ELECTRONIC MAIL AT CITIBANK

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ABSTRACT

Citibank's use of electronic mail started in 1981 with a pilot of the "Comet" software package running on a PDP11/70 in London. The pilot had a few dozen users initially, but was such a success that it spread throughout the London branch. It was then opened up to all Citibank branches worldwide, and grew to a network of systems that supports 25,000 users with five different software packages, interworking under a set of internally developed standards.

Although the original Comet package has been very successful, several of the systems are being converted to DEC's All-In-One software, running on VAXs because of the better supportability of VAXs.

The use of other vendors' products to provide service in certain locations will continue, and the different systems will continue to communicate with one another using a set of internally developed (pre-X.400) standards.

INTRODUCTION

Electronic mail at Citibank is a vital part of Citibank's infrastructure. About 25,000 of its 90,000 employees use electronic mail. Excluding staff who have jobs that involve a continuous structured workflow for the whole of the day (such as tellers, data center operators, data entry staff, and so on), there is a potential user population of office workers in Citibank of about 50,000. So, complete electronic communication is 50 per cent achieved, and the rate of growth of electronic mail use is about 15% a year. For staff who deal in international matters, electronic mail has changed their job so radically that they could not do without it.

The electronic mail service - known as Citimail - started in 1981 with a small pilot in Citibank London. This was quickly a success and was extended to the whole of the branch, then to other branches in Europe, then all branches worldwide, by which time it became an "official" service. The pilot was based on the Comet electronic mail package, running on a DEC PDP11/70 computer. Comet was originally written by the Computer Corporation of America, but it has changed ownership several times and is now owned by MaxCom.

Soon after the Citimail service became a worldwide one, a second PDP11 was installed as a backup to guarantee continuity of service when the main computer failed. Later, when the first system was "full", a third PDP11 was added and the users were split between the two systems, then known as "CM1" and "CM2". For the next stage of growth CM3 and CM4 were added in New York to serve North and South America, then

CM5 and CM6 were added in Singapore to serve Asia Pacific. Since then a system has been installed in Florida to serve South America, and additional systems have been installed in London and Singapore.

INTER-SYSTEM MESSAGE EXCHANGE STANDARDS

While this growth was taking place, other electronic mail systems started to be established in Citibank in the USA to serve particular business groups. In order to allow these to intercommunicate with Citimail, a set of standards were developed by a Citibank committee consisting of representatives of the various business groups that operated the mail systems. The standards that were developed - known as the Citidex Electronic Mail Standards - covered the exchange of messages and the synchronization of directories between the systems. This was done in advance of the publication of the X.400 standards. The Citidex standards are still some way ahead of CCITT standards for intra-company directory management.
The standards were implemented first on Comet, so that the Comet systems moved from communicating using Comet's own inter-nodal protocol to using Citidex. Then they were implemented on DEC's All-In-One and on Datapoint's EMail (although in the latter case the actual interface runs on a separate gateway using Tandem hardware). Subsequently the standards have been used to connect an HPDesk system and a SYSM system into the network, bringing the total number of software packages used in the network to five.

This effort was extremely successful because it allowed Citibank business groups to choose whichever system best suited their needs and freed Citibank from total reliance on one vendor. The directory management features inherent in the definition of the Citidex standards allowed the operation of a large network with no human intervention in the routing of messages and an up-front guarantee of message deliverability for users: all addressees are validated at compose time and it impossible to send a message with a "wild" address. This contrasts with many public systems, in which a message may bounce back to the sender if the addressee cannot be found on the distant system.

EASE OF USE

Another feature of all the electronic mail systems under the Citimail umbrella is ease of addressing. Every user is addressed by his or her name. Duplicate names are distinguished by a suffix indicating the city and functional group in which the person works, e.g. I am shown in the directory as Malcolm P. Hamer (APHKG:ATG), indicating that I am in the Asia Pacific region, in Hong Kong, working in the Asia/Pacific Technology Group. Wherever possible staff with common last names are asked to use their middle initials so that their name alone is unique. The suffix can be typed by the sender of a message in the To: or CC: line but does not have to be. The system will insert it automatically when it confirms each addressee. In cases where the name alone is ambiguous, the system lists all matching names, with the suffix after each name, and asks the user to choose one by typing the number of the name in the list.

I believe that the ease of use of a system that has simple name-based addressing, without the user having to look up some cryptic address in a directory, or type routing information in front of the name, was a critical factor in the success of Citimail.

Another aspect of Comet that made it easy to use is the simple command structure. There is no menu hierarchy and just 12 basic commands used at the single command level.

The user is never in any doubt about where he is in some complex hierarchy of menus: after execution of every command (e.g. read, delete, compose), the system returns to the same basic prompt - 'Command'. A number of surveys of Citibank customers and staff have determined that command-line applications without menus or command hierarchies are the most acceptable to the majority of users.

Although there is a formal manual for Citimail, copies of it are rarely found of people's shelves. In general, users learn to use Citimail by being shown the basics by a colleague and then just trying it for themselves.

RECENT DEVELOPMENTS

The major problems that emerged with the Comet software package as Citimail grew in popularity were the excessive housekeeping needed by its database - necessitating one and a half days of downtime over the weekend - and the difficulty of growing each system. Growth has been handled by simply adding more PDP11s at each location. However, each time a new one is added the database has to be split and a group of users selected for moving to the new system. This is an inconvenience to users. Also, the split process is a difficult one and the merging of split databases, so that portions of the user populations of two systems can be moved to a new third system, is very complex indeed. On top of this, the sharing of a backup PDP11 between more than three on-line machines, including disk drives, is almost impossible, leading to the need for two backup machines for four on-line machines.

Obviously we started looking at VAXs as a better hardware base for Citimail, because of the ease of growth, higher reliability, and better support. Unfortunately MaxCom's plans to produce a VAX version of Comet were somewhat behind our desired timetable so we decided instead to move to All-In-One as the software base. We already had the Citidex inter-system message standards "back end" to All-In-One. So what we did was to write a "shell" around All-In-One to give it the same user interface as Comet, since this has been so successful (and since we did not want to get involved in a big re-training effort).

The shell was completed two years ago and the first Comet look-alike based on All-In-One has been running since then, serving users in North America only. Unfortunately there were a lot of teething problems with the system, mainly due to inadequacies in DEC's Message Router. The Citidex software also turned out to be sluggish and difficult

to manage under high traffic conditions, and has recently been re-coded in-house. (The original version was written under contract by DEC.)

A third problem was the unexpectedly poor performance of All-In-One in terms of number of concurrent users supported by a fairly costly hardware configuration. The unit cost of the All-In-One-based version of Citimail turns out to be about $500 per user per annum, as compared with $250 for the Comet PDP11 based service.

We are now feeling more comfortable with All-In-One. DEC have somewhat improved Message Router and our senior management have adjusted to the shock of the doubling in cost. We are now planning to deploy All-In-One, with the Comet shell, in London, Singapore, and Florida early in 1990. The configuration I am planning for Asia Pacific in Singapore will use two 6410s and a 6310 as a backup machine to give a slightly degraded service during a 6410 outage. The two 6410s should, according to DEC, support about 210 concurrent sessions with acceptable response times.

We are approaching the whole project in all three locations as a single corporate turnkey effort with DEC, who will, we hope, give contractual commitments on performance.

CONCLUSION

The success of electronic mail in Citibank has been largely due to the simplicity of the Comet user interface and the preservation of a single global directory - so that users have the illusion of being on a single system. Citibank users demand basic electronic mail, rather than an OA-linked service, partly because the users are mainly management and not secretaries, and partly because so many users travel around. (Many managers now use Citimail from laptop computers in their hotels.)

All-In-One is at last stable enough to be used to replace Comet, giving a service which is nearer the 24-hour ideal (but still not all the way there), and migration to VAX hardware. However, the actual user interface of All-In-One has been covered up with a shell, preserving the Comet user interface. All-In-One price/performance is still an issue.

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