coincidence, but we (the IS section) have planned it months ago. We put Sylvia Lau in charge of Personnel Systems just in case she gets calls that are intended for Sylvia Lee (of the Personnel Office) and we especially recruited Annie Au to develop the Admission and Student Systems just in case Anne Lung (of the Office of Admission, Registration, and Records) is away from her office and someone needs quick information on admission/student matters.

Bill Tung is wondering if he will ever get called about events in Happy Valley and Shatin?!

By the Information Systems Section

More Software Installed on Our VAX System

Language Compilers Available For Use

The following language compilers are available for use on the VAX 3800 system:

FORTRAN, BASIC, COBOL, C, PASCAL, MACRO

Interested users should contact our Consultation Coordinator, Mr. Tony Chan (Tel.: 302 1476 E-mail: cctony) for the commands to invoke the compilers.

SAS Available For Use

SAS (Statistical Analysis System) is now available for trial use on our VAX 3800 system. SAS is an integrated data management, analysis and presentation system.

Interested users should contact Mr. K.K. Tam (Tel.: 302 1578 E-mail: cckktam) for the command procedures to invoke the package.
What Happened to the Campus Network?

The network has been tame and obedient since it was first laid in August 1989. Starting from August 20 this year, just after our Professors were on board and after its first year birthday, it became very naughty. During the three weeks starting from August 20, hardware engineers and system programmers in CCST had been tackling breathlessly around like soldiers in the battlefield. "Oh, the system crashes again!" "Here come the corrupted packets!" "How come...!"

"What happened to the network?"

"Is it jealous to our talented Professors?" "Is it like other babies at the age of Terrible Two?"

Causes of Failure

"It never rains, but it pours." Actually there were three hardware errors and one software error that caused more than ten failures for the three weeks starting from August 20.

The first one was a disk error on August 20. One of our disks where the paging file resided got corrupted. The disk unit was finally replaced on August 23.

The second and third hardware errors happened after the power failure during the long weekend (Aug 25 - Aug 27). The error on Aug 29 was caused by a faulty Ethernet segment, the 13th segment on 13/F. The Ethernet seemed to be "double grounded", thus a lot of Ethernet packets were mis-aligned and corrupted.

The faulty Ethernet segment was disconnected and repaired on Aug 30. Just when we were ready to announce "Everything was back up normal", the network got jammed again. What had caused the error this time was a jabbering Ethernet card which kept on sending out broadcast packets. All machines were so busy in handling these packets that they could not perform any constructive work. Finally, the card was replaced on Sept 7.

After all the hardware errors were cleared, the file server process kept on crashing. That reviewed another software error on the file server process. When the number of PCs connected exceeded certain limit the memory acquired by the process kept expanding and finally crashed. To bypass the problem, starting from Sept 10, the server process was re-started every night to get rid of the garbage. The network has then been normal.

We were unlucky. We met those errors that rarely happened. We had heard about fatal jabbering Ethernet card problem from Stanford University before, but that only happened two to three times in ten years! It was even worse that all the hardware and software errors occurred at the same time. On the other hand, I would say we were lucky because these errors happened at the early stage when we had less than two hundred nodes on the network. Thus, we could take this opportunity to gain experience in trouble shooting the most difficult problems. Otherwise, that will be disastrous, if such errors appear when we have more than a thousand nodes.

Plans to Improve Network Reliability

"Do you have any plans to improve the network reliability?" "Yes, that is actually in our original plan." We had ordered extra hardware to cater for the expanding network, and some already arrived.

First of all, bridges will be installed. We already get some FDDI bridges which we will put into preliminary production in our Centre in early October. If everything goes smooth, we will put them into full production in mid November so that each floor will be separated into different subnets. With these bridges, we can isolate the network hardware faults. Since bridges examine each packet before forwarding, corrupted Ethernet packets would not flood the whole network. That means if the error on the 13th segment on 13/F occurred again, only systems on the same floor will be affected.

When the new VAX 4000 arrives in mid-October, we can design backup servers so that network services will still be available when the primary server fails.

We will also enhance our PC network software to provide better backup and recovery mechanism. Enhancements for the E-mail service has already been rolled out in late September.

Finally, we would like to take this opportunity to thank Prof. Vincent Shen and the Computer User Group. They made very relevant suggestions on how to enhance the PC network software. Without the input from users, we can never construct an up to the state-of-the-art computer system for our University!

Mr. Lawrence Law, Manager of Systems & Operations
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HKUST Telephone Directory Goes On-line

The HKUST Telephone Directory has been updated onto our Office Network. Users can refer to the on-line Directory for up-to-date information about telephone extension and E-mail address of staff members of the University.

The Directory is included in the Information Services submenu of the Office Network Main Menu. Use of the Directory is self-explanatory. If you need any assistance, contact our Consultation Coordinator, Mr. Tony Chan (Tel.: 302 1476 E-mail: cctony), or any consultant of CIC.

Reporting Problems Via E-mail

"I want to send an E-mail to a friend in US, but, how to formulate the address?"

"How can I transfer the file to Dr. Kwok?"

"The LaserWriter prints unevenly. Does it need a new toner cartridge?"

"Oh, just call CCST. They will give you advice."

"But I have to go now." "It's after office hours."

"Form NOW on, you can send E-mail to the account CCHELP to report your difficulties and problems, at any time, and you will get the answers when you are back."

An E-mail account, CCHELP, has been set up for users to report problems and difficulties. There are times when a problem occurs after office hours and/or a problem does not need immediate remedy. In this case, users may send an e-mail to this account to report the problems. A consultant will respond to messages sent to this account as soon as possible.

AT ANY TIME

Send E-mail to

CCHELP

How can I transfer...
Sigma Designs (H.K.) Ltd. has made a special price offer on Sigma PC 286 and 386 systems to members of the University at the following prices. Interested users please contact the company at 4263179 directly.

Sigma 286 PC

<table>
<thead>
<tr>
<th>Model</th>
<th>Unit Price (HK$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 12 MHz 80286 CPU</td>
<td>8,000.00</td>
</tr>
<tr>
<td>with monochrome display.</td>
<td></td>
</tr>
<tr>
<td>2. 12 MHz 80286 CPU</td>
<td>11,000.00</td>
</tr>
<tr>
<td>with VGA display</td>
<td></td>
</tr>
<tr>
<td>3. 16 MHz 80286 CPU</td>
<td>8,500.00</td>
</tr>
<tr>
<td>with monochrome display.</td>
<td></td>
</tr>
<tr>
<td>4. 16 MHz 80286 CPU</td>
<td>11,500.00</td>
</tr>
<tr>
<td>with VGA display</td>
<td></td>
</tr>
</tbody>
</table>

All the above systems come with a 40MB hard-disk.

Sigma 386 PC

<table>
<thead>
<tr>
<th>Model</th>
<th>Unit Price (HK$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sigma 386SX system with 16 MHz 386SX CPU</td>
<td>15,150.00</td>
</tr>
<tr>
<td>2. Sigma 386DX-25 system with 25 MHz 386 Cache-25 CPU</td>
<td>19,250.00</td>
</tr>
</tbody>
</table>

The above 2 systems come with a 100MB hard-disk and a VGA display.

All the prices listed above include the following components:
- 1MB RAM;
- 1 x 1.2MB Floppy Drive;
- 1 x 360KB Floppy Drive;
- 2 x RS232C ports;
- Centronics parallel port;
- 8 expansion slots;
- Detachable keyboard, Chassis & P.S.;
- MS DOS 4.01.

For exchanging and adding of components, users may refer to the following table for adjustments.

<table>
<thead>
<tr>
<th>Parts to be removed</th>
<th>(and the amount saved)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VGA Card</td>
<td>($400)</td>
</tr>
<tr>
<td>VGA monitor</td>
<td>($3,100)</td>
</tr>
<tr>
<td>100MB hard-disk</td>
<td>($4,485)</td>
</tr>
<tr>
<td>360KB floppy drive</td>
<td>($400)</td>
</tr>
<tr>
<td>1.2MB floppy drive</td>
<td>($500)</td>
</tr>
<tr>
<td>MS DOS 4.01</td>
<td>($300)</td>
</tr>
</tbody>
</table>

Replacement parts to be added (and the amount added)

<table>
<thead>
<tr>
<th>Parts to be added</th>
<th>(and the amount added)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monochrome Card</td>
<td>($300)</td>
</tr>
<tr>
<td>Monochrome monitor</td>
<td>($700)</td>
</tr>
<tr>
<td>40MB hard-disk</td>
<td>($3,600)</td>
</tr>
<tr>
<td>200MB hard-disk</td>
<td>($9,200)</td>
</tr>
<tr>
<td>1.2MB floppy drive</td>
<td>($550)</td>
</tr>
<tr>
<td>720KB floppy drive</td>
<td>($580)</td>
</tr>
<tr>
<td>1.44MB floppy drive</td>
<td>($600)</td>
</tr>
<tr>
<td>80387-16 co-processor</td>
<td>($3,300)</td>
</tr>
<tr>
<td>80387-25 co-processor</td>
<td>($4,200)</td>
</tr>
</tbody>
</table>

Remarks:
1. Campus: delivery free of charge, but no installation;
2. Home Delivery: HK Island - $300.00, Kowloon - $200.00
New Territories and Outlying Islands - no delivery/installation service provided
3. Home/Campus Installation: $500.00
4. Home Warranty: Add 12% to total equipment purchase price (excluding New Territories and Outlying Islands)
CCST Contact Points

User Consultation Coordinator -
Mr. Tony Chan - 1476 ccTony

UNIX Support -
Mr. Patrick Leung - 1538 ccpleung

Telephone Services Coordinator -
Mr. Scott Cheung - 1760 ccscott

Training Courses Registration -
Mrs. Anna Ho - 1570 ccanna

Requests for Computing Resources -
Mr. Danny Tang - 1512 ccDanny

Problem Reporting E-mail Account -
CHHELP -
For users to send in their problems and difficulties via e-mail. A consultant will respond to messages sent to this account as soon as possible.

Suggestion E-mail Account -
CHANNEL -
For users to send in their queries, ideas, suggestions and comments concerning services we provide. A consultant will respond to messages sent to this account as soon as possible.

FAX 736 7088
Dialup 736 9181
Computer room 1494
SE workshop 1535

The telephone extensions are (852) 302-xxxx.
The BITNET addresses are E-mail address@usthk.BITNET

Channel Mailing List

A mailing list is maintained for the distribution of Channel. To be placed on the mailing list*, fill out this form completely and mail to the Computing Information Centre, CCST, 13/F, World Shipping Centre, 7 Canton Road, TST, Hong Kong. Please print clearly.

- Add my address to the mailing list
- Address change (write new address below)
- Remove my name from the mailing list

Name: ____________________________
Organization: ______________________

Address: __________________________

*Registered users of the CCST services are placed automatically on the mailing list.