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By the end of the century it seems possible that electronic mail (EM) will have the capacity to replace much of today's written correspondence. Some primitive (by year 2000 standards) systems are providing EM service to a few groups of individuals who have need of rapid communication of high priority written information. A brief review of the basic design and operational principles of the AGNET EM system[1] may prove useful as background to the future development of a national, reliable and economic method of supplementing or replacing traditional methods of exchanging written messages.

How EM Works

In the AGNET EM system the sender begins the process by calling a central computer and "talking" to that computer over normal telephone lines through a typewriter-like device called a terminal. There are many portable terminals on the

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[1]AGNET is a computer system designed as an information delivery network for decision makers. EM is one of the packages offered by AGNET. COMET and DIALCOM are computer systems which also offer EM. Further information may be obtained from these vendors by contacting: AGNET, University of Nebraska, Lincoln, NE 68583; COMET, Computer Corp. of America, Technology Square, Cambridge, MA 02139; DIALCOM, 1109 Spring St., Suite 410, Silver Spring, MD 20910. ACE Headquarters has a DIALCOM mailbox—AGZ010.

market, some weighing less than ten pounds. The user pro-
vides a password to the system to prevent unauthorized
use, and indicates (often by selecting from pre-established
mailing lists) the recipients(s) of the forthcoming communi-
cation. The text of the message is typed by the sender and
automatically stored by the computer. The recipients
receive the message by calling the same central computer.
When they "log on" (access the computer), the computer
notifies the users of any awaiting mail.

Who Uses EM

The process of sending or receiving EM is quite simple in
practice, and is easily learned in a few minutes. However,
EM often causes a change in office procedures for handling
written correspondence. Those who have need of sending
or receiving high priority mail are often the executives or
administrators of an organization. Traditionally, these in-
dividuals are one step removed from the mechanics of send-
ing or receiving written information—i.e. others type and
proof, post or open, scan and classify the mail. However, EM
is justified by the need for speed in written communications
among decision makers. This means that they, the
executives and administrators, are the ones who will often
have the terminals, and it is they who will type in or "open"
their own EM.

The following describes some ways the MAILBOX pro-
gram on AGNET is being used around the country.

Annie Berry, Extension Computer Instruction Specialist at
Ohio State University, tells of an application of MAILBOX in
the pest management area. If an agent in the field is having a
problem identifying a particular pest or knowing what to do
to control it, that agent types a description of the pest and
the kind of damage it is causing, and sends that information
via MAILBOX to a pest management specialist at the OSU
Research Center or the Entomology Department. The
specialist would then either send back recommendations for
control of the pest, or request additional detailed informa-
tion. Berry said this is the second year they have been using
electronic mail, and the more familiar the agents become
with it, the more dialog is generated. One relatively recent
addition to this process is the use of the Texas Instrument
memory terminal. This allows users to input a large volume
of information "off-line." When the file has been edited and

is ready to go, it is simply "dumped" into the MAILBOX program. This process, says Berry, has considerably cut the cost of putting lengthy messages on the system.

According to Tony Wright, AGNET supervisor at Washington State University, county agents use MAILBOX to order publications and audio visuals. They get quick confirmation of their orders. This system is particularly useful, says Tony, when urgent requests come in for publications that are low in supply or totally depleted. This sytem of publication ordering is also used at the University of Nebraska-Lincoln (UN-L).

At UN-L's Institute of Agriculture and Natural Resources, message centers have been established in several departments. In each of these centers, one person prints out daily all mail sent to members of that department or unit and then distributes it. Duane Jewell, Computer Specialist in the Department of Agricultural Economics, distributes and answers messages in his department. Typical examples, he says, involve county agents' questions of a legal nature to the water law specialist, or inquiries to extension personnel about putting on workshops in their counties.

At a time when most university budgets are being severely cut back, EM used in these and other innovative ways can amount to a real cost savings.

Features of EM

Security for the Sender and Receiver

As long as the sender and receiver of EM keep their passwords private, the recipient can be reasonably assured that the message came from the named sender, and senders can be reasonably assured that their correspondence will be read only by the addressed recipients. No system of communication can be completely secure, and EM is much less secure than messages that have been incoded and decoded by some system of cryptography. Nevertheless, with passwords kept secure and changed periodically, EM offers greater privacy than communications that are typed by others and delivered to a general office address where mail is sorted and often opened by someone other than the addressee.

Ease of Multiple Addressing

Most organizations have pre-established mailing lists for addressing routine correspondence. AGNET EM system

simply incorporates the same concept, but makes it easy to use for the EM client. A vice president of an organization may need to regularly address high priority written messages to district-level managers, support staff and/or technical teams. Here, three mailing lists (the A, B and C lists) could be established, and the vice president wishing to send a message to the district administrators and support staff would simply indicate lists A and B when the computer program asks for the addressee of the message. Names can be added or deleted from any mailing list with ease. Correspondence can also be addressed to individuals.

When a sender indicates which mailing list(s) or individual(s) are to receive a message, the EM system automatically provides a "header" that includes the date and time of the message, the name of the sender, and the name of the addresses, any carbon copies of the message, and a message reference number. This message header is part of the correspondence received by the recipients and tends to reduce such common ploys as, "I sent my response to you two days ago," or "The mail is very slow, I have not yet received your request." A minor, but sometimes handy EM feature permits the sender to determine which addresses have read their mail by keying on the last date-time they last used the EM system. With this feature a supervisor who requests action by a certain date or time can quickly ascertain who needs a reminder to read and comply with instructions without bothering others who have read the message.

The EM Mailbox Is Open 24 Hours Per Day

A telephone call can be used to transfer high priority information just as well as EM, providing that the information is simple enough so that a written record is not needed, and providing the sender and receiver can be available at the same time. In some cases the logistics involved in scheduling telephone calls between individuals requires the exchange of more information than will be contained in the final high priority message. This problem can become even more complex if one of the individuals is in travel status and/or resides in a different time zone. With EM senders and receivers do not have to be on the system at the same time. An East Coast home office might have a message for an executive traveling on the West Coast. Using EM, the message can be placed into the system at 8:00 a.m. EST,

and retrieved by the West Coast executive whenever and wherever he/she arises and checks into the EM system.

Company sales representatives can enhance the clients' image of their firm by processing orders through an EM system. Some representatives still take orders during the day, write them up in a motel room at night, and send them in the next day's mail. Such orders might be received in the home office in two or three days, and the client notified within a week or ten days. With EM, the representative can process the order while still on the client's premises (if a portable terminal is used) or that night in the motel room, and receive confirmation of the order either immediately or first thing the next morning.

Brevity of Correspondence

Traditional written correspondence frequently contains verbage that is not germane to the message. General greetings, the "ice-breaking" introductions and other extraneous material can even mask the main thought of the correspondence. With EM, and with the decision makers engaged in the typing of the messages, the text tends to become very terse, i.e. ATTN: ALL DISTRICT MANAGERS, TOMORROW'S MEETING IS MOVED UP TO 9:00. BRING THE FY-82 BUDGET. SMITH, VP. What is transmitted is mostly message, and while we may all well lament the passage of elegance in writing style, the message is quite clear.

Common Messages Are Simultaneously Delivered

It is often not critical if one addressee receives a message sooner than other addressees. However, in some organizations the time of receipt can become a problem. Suppose that a number of marketing firms employ a consultant to serve their common interests in identifying potential trade leads. If the consultant has a prospective customer, then the first firm notified would have some advantage. Even if the notification were by phone, someone has to be called first, someone last. With EM, when a sender posts a message in the system, all addressees can read the message at the same time. Whether they do or not is their business, but the problem of simultaneous receipt of time-critical information is shifted from the sender to the receiver.

Cost Is Shared by Sender and Recipient

Unlike regular mail, the cost of EM is shared between the sender and recipient. To type in a message, the sender may incur a computer cost of between $.75 to $1.00. The recipient pays a computer charge of about $.35 to $.50 to read the message (cheaper than the sender, since the computer can type out the message faster than the sender can input it). For volume mailings EM may be cheaper to the sender than regular mail. To send the same message to 20 addressees, the postal service requires the sender to bear the entire cost of writing, duplicating and mailing the correspondence. At a minimum this cost would be $.25 per copy, or $5.00 for the entire mailing. Using EM, the cost of generating the message might be only a dollar to the sender, but now the recipients must pay (say $.35 each) to read the message.

EM Can Be Scanned, Re-Read and/or Categorized

An EM client, when checking into the system, might find a number of electronic letters in his/her mailbox. Some of these items might be of low, others of high priority. By requesting a scan of the unopened mail, the client is provided with the header information mentioned earlier. The client can then choose to read all or part of the awaiting EM. Unlike traditional mail, EM can be electronically stored for future viewing. Using the scan feature again, old mail can be reviewed to either obtain a copy of lost mail, or categorize the mail into whatever groupings the client desires. Past memos from John and Bill could be grouped into files under their names so that the client could request a summary of all the correspondence received from John by simply requesting the John file.

Traditionally, correspondence files are available only during normal working hours, but the EM client can review, categorize, originate or forward written messages 24 hours a day, seven days a week.

Automatic Forwarding of EM

Upon receipt of an EM item, the client may wish to inform others of the contents. In AGNET EM this is accomplished by simply readdressing the EM letter to those who need the information (adding comments if desired), and then forwarding the message by giving the reference number of the correspondence you wish others to see. Recipients see the

package as a letter from you with your header information, your comments concerning what is to follow, and then an exact duplicate of the EM letter you originally received. This forwarding feature greatly reduces the work normally required to make others aware of the contents of high priority information that was addressed just to you, but of interest to others.

Integration of EM With Other Computerized Management Programs

For many organizations it might be difficult to justify the cost of EM as a stand-alone facility, but offering it as part of a package that includes management models may make it attractive. On AGNET these models include least cost ration formulation, irrigation scheduling, maximum bids on land purchases, income tax alternatives, loan analysis, etc. Over 200 of these management models are presently active on AGNET to aid decision makers in their short and long run planning. With this integration, the total package becomes a management information system rather than just a communications tool. In the long run, it might be that integrated systems are the ones that will attract more clients than those that only offer message switching.

The Probable Future for EM

As noted previously, EM is presently confined to a few groups of clients that have need of sending and receiving high priority correspondence. Before EM can expand into a general communications system that will be used by many for personal as well as business correspondence, a number of developments must take place. Today, the few existing EM systems are operationally independent. A client on system ''A'' cannot send or receive messages from EM clients on system ''B.'' A similar situation existed early in the 20th century in the telephone industry—a number of independent firms with no cross-ties. In some cities, the clients would need to have (and some did have) three or four phones to talk with everyone in town. Obviously, the various EM systems must be interconnected and greatly expanded if this form of communication is to ever provide a viable alternative to traditional mail.

Since virtually all long distance, and many local, telephone calls are now computer processed, it might be logical

that the major phone companies (which are presently fully cross-connected) would be the ultimate vendors of EM services. For the user, the telephone would be replaced by a communications device that would handle the traditional voice messages, plus a keyboard for use with the EM system, the various simulation and management programs necessary for business or home, and even access to complex games to satisfy the children (in all of us). The communications device would provide both printed and visual output in addition to voice. While a strong case can be made for the phone companies as the vendors of EM, they are not now very active in this area. Their present reluctance may be due in part to perceived legal restrictions, or a plan to let the current EM vendors fully explore the field—and then buy them out.

The phone companies are not the only alternative for future EM delivery. The cable TV industry is undergoing rapid growth and is fully capable of linkage, via satellite, into a single, nation-wide system. The addition of a keyboard and printer device to our present TV sets could provide the necessary equipment for nation-wide EM service that would completely bypass ''Ma Bell's.''

However, it is possible, though unlikely, that the existing EM vendors may integrate and standardize their operations to provide an independent EM service that serves vast numbers of clients. Equally unlikely would be a move by the U.S. postal service into the EM area. Most probable is that EM service will continue to be provided by existing vendors for the next three to five years. During that time EM service will be improved and the potential clientele more firmly identified. At that time the phone companies may move in to absorb and integrate EM into a total information delivery system.

However EM is eventually delivered to the nation, this new means of communication will alter traditional correspondence in ways not previously examined. As long as the recipient bears some of the EM costs, it is difficult to see a role for the volume of junk mail now experienced. Newspapers and magazines will offer electronic as well as traditional subscription service. Mail as we now know it might be confined to the personal exchange of messages on birthdays, holidays and matters of the heart. At that time, the mail carrier's visit will be as memorable as the arrival of the telegraph boy a few decades ago.