Electronic message handling for the nineties

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1 General concepts of electronic mail and electronic messaging

11 About wording

In this paper, Electronic Mail is defined as the exchange between terminals or software processes of messages intended to be handled sooner or later by some human being. These messages are electronically collected, processed and transmitted via the whole range of existing transport networks (Telex, LAN, PSTN, PSPDN, CSPDN, ISDN etc.). Character-coded texts, graphics and voice annotations are typical messages destined mainly for the senses of sight and hearing of human beings. With this general definition, the telephone call becomes just a special case of realtime electronic mailing between two persons, via a PSTN or ISDN network and using two telephone sets as terminals. Other typical realtime electronic mail services are the old but universal Telex service and the new Teletex and Facsimile services *(fig. 1)*. The electronic messaging in this paper is understood as the non-realtime end-to-end transportation of electronical mail by specialised message handling servers acting as store-and-forward processing units *(fig. 2)*. These servers are interconnected over the different transport networks. They accept the messages submitted to them via terminals and relay and deliver them to the destinations. They offer typically a wide range of supplementary facilities, such as broadcasting, distribution lists, code and format conversion, message storing or delivery to the recipient's terminal, as well as archiving, retrieval, etc.

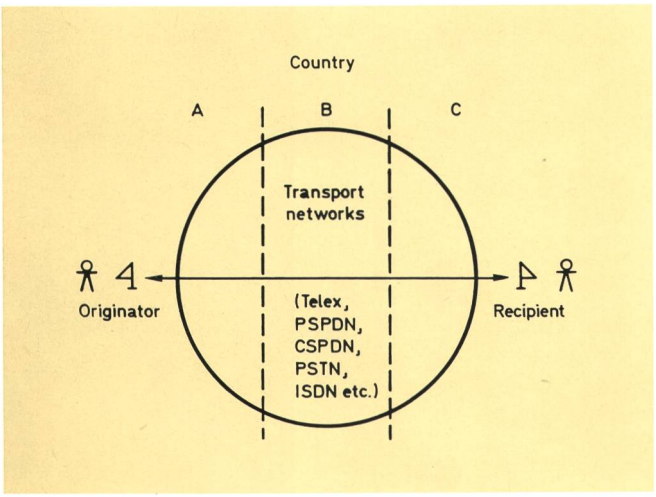

Fig. 1
Realtime electronic mail
PSPDN Packet switched network
CSPDN Circuit switched network
PSTN Switched telephone network
ISDN Integrated Service digital network
A Initiation
B Expansion
C Formalization

[1] This article was written April 1986 and presented as «Invited Paper» at the IFIP Congress 1986 in Dublin.

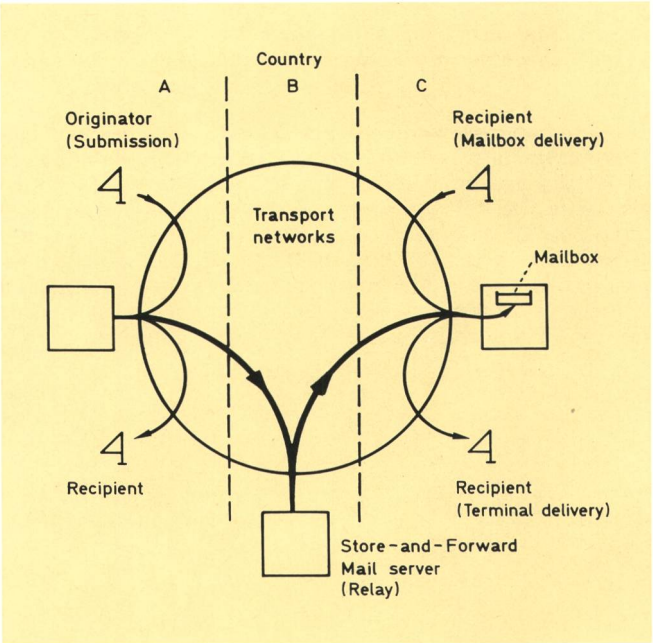

Fig. 2
Electronic messaging (non-realtime electronic mail)
A Initiation
B Expansion
C Formalization

12 Main characteristics of electronic messaging

121 Time independence

The main characteristic of electronic messaging systems is the introduction of time independence between the originator and the recipients. The process can be described as connectionless, asynchronous and mainly one way: The originator can reach the recipient even if the latter is not present at the other end when the message arrives. «No more telephone tag» is a typical argument often heard in favor of electronic messaging.

122 Space independence

If the originator can access the message server over any kind of switched network, he can be located wherever an access point to this network exists. On the other hand, if a recipient has not only subscribed to delivery of messages to his terminal, but also to a certain amount of memory on his local server (often called Electronic Mailbox), the messages to be delivered are stored in this reserved area (mailbox delivery) (fig. 2). The time difference between message submission by the originator and message delivery to the recipient's mailbox typically ranges from several minutes to one or two hours, even if the message must transit several companywide or national or international store-and-foreward servers.

The end recipient can access his mailbox at any time, from any access point to the switched network. This reading process is sometimes called message receipt.

Free of the constraints of time and place for both the originator and the recipient: What a wonderful service!

13 Emulated white-collar desk

All the public and private electronic messaging systems try to emulate with more or less sophistication the white-collar worker's traditional desk, typically with these elements *(fig. 3)*:

- A working area
- An electronic diary
- A local archiving facility
- Some access to data bases
- Some kind of bulletin board for generally accessible information
- And last but not least in the context of this paper: an electronic mailbox.

Around these elements, office automation products *(fig. 4)* as a rule offer five kinds of application to the user:

- Non-realtime electronic mailing facility
- Textprocessing feature
- Decision support tools like spreadsheets or easy graphics
- Document archival and retrieval
- Administrative support like «to do» lists, calendar management, management of common facilities, etc.

The range of in-house or private electronic messaging is highly sophisticated (fig. 4). In comparison, the public electronic messaging systems generally offer simple features to the end user in addition to the relaying functions between the private messaging systems.

14 Short historical background

It is interesting to note that at the very beginning of telex in the thirties this service was propagated under the name of electric mail! But it is only in the sixties that value-added services for telex appeared in the form of stand-alone store-and-forward message switching systems. In the seventies a considerable amount of research went into computer based messaging systems (CBMS). (For example on the ARPA network, where systems developed jointly by BBN and MIT came into operation.) Today, the first true multimedia mailing systems (text, graphics and voice annotation) are appearing on the market and interconnection trials between heterogeneous electronic messaging systems on the basis of international standards (message handling system recommendations *CCITT MHS X.400*) have been successfully completed. If we view the electronic mail stages of growth as the familiar «S» growth curve *(fig. 5)*, the initiation and expansion phases can be considered completed. The turning point starting the formalization stage seems to be the publication of the X.400 series of recommendations in 1984.

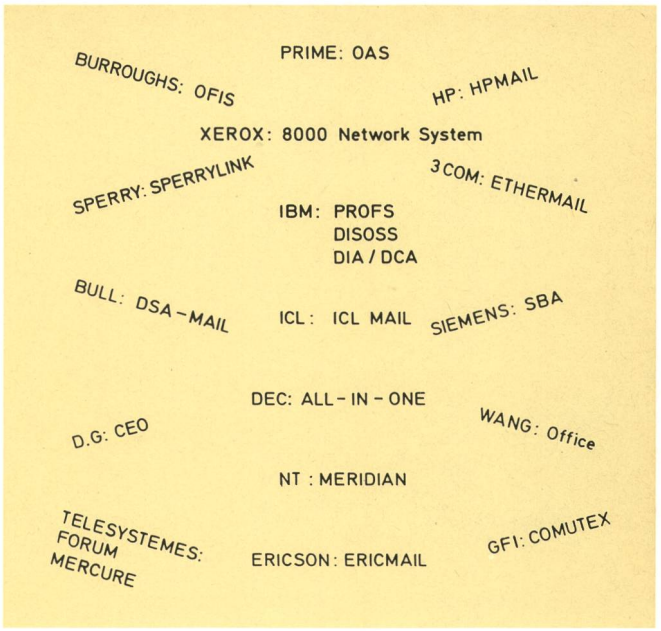

Fig. 4
Office automation products

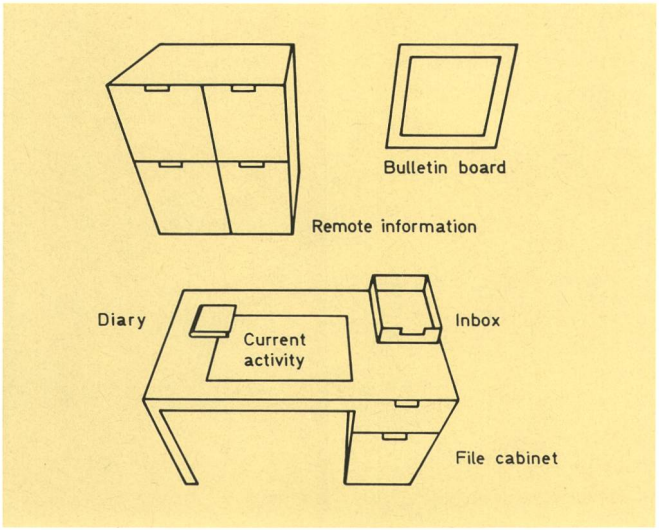

Fig. 3
The simulated office

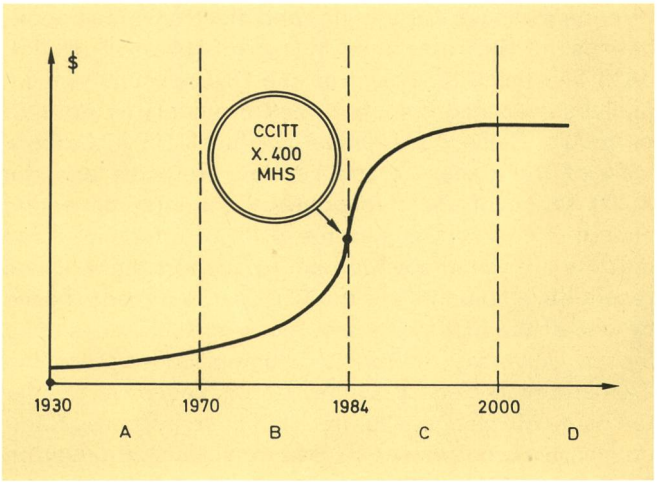

Fig. 5
Investment for electronic mail
A Initiation
B Expansion
C Formalization
D Maturity

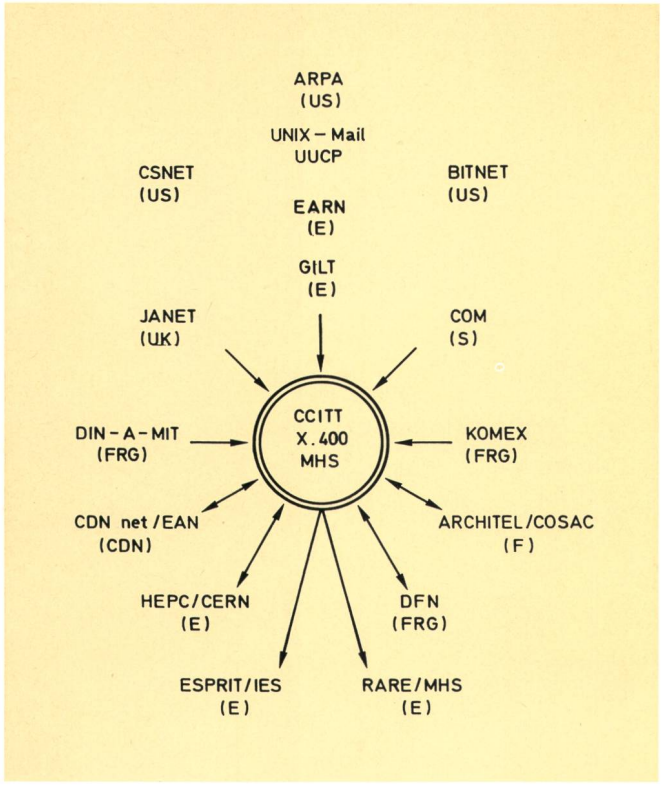

Fig. 6
Electronic messaging in the academic environment

In the area of realtime electronic mail, current offerings extend from group-3 facsimile to the end-to-end document exchange via the teletex service, whose interconnection is guaranteed by the administrations.

2 Current developments

21 Academic environment

A proliferation of logical networks has appeared during the last years between the different universities and research centers of the Western countries. Among them are such major systems as ARPA, CSNET and BITNET in the U.S., offering electronic mailing facilities in a pre-standardized way *(fig. 6)*. Then, there is EARN in Europe, offering primitive file transfer and electronic mail applications on IBM machines in a pre-SNA environment, JANET in the U.K., based on the OSI reference model and the so-called coloured-book protocols as pre-OSI protocols. Since the approval by the CCITT in October 1984 of the transport and session protocols and the X.400 series of recommendations for interconnecting electronic messaging systems, a lot of effort has gone into the academic environment to support them. Some recent developments are the CDN net in Canada, based on one of the first implementations of X.400, developed by the University of British Columbia under the name EAN and marketed by Sydney Corp. (Vancouver) under the name Messenger 400; the High Energy Physics Community in Europe bases its electronic mail strategy on X.400; the DFN research network in the F.R.G. is implementing X.400 on four different operating systems, while using the EAN software for the time being. An X.400 mail system is planned as part of the ESPRIT project infrastructure IES (Information Exchange System). Under the name RARE (Réseau Académique de Recherche Européenne) the European academic community is setting up an association, with one of its goals being to provide an European MHS application. In Switzerland, several EAN X.400 implementations are in operation and the Swiss Federal Institute of Technology in Zurich along with Zurich University and CERN are actively participating in the Swiss MHS group (fig. 6 and *7)*.

22 Private electronic messaging systems

Most private electronic messaging systems currently on the market have been developed by the large EDP manufacturers for their customers since 1982. These applications are as a rule integrated into the office automation systems superposed on the different proprietary network architectures. The major manufacturers are looking for ways to interconnect their different electronic messaging systems via the CCITT X.400 series of recommendations. To compete in the market, OSI compatibility is becoming a must!

The manufacturers for example participating as active testers in the Swiss MHS group are BULL, Data General, DEC, Hasler (NT/SL1 representative), IBM, ICL, Radio-Suisse, Siemens, Wang, XMIT (LAN and Gateways products) and Danet (F.R.G.), supplier of a message handling test system *(fig. 8)*.

At the SICOB fair in Paris in 1985, BULL, ICL and Siemens demonstrated the interworking of three heterogeneous mail systems via a subset of X.400. Similar but more complete multivendor demonstration is planned for autumn 1986 under the auspices of Group SPAG (standards promotion application group), which is defining the X.400 implementation profiles for the interworking of private electronic messaging systems. NBS in America, which issues purchase specifications for the U.S. government, has found an NBS MHS Special Interest Group, led by Wang, with the main goal of specify-

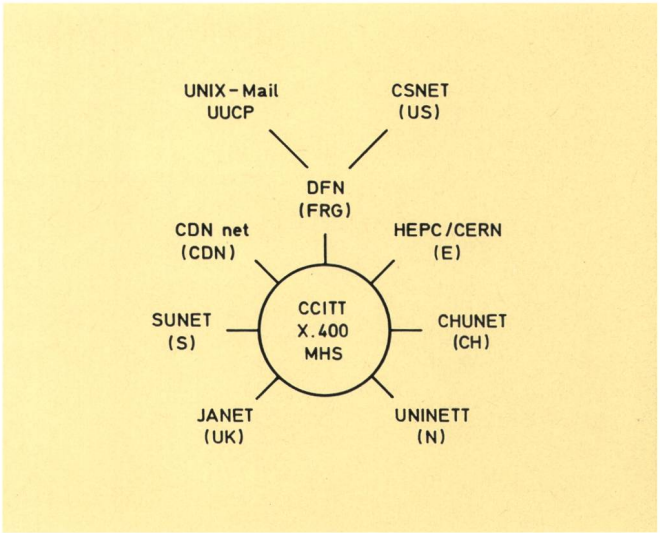

Fig. 7
X.400 connections of academic networks (EAN implementation/January 1986)

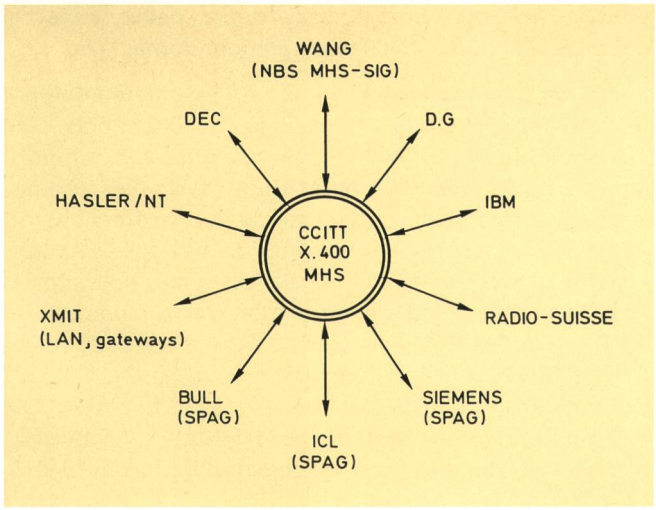

Fig. 8
EDP manufacturers participating in the Swiss MHS Group

ing details of X.400 implementations in a multivendor private environment, jointly with the European SPAG. The recently formed North American Corporation for Open Systems (COS) will also address X.400 as one of their first sets of standards.

23 Public electronic messaging systems

Public electronic messaging systems were developped in the seventies by some packet switching network suppliers as value-added features for their networks *(fig. 9)* (Tymnet: Ontyme, or GTE: Telemail). Several others were implemented as applications in consumer oriented remote CBMS systems or as part of their remote-accessible application packages (Infoplex of COM-Puserve, the Source in the U.S., COM in Sweden, Quick-COMM

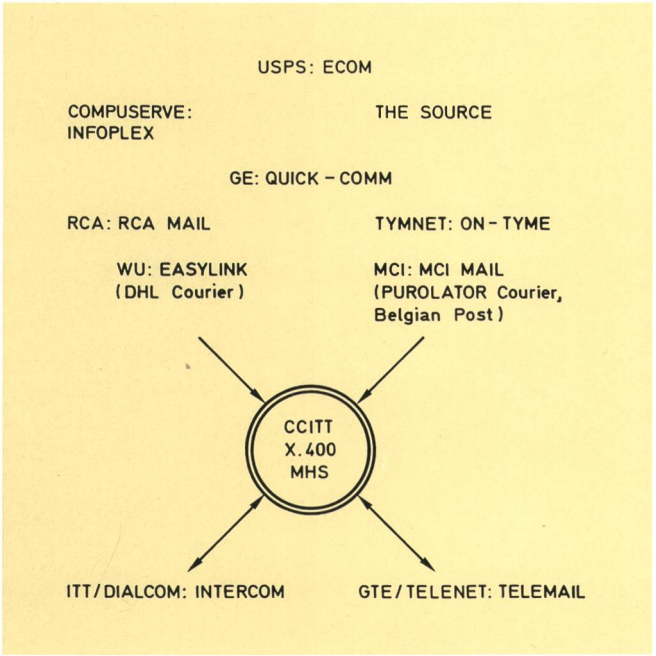

Fig. 9
Public electronic messaging in the U.S.

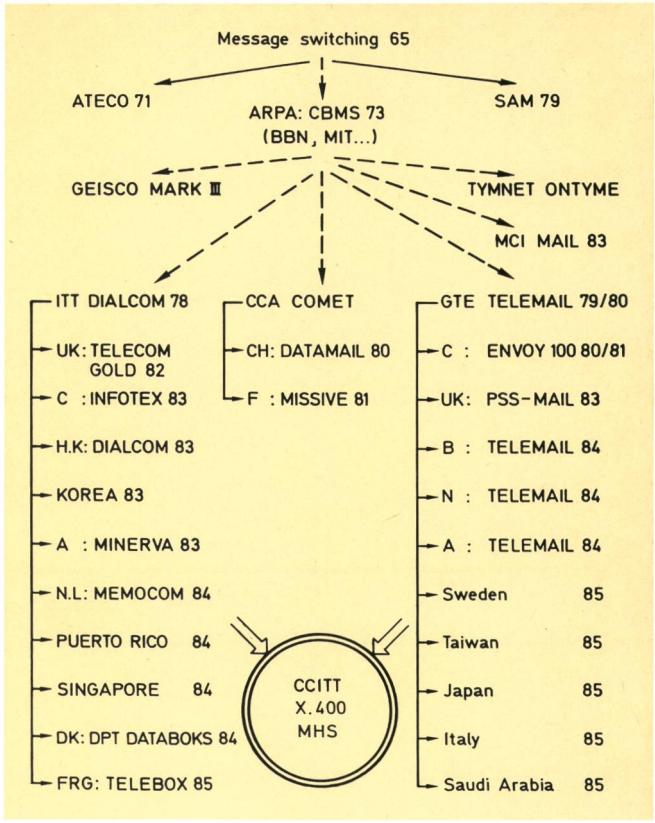

Fig. 10
Evolution of public electronic messaging

of Geisco or I.P. Sharp). In the U.S., the USPS tried to introduce an ECOM service, but was obliged to stop it for non-technical reasons. WU operates the Easylink service with connection to DHL Courier. MCI operates MCI-Mail, with connection to Purolator Courier and the Belgian Post (fig. 9).

ITT/Dialcom with its Intercom product, GTE with Telemail, and CCA with COMET have been able to market their systems outside the U.S. to different telecommunications administrations or carriers over the last few years. These services are sold under different names in the various countries (e.g. Telebox in the F.R.G.). In December 1985, the following Telemail systems were in operation *(fig. 10)*: Four in the U.S., others in Canada, the U.K., Belgium, Norway, Australia, Sweden, Taiwan, Japan, Italy and Saudi Arabia. Remote access was provided as a service from Austria, Chile and Columbia. In January 1985, ITT/Dialcom systems outside the U.S. were in operation in the U.K., Canada, Hong Kong, Korea, Australia, the Netherlands, Puerto Rico, Singapore, Denmark and Germany (F.R.G.). ITT and GTE are committed to the X.400 standards and ITT aimed to gain acceptance of its X.400 implementation on Telebox/F.R.G. in autumn 1985.

In Canada, Telecom Canada operates an extended GTE Telemail system with connection to the Canadian post under the name of Envoy 100 *(fig. 11)*. CNCP operates the ITT Dialcom system under the name of Infotex, and Teleglobe is currently developing an experimental message system, EMS, based on X.400. In the private sector, Northern Telecom announced in 1984 the Meridian X.400

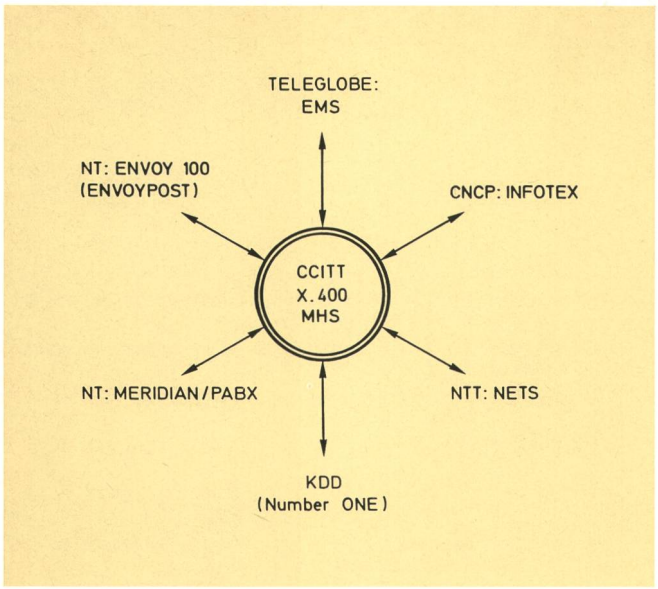

Fig. 11
The Canadian and Japanese public scenes

compatible multimedia messaging system attached to the SL-1 PABX product.

In Japan (fig. 11), KDD was the first carrier to have an X.400 prototype running and successfully connected to a private Canadian X.400 implementation as early as March 1985. The supported terminal types were ASCII, G3 facsimile and teletex. Three X.400 KDD projects are now running: A textmail service supporting ASCII and telex terminals, a public facsimile store-and-forward system and a private intracompany product. NTT also has some X.400 implementation plans, in particular with the Facsimile service and for connection to the NTT's enhanced Telegram System (NETS) (fig. 11).

In Europe, two other DBP/F.R.G. developments around X.400 are under way in addition to the above mentioned Telebox service: VUS, the new generation of telex/teletex conversion facility representing a X.400 management domain, and the teletexbrief, a postal delivery system also representing a X.400 management domain *(fig. 12)*.

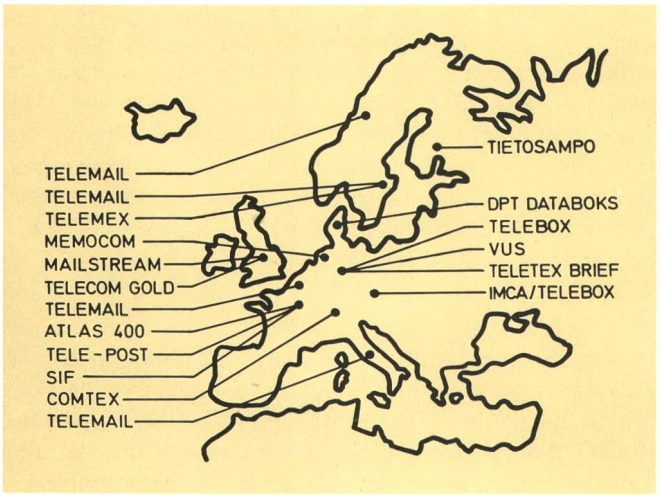

Fig. 12
Public X.400 messaging in Europe

In France, the administration and its associated companies are employed on three main X.400 projects: The Transpac message handling system Atlas 400, supporting ASCII, videotex, teletex and telex terminals and private electronic messaging systems due to start operating in 1986, the «Téléimpression Postale» for the postal delivery of electronic mail, also coming into operation in 1986, and the SIF (serveur d'interfonctionnement) of FCR, acting as gateway between the non-CCITT compatible CBMS and the compatible ones. In the U.K., BT is running an ITT/Dialcom system with Telecom Gold and a GTE/Telemail system with BT/National Networks. A third X.400 supplier is to be selected in Spring 1986. In Sweden the Telemex project, in Finland the Tietosampo, in Austria the IMCA/Telebox and in Switzerland the Comtex project are other X.400 related undertakings worth mentioning.

24 Electronic Messaging terminals

The advantage of electronic messaging service over other Telematic services like videotex or teletex is, that it is based on the existing terminal population *(fig. 13)*.

The current variety of terminals is already very high: On the private systems are typically connected proprietary terminals and terminals compatible to defacto standards (e.g. IBM 3270, DEC VT xxx, etc.). The public messaging systems generally support the terminals used for end-to-end electronic mail, like telex, teletex and facsimile (for the time being often only in output direction). They also offer access to the common public database

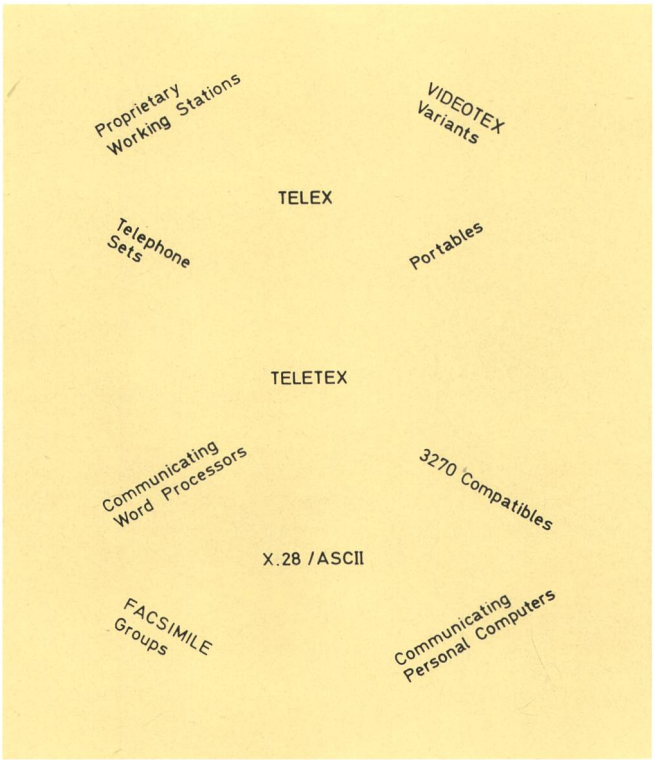

Fig. 13
Potential electronic messaging terminals

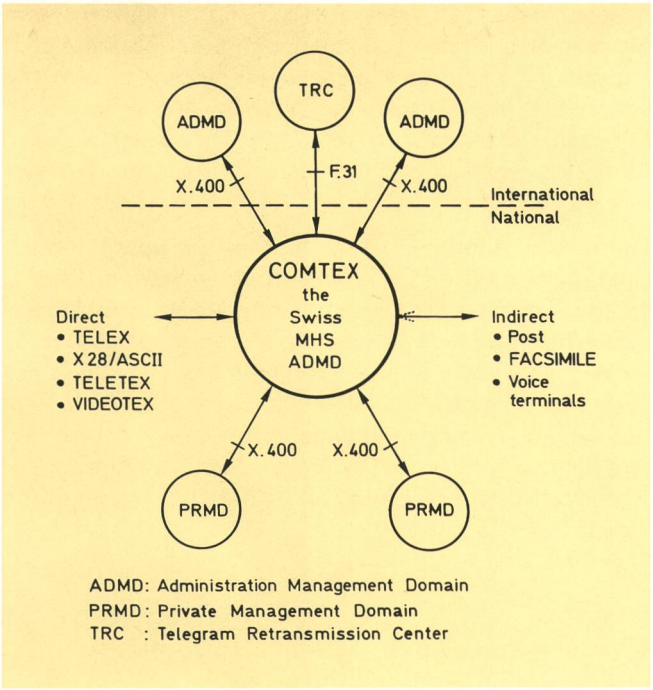

Fig. 14
A typical electronic messaging strategy of a telecommunication administration
ADMD Administration Management Domain
PRMD Private Management Domain
TRC Telegram Retransmission Center

inquiry terminal (X.28/ASCII and Videotex). Other potential user equipment includes communicating wordprocessors and communicating personal computers. Currently, these two types of working stations emulate one of the above terminals for communication, the true link to the mainframes being always missing.

25 A typical electronic messaging strategy of a telecommunication administration

By way of illustration, the electronic messaging strategy of the Swiss PTT is outlined below. An MHS project named comtex (communication of texts) has been launched with the following main objectives:

- Extension of the existing telex store-and-forward service (SAM) in terms of capacity and facilities (fig. 10)
- Replacement of the old Ateco telegram switching system (fig. 10); redesigning and integrating the national telegram service into the electronic messaging concept
- Introduction of a public MHS X.400 service as interconnection point for telex and other non-voice terminals and private messaging systems.

The main results of the comtex strategy are the following *(fig. 14)*: This system will form Switzerland's X.400 Administration Management Domain (ADMD) for message handling.

Direct access is to be offered to the telex service and X.28/ASCII, teletex, videotex services and to private electronic messaging management domains (PRMD), if they are compatible with the X.400 standards. Indirect access via PTT operators will be available for telephone submission, facsimile and postal delivery facilities. It is expected that most of the electronic mailboxes will be located in the private messaging systems and that one of the important comtex roles will be transparent message transfer between these mailing systems.

Comtex will be directly connected to foreign public MHS management domains of carriers and administrations and also to foreign telegram retransmission centers. Three main services are to be offered on Comtex:

- Message transfer service as defined in X.400 between the different electronic messaging systems directly connected to comtex *(fig. 15)*
- Interpersonal messaging service as defined in X.400 for all the users accessing comtex indirectly or directly, with or without subscription to MHS (if the user can be logically identified). These users can be located in the private mail systems (fig. 15)
- Telegram service as application superposed on the interpersonal messaging service and offering the facilities as defined in CCITT recommendation F.31 for international telegram service.

As a public service, the Swiss PTT considers its obligation to provide the infrastructure enabling the public to benefit from X.400 as open system interconnection application.

3 The standardization effort

31 Short historical review

The problem of «computer mediated messaging» was proposed as study item within the IFIP working group

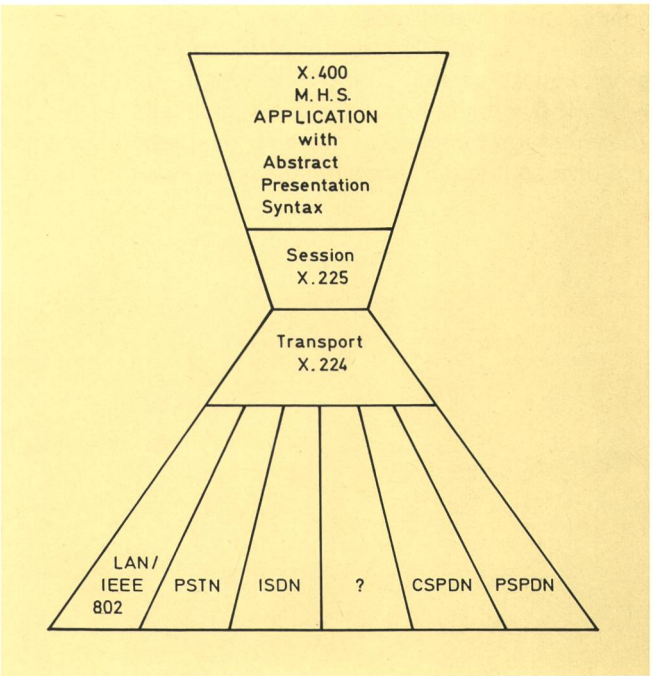

Fig. 15
Message handling in the OSI reference model
LAN/IEEE Local aerial network
PSTN Switched telephone network
ISDN Integrated service digital network
CSPDN Circuit switched network
PSPDN Packet switched network

6.5 in 1978. Much research and preliminary work was done within IFIP and transferred to the CCITT as soon as a Special reporter Group on Message Handling Systems (MHS) had been established in 1980. Within one CCITT study period (1980-1984) this group worked very hard and produced the X.400 series of recommandations, which were accepted by the CCITT plenary assembly in October 1984. Among the administrations and carriers participating in the standardization effort were: ITT, GTE, NT, CNCP as well as the administrations of France, Japan, F.R.G. and the U.K. Manufacturers such as IBM, DEC, Xerox, 3 COM and Philips acted as advisers. Currently, ECMA (ECMA-93 standard), ISO (Motis) and CEN/Cenelec with the help of SPAG are continuing the CCITT's work of defining the direct interconnection between heterogeneous private messaging systems, for example in the same company. CCITT, assisted by different CEPT groups, is now perfecting its recommendations by producing a X.400 implementor's guide, by setting up an MHS conformance testing group (Study Group VII), by defining the service aspects from the end user's point of view (Study Group I), and by starting to study the international MHS tariff issues (Study Group III).

32 Short introduction to X.400

Message handling has been defined in accordance with the Open System Interconnection (OSI) reference model. It specifies the standards for interworking between public, or public and private electronic messaging systems as an open application, independent of the transport networks used to interconnect the systems (PSPDN, CSPDN, PSTN, ISDN, LAN, satellite, etc.) (fig. 2).

The message handling application makes use of the recently published Transport and Session standards (X.226 and X.225). The whole MHS application is built around an efficient abstract Presentation syntax (X.409), which ISO intends to use for other applications (fig. 15). The message handling application has been structured and divided into two parts or sublayers, one offering the general *message transfer* service *(fig. 16)* based on an electronic envelope associated with the message building content and allowing the open system to play the postman's role, that is to submit, relay and deliver messages in store-and-forward mode. This service is performed by logical entities named Message Transfer Agents (MTA).

The second sublayer defines one of the possible message contents used for *interpersonal messaging*, that is for the exchange of messages from one individual to another (fig. 16). For that purpose, the message content is divided into two logical elements: the standardized header with end-to-end significance, and the free-form body (texts, voice annotations, graphics etc.). This second service is provided by logical entities, named User Agents (UA), acting on behalf of the end user (e.g. the human being).

4 Current research work in electronic messaging and related areas

In addition to the perfecting of the MHS recommendations, further research and standardization work is covering in such areas as:

- The directory system and service applied to message handling (distribution list expansion, search of recipient's address with the recipient's name, etc.)
- MHS access services for telex and other nonvoice terminals except teletex (already defined)
- Functional standards for ADMD/PRMD (A/311) and PRMD/PRMD interworking (A/3211)
- Interworking of MHS with physical delivery services (postal administrations)
- Architecture for reformattable documents (mixed-mode teletex/facsimile, extension of simple formattable documents, etc.)
- The multi-media documents with voice annotation (standardization of voice compression algorithms, etc.)
- Realtime and non-realtime teleconferencing (videoconference, group communication)

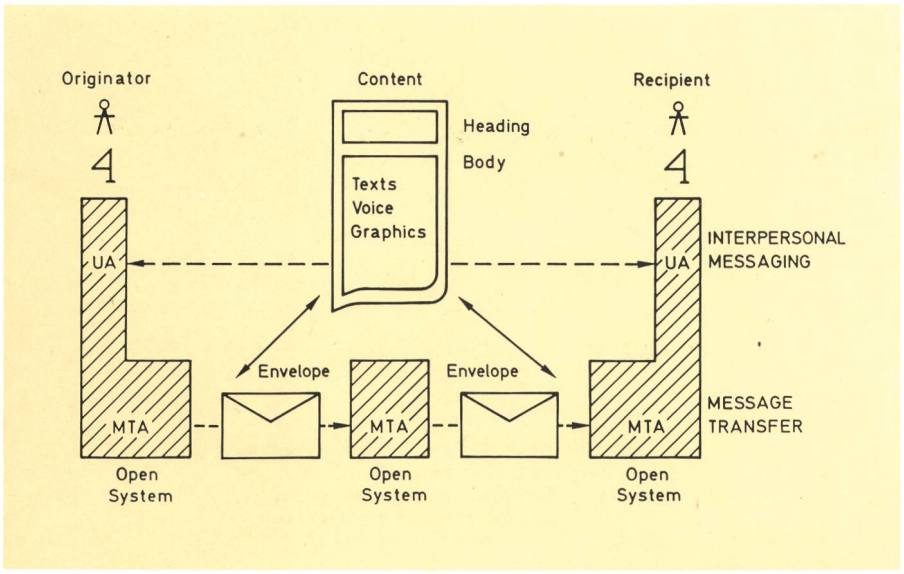

Fig. 16
The standardized message handling application
UA User agent
MTA Message transfer agent

– Impact of portable terminals and PCs on messaging services, in particular on remote access to already delivered mail (centralized message store).

To summarize at this stage, it can be said that if the current market in electronic messaging is still «embryonic», it may well grow very rapidly as a result of proven messaging techniques, the existence of high-quality standards based on the OSI reference model, and the commitment of administrations, manufacturers and universities to these standards. The first signs of success are already there and from an engineer's point of view the X.400 recommendations have come as the right standard at the right time in this emerging market (fig. 15).

5 The human being's point of view

51 The inherent limitations of man

Let us now consider the human being as part of the messaging system: In a first approximation, a man as originator or recipient of electronic messages can be considered a physical entity communicating with his partners by means of the five traditional senses:

Sense of hearing

This is the only sense for which we have appropriate specialized organs to send (vocal cords) and to receive (ears) messages. But even for this sense, we are better built as recipient (stereo, bandwith) than as originator (mono).

Sense of sight

We can see still or moving objects two- or three-dimension without difficulty, but if we want to sell our image to others, the only way is facial expression, eye or body language, or dress.

Sense of touch

We are a very sophisticated «machine» for the sense of touch: Our body and particularly our limbs are able to process a large quantity of information about the location of objects and their structure. And what are our emitting facilites concerning touch? What can we give others to touch? Just our body! Think of the range of information you can get from the deepness of a relationship between two persons, if you just observe the proximity between them, their way of embracing or kissing, for example.

Sense of taste

We are able to be very «fin gourmet» with our tongue, but what can we give of ourselves to taste? Not very much, we must admit!

Sense of smell

Our nose can distinguish between many smells, from the finest to the most offensive. We are somewhat limited in the production of smells, and we do not, of ourselves, often smell like a rose!

In summary, if we consider ourselves just as communicating physical entities, we are very good recipients of messages but very poor originators, and this is valid for all the five senses. A true electronic interpersonal mail service cannot ignore this inherent assymetry. If in more thorough investigations we regard ourselves as being somewhat more than physical entities, that is to say as having intelligence and emotions, we see the limitations of man in creation, in expressing his feelings, emotions and thoughts in symbols that can be recognized by others. Here are some examples:

– The ability to produce and transmit our inner sounds and music
– To design and present to others images or pictures of our minds without resorting to the difficult process of drawing or painting
– To produce sculptures or any other 3-dimensional objects of our imagination
– To produce or convey gastronomical sensations or phantastic scents of which only we are aware
– To express ideas and feelings as purely as possible, without the difficult process of writing or even speaking.

The ideal electronic interpersonal messaging service should be a help to human communication and not an additional handicap in expressing our true selves.

52 What is expected of technology

What, then, does man expect of a true interpersonal electronic mail service? Two main facilities:

– To convey to the communicating partner as far as possible the same physical entity as if space and time differences did not exist
– To help him in his limited ability to originate and transmit intellectual and emotional messages.

In regard to the first expectation, only the sense of hearing (telephone) and to some extent the sense of sight (videotelephone, videoconference) are addressed in realtime electronic mail. The same applies to non-realtime systems as for example with voice annotation in document and voice mail. Even here, we were unable to invent user-friendly voice interfaces just adapted to our appropriate input and output organs, without any complicated supplementary button pressing.

In regard to the second expectation, our current technology (telephone, telex, teletex, facsimile, MHS, etc.) is very far from meeting human requirements such as:

– Electronic 3-dimensional virtual object creation and modification, cutting and pasting (like easy reformattable holographic representations)
– Direct electronic capturing of ideas without manual work (reformattable dictaphone-produced text)
– Direct creation of reprocessable electronic images (still or moving pictures) without writing, typing, painting, drawing or «mouse driving»
– Easy electronic capturing, mixing or modification of external pictures as bit-mapped graphic or structured and reformattable graphics (camera in input and mixed-mode structured document in output)
– Easy electronic sound capture, either as «bit-mapped sound» (digitalized music) or as automatic note-coded music (score).

Our electronic mail technology for the nineties has many challenges to meet, before it can actually facilitate human communication. If at least the poorly named «multimedia document» character-coded texts combined with structured and bit-mapped graphics could be produced, modified, and read easily by the average citizen, without being of the «homo computerus» species, much would have been already achieved.

53 The document architecture and the human being

531 Multimedia/multisense document reception

The user wants to read and listen to his multimedia mail in his private office, that is at his normal work station. If the document architecture continues to develop in the direction of more sophisticated patterns, then the traditional 2-dimensional/1-sense document (screen page or paper page/sense of sight) will move in the direction of a 4-dimensional/multisense document (space and time/sight, hearing etc.), with «reading» scenario selection facilities. The document «reading» process will then become a kind of non-realtime video show . . . and the user will have to rent the sophisticated and specialized video-conference room, just to «read» his daily multimedia mail!

532 Multimedia/multisense document production

The use of more than one sense in the production of electronic messaging documents will be widely accepted in the nineties only if the scenario and the document production itself are straightforward procedures. Even if it is a natural everyday process to add some non-formal spoken comments when passing on a document, the equivalent electronic process will be used only if it is just as easy not only to add these spoken comments . . . but also to delete them at every hierarchical level in the company. If this process is too complex, then this sophisticated feature will never be used, but just be provided for the company image, or else voice annotation at the lowest hierarchical level, where the document was produced, will accompany the document up to the Chief Executive and will totally lose its informal character.

54 Electronic messaging and hierarchical position

541 The electronic messaging revolution: Back to the pre-Gutenberg age, or to the pre-Bell age?

Before Gutenberg, the information was circulated by means of handwritten documents produced with much artistic skills and patience by monasteries. In the present information age the production of a newspaper title («Der Bund», the «Union») in large gothic letters on videotex using DRCS took approximately one man-week three years ago within our company! Will the consequence be that the sophisticated work station is installed only at low level for low-paid personnel, the high level, well-paid executives being just equipped with technically dumb but deluxe terminals.

Before Bell invented the phone, all information circulated as hand- or typewritten documents . . . and many sociologists are defining our time as the end of the «writing age». But electronic messaging technology moves exactly in the opposite direction. Most, if not all, the current office automation systems demand of any user from lowest clerk to highest executive some typewriting or «mouse driving» skills. But what about the so-called «keyboard bottleneck»? Are your managers also good typists? And if their efficiency is measured by the number of electronic mail items handled, will the secretary not be much more efficient than the boss? Another psychological element is not to be ignored either: The introduction of a keyboard in a manager's office is very often considered a backward promotion!

542 Multisense document and direction of information flow

The electronic documents flowing from the bottom to the top of a company or from the seller to the buyer need very often to be formal and to address the sense of sight: There is always an aspect of formal picture show in selling ideas to managers or customers. In the other flow direction, that is from managers to employees or from customers to manufacturers, it is the sense of hearing that is mostly addressed: Some of the reasons are the easiness of voice production, the non-binding effect of unrecorded voice remarks and voice's greater scope for diplomatic wording and allusive expression. Is, then, the ideal work station for electronic messaging a very sophisticated text and image processing machine (in input) with some voice-playing features (in output) at the lower hierarchical levels or in the selling departments and a very sophisticated voice-recording machine (in input) with text and image presentation facilities (in output) at the higher levels of hierarchy or in the buying departments?

543 New assignment of tasks

The introduction of electronic messaging in a company brings about a number of changes in working methods and job definitions, which may meet with resistance from the staff concerned.

Let us examine some of them:

- The modified team relationship between private secretary and manager, in areas like delegation, mail filtering criteria, mail sorting, appointment management, etc.
- The change relationship between typist and document producers: Who will first electronically collect the document? Who will do the editing? Will secretarial time be saved and executive time be lost?
- The impact of the multimedia document on the drawing office: Who will be the first to electronically collect the sketches? Who will check them? The drawing office or the author?
- The impact of a companywide voice mailing system on the switchboard operator's job.
- The promotion of interdepartmental cross-relations via electronic messaging (networks instead of hierarchical communication) and the more difficult role of middle management. And how will authorization and

signing procedures be solved for the electronic mail leaving the company?
- The impact of electronic messaging on the traditional courier service: Will its workload diminish? Will photocopying machines be replaced by electronic printing centers serving addresses without electronic equipment?
- The impact on office furniture such as management desk design, with intergrated facilities for multisense realtime and non-realtime electronic mail or conference room furniture and with integrated horizontal displays for minutes, agenda consultation, etc.

544 Electronic messaging: Means, not end

The consumer does not want to use electronic messaging «per se», but to take advantage of it for other higher-order applications related to his specific job. To set up an expensive infrastructure just for electronic messaging is doubtless wrong.

On the other hand, the user will not put up with a proliferation of terminals in his office, one for every new application. What he wants is only one work station for the various jobs. A first integrating step could be to interconnect the different electronic messaging applications accomodated in the company's various computer systems. The resulting overall electronic messaging application could be based on the CCITT X.400 standard and could also become one first step away from the tower of Babel due to independently computerized applications in the company.

And we should remember that the emerging integrated network, ISDN, intends to integrate the information transport services only as bit strings on the same links and via the same switching equipment. But it is not at all the intention of ISDN to solve any higher-order integration problems at the applications or teleservices level.

55 Electronic messaging and liberty

551 Electronic directory: First step towards «Big Brother»

As a complement to the electronic messaging standards, electronic directory standards are now developed: If we know the recipient's name but not his address (mailbox, terminal, etc.) or the routing information needed to prepare our electronic mail envelope, we can consult the electronic directory. It will either provide the information from its own memory or ask other company wide, nationwide or international directory systems for it.

With electronic directories, the problem of personal data protection is touched: What kind of information about us, our trade or profession, our hierarchical position, our terminal location and characteristics, our appearance on some distribution lists, etc. Are we prepared to make publicly available? Are we prepared to make indirectly visible the structure of our organization, personnel fluctuations of an unstable department, or the growth rate of our new and secret development team? What a wonderful tool for industrial espionage the international electronic directory service could become! One condition for preserving our privacy is to ensure that interconnected international electronic directory services do not contain any sensitive data, that is to say to insure the «non-openness» of this potential open-system application!

552 Electronic messaging: A dangerous arm?

With electronic messaging, once our message is recorded electronically, we can never be sure that even an informal small voice annotation will be destroyed after reception by the addressee. An analogous situation would be if all our phone conversations were always tape-recorded by the switching equipment. All the informal information could thus become formal information and be used as proof for or against us at any time in the future. The concept of «off-the-record» remarks is not at all guaranteed with electronic messaging. Will the proverb «verba volant, scripta manent» no longer be true?

Electronic messages can be easily reused by the recipient: The ethical problem here is that the recipient, if he is not honest, can easily appropriate the contents of the author's message to himself, add some sentences and present it as his original work, without any mention of the real originator. The whole problem of idea stealing, of electronic plagiarism, of a copyright on electronic messages as well as of electronic freezing of messages (unreformattable documents) is just beginning to appear.

56 The new bureaucracy: Electronic group communication

Group communication via electronic messaging is a wonderful idea for trying to bring together a certain number of experts on a specific subject. Primitive forms of group communication could be just specific distribution lists associated with certain topics, or electronic bulletin boards related to different conferences. The risk with these unchaired forms of information exchange is that group communication can rapidly become an electronic chattering club or an electronic Hyde Park Speaker's Corner, without clear meeting goals, without agenda, without time limit. A non-realtime electronic conference, once started, can last as long as there is more than one player ready to continue the chattering game. Without a highly diplomatic but strict chairman, without a very clear definition of roles (who are the reporters, the chief editor, and the readers in this primitive form of electronic newspaper) and rules (subject, goal, time limit, etc.), the electronic messaging for group communication can be misused and employ any number of computer age bureaucrats we want. Useless work is then easily multiplying in accordance with Parkinson's law. Will electronic group communication become the solution for the nineties to the problems of unemployment and human isolation?

57 Electronic messaging and information filtering

571 The global electronic mail market

The human element is the only one to be considered in the evaluation of the global mail market: The mail mar-

ket potential is limited by the information quantities mankind can absorb and process per unit of time. All additional electronic or non-electronic messages produced just end up in the recipient's waste basket.

Just to illustrate this with an example:

Today's optical fibers can transmit 140 million bits per second or more. Within less than 30 seconds, as much information can be transported on this fiber as an employee can absorb during the forty years of his working life, if he reads and studies every working day an electronic character-coded document of 20 pages with 30 lines of 80 characters each. To what extent will the wideband networks we are now installing for our wired society be wasted, just keeping computers busy!

572 The recipient: From king to slave

With realtime electronic mail, if we refuse to answer our phone, or if we switch your terminal off, a big mail filtering effect is obtained: Only those with very important items will have the patience to overcome the telephone tag and try again until they will reach us at the end. From the originator's point of view, we are then considered a very busy, and thus important person.

With non-realtime electronic mail, the recipient's image suffers: The messaging computer will reach our electronic mailbox anyhow, and will even send a «delivery notification» back to the originator, if we have asked for it: Not only all the unimportant items will reach us, but the originator will even be informed that we got the mail, and we will then be considered inefficient, lazy person if we do not acknowledge or answer the mail within a reasonably short time!

573 Quantity and quality filtering or uncontrolled information flood

Large documents produced directly in electronic form at the terminal very often lose some information density compared with conventionally produced documents (pencil and paper). The writer's being unable to view the whole document at a glance may be one of the reasons for this slip.

Small memoranda exchanged via electronic messaging systems are very efficient means of accelerating communication between distant partners . . . But if we consider them just the first salvo of a «memo war» and we begin to reply to a response memo, or if we forward with our own comments some already commented and forwarded memos, we will easily lose the final recipient, and the ratio between useful information and purely administrative information will rapidly deteriorate. The bigger the use of electronic messaging, the more difficult the quality filtering of the different mail items. Currently, with conventional mail, either we or our secretary can rapidly sort the incoming mail into at least three different groups: advertisements to be just thrown away, informal memos to be read and also put in the wastebasket and the formal documents to be studied. But how shall we do this in a totally electronic environment? How to prevent junk mail entering a company's internal electronic messaging system and how to solve the problem of electronic garbage disposal? An appropriate solution to the problem of quantitative and qualitative pollution by electronic introduction of electronic messages must be found, or else there will be a backlash against the flood of information.

58 Naming: A hidden new slavery

To be reached electronically, we have to give our name, that is to say a part of our identity, to our assigned electronic user Agent, that piece of hardware and software submitting and receiving our mail on our behalf (see 32). The delicate question here is: How much of ourself are you prepared to give up to this electronic tool? We have already given it our name, even possibly our nickname. Will it filter the incoming mail on our behalf? Will it take over some of our appointment management? Will it also send back automatically some «receipt notification» for our incoming mail? Will we be lost when our user agent breaks down? Will we become just a living complement to this dead organism? The electronic messaging customer must carefully check the amount of freedom he is prepared to give up for the benefit of his User Agent.

59 Alone but never disconnected

In electronic messaging a development trend is towards the so-called «universal electronic mailbox», never disconnected for any potential originator and allowing the recipient to read it from anywhere: From the office, from home, during flights, from public telephone booths, etc. If work is definitely our only aim in life and quiet moments mean nothing to us, then this kind of electronic messaging is the right communication tool. We will possibly get a heart attack earlier, but that is a different problem!

Electronic messaging comes between the communicating partners despite overcoming space and time barriers. It could create a lonely artificial world rendering face-to-face communication even more difficult than today, causing partners to meet as strangers on the rare occasions, when they see each other.

6 Cross-fertilization points and conclusion

First quotation:

«I believe that how quickly things get done in an office, how quickly information gets exchanged, is more a matter of style than of systems.» (Marck H. McCormack)

Electronic mail in general and electronic messaging in particular are wonderful means of communication that are just beginning to emerge. Communication through electronic mail boxes offers the user a lot of new possibilities, and implementation of this wonderful idea on a large commercial scale is just beginning, after intensive preparations by IFIP and very careful standardization work by the CCITT, whose X.400 series of recommendations (message handling systems) has also been adopted by ECMA and ISO (fig. 5).

On the other hand, the future customer should be aware of the benefits and the possible abuses of this powerful new communication means: At this stage of growth towards electronic mail maturity (fig. 5), he can set up

extensive new networks of human relations, but he must take great care in defining the way of using the new instruments within and outside his company. A huge authoritarian bureaucracy could be put in place through the uncontrolled introduction of electronic messaging, destroying the always fragile human relationships for the sole benefit of technological efficiency.

Second quotation:

«Communiquons, je veux dire vivons, en mettant en œuvre, sans vaines frousses, tous les moyens qu'une époque inventive met et mettra à notre disposition; mais si l'horizon ultime de cette communication n'est pas, osons le mot, la communication entre les personnes, mon opinion est que toute la quincaillerie supersophistiquée pour laquelle on nous fait l'article ne vaut pas qu'on s'endette pour s'en rendre acquéreur.» (Maurice Deleforge)

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