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On the Origin of Email and Why the United States Postal Service (USPS) May Now Embrace It

SUMMARY

Email is the full-scale electronic emulation of the interoffice, inter-organizational paper mail system. In the late 1990's, misconceptions of email dissuaded the United States Postal Service (USPS) from embracing its relevance to their core business. Understanding email's true origin clarifies why the USPS may now embrace it.

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“At this time, no attempt is being made to emulate a full-scale inter-organizational mail system.”¹
Rand Report to DARPA, December 1977

Definition of Email

I. EMAIL IS A SYSTEM OF INTERLOCKING PARTS

What we know today as “email” is really a *system* --- a system of interlocking parts, each of which is essential for ordinary people to communicate effectively with one or many others, in an environment where different kinds of information must be shared (memos, documents, files, etc.) i.e. the modern office environment.

Many people over the age of 40 will remember the *interoffice paper mail system*, which was the basis of how offices around the world operated, from the level of secretaries to CEOs. The interoffice mail system had the following interlocked parts (as detailed in Table 1 below), which are the now-familiar components of email: “Inbox”, “Outbox”, “Drafts”, “Memo” (“To:”, “From:”, “Date:”, “Subject:”, “Body:”, “Cc:”, “Bcc:”), “Attachments”, “Folders”, “Compose”, “Forward”, “Reply”, “Address Book”, “Groups”, “Return Receipt”, “Sorting”. This system was not only used within offices but also for communication between different organizations.

TABLE 1

The System of Interlocking Parts of the Interoffice, Inter-organizational Paper Mail System²

| Part Name | Part Description |
|-----------|---|
| Inbox | This was the physical inbox where a secretary received incoming documents. It was usually made of wood, metal or plastic. The courier or “office boy” or “mailroom clerk” would deliver documents – postal mail or internal memos came to the Inbox regularly, such as twice per day. |

¹ Crocker, David. Framework and Function of the “MS” Personal Message System. Santa Monica, CA: RAND Corporation, December 1977.

² Ayyadurai, V.A.S., Papers and Notes, submitted to Smithsonian Institution, February 16, 2012.

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| Outbox | This was a physical box of metal, wood, or plastic, for memos that were composed and edited, ready for sending to its recipients. The courier or "office boy" or "mailroom clerk" would come and pick up the mail from the Outbox regularly, sometimes twice per day. |
| Drafts | A memo sometimes was saved for review prior to sending. A secretary or another person would write the memo and put in a Drafts folder, which a superior would review and provide 'red-line' feedback in the Drafts folder. |
| Memo | This was typically a piece of 8½ by 11-inch piece of BOND paper. The top of the Memo had the words '+++++ MEMORANDUM +++++' written on it. Below that were the following areas: 'To:', 'From:', 'Date:', 'Subject:', 'Body:', 'Cc:', 'Bcc:' (only for view in the sender's original), and an indication with 'Encl.:', if attachment(s) were included. |
| Attachments | A Memo could sometimes indicate 'Encl.:', if attachments or enclosures such as another file folder, another document, a drawing or a photograph, or even a parcel, were included. |
| Folders | Mail sometimes was organized and filed in separate folders based on some subject matter. |
| Compose | A new memo was typically composed on a typewriter. Sometimes whiteout (a white liquid or white paper) was use to erase mistakes. |
| Forward (or Redistribution) | A person receiving and reviewing an incoming memo could forward or re-distribute it to others. Forwarding literally involved adding a list of other people to review the memo. Sometimes the forward list was just paper-clipped on the received memo. |
| Reply | Sometimes instead of writing a new memo, an employee replied to a memo received in the Inbox. The memo that was being responded to would be attached. |
| Address Book | Every office had an address book, which listed each person's first and last names, campus location, group (e.g. surgery, pharmacology), room number and phone number. |
| Groups | At UMDNJ, different groups were at different locations, such as Surgery, Pharmacology, ICU, IT. Each location had different people in different groups. |
| Return Receipt | This was a formal receipt that a delivery person would make sure got signed by the recipient who had been sent a registered memo. This return receipt would then have to get sent back to the original sender. |
| Sorting | Different locations had mail sorting facilities, where the mail would come |

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| | in, be sorted by groups, departments, locations, zip code, office numbers, so the delivery was easier. |
| Send | Memo to an individual meant that the 'To:' field had only the name of one recipient. |
| Receive | Memos are received by a secretary in the Inbox. |
| Scanning Mail | Visually reviewing the mail was the process of quickly reading the envelope or top portion of a memo, such as the 'From:', 'Subject:', lines to get an idea of which memo to read first, to put for later review, or sometimes to discard altogether. |
| Forwarding with RETURN RECEIPT Requested (or registered memo) | This was an important feature of the office. Sometimes, an important letter, say from a Director, would be received by a Manager, and that Manager wanted certain employees in his group to read it and make sure that they did in fact read it. So forwarding with return receipt, enabled the Manager to know exactly who got and who did not get the memo. |
| Editing | A memo sometimes would be edited after it was composed. Editing could be iterative based on the feedback received. |
| Broadcast Memo | Sometimes a memo would need to be sent to multiple recipients, not just one individual. This meant having multiple names of recipients in the 'To:' field. This was a complicated process, since copies had to be made – carbon copies on a typewriter. A 'check' mark was put next to each copy's intended recipient, so the envelope would be addressed correctly. |
| Sending Memo to Group | In a large organization, within and across facilities, as at UMDNJ, there were different faculty departments: Pharmacology, Surgery, etc., and one may want to send a memo to a Group. Again, copies were made, and an Address Book used for a secretary to correctly address each envelope. |
| Deleting | Sometimes a memo would be thrown into a trash folder for disposal. |
| Purging | The contents of trash folders, by request, would be collected and permanently destroyed. |
| Updating Address Book | Address books were updated as employees came and left UMDNJ. New people were added, and those who had left were removed. Sometimes a circular was sent out which was the update to the existing Address Book, and one would have to manually insert the changes. |
| Prioritization | When mail was left in the Inbox, it sometimes was sorted based on some priority, and so marked. |
| Archiving | Memos to be kept were often put into an archive file cabinet and organized for long-term record keeping. |
| Carbon Copies | A secretary would typically place dark blue carbon paper between two |

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| | Bond pieces of white paper and roll them into the typewriter, to create copies. The Bond paper on top was the original, the ones below was 'Carbon Copy' or CC. Sometimes, several Carbons were used, and sometimes if the CC list was long, the original would be mimeographed on a mimeograph machine. Then the original To: recipient would get the original, and each person on the CC list would get copies. This got more complicated if there were multiple recipients or a Group in the To: field. |
| Blind Carbon Copies | A Bcc list, in the header of the memo, was kept by the Sender only, and others who got Carbon copies did not see the one with the Bcc list. So only the sender knew who was on the Bcc list. |
| Registered Memo | In the hospital environment, this was a very important feature, because certain memos had to be acknowledged as received. A Memo could be flagged as a 'Registered Memo,' this would mean that it was treated differently for instance, the delivery person could put it in a different color envelope and ensured that recipient signed for it. |
| Undeliverable Notification | Sometimes a memo could not be delivered even after many Retries. In this case the delivery person would take the memo back to the sender with a note on it saying 'undeliverable'. |
| Retries | All mail had to be delivered, or a real effort made to keep trying before being deemed undeliverable. This meant policy of 'retries' as many as 3 to 5 times, before the attempts stopped. The number of retries was a policy decision. |
| Securing Delivery | All mail had to be securely delivered. This meant that only the designated recipient had to get it. Typically this was ensured, as the delivery person knew who was who and knew the secretaries. Moreover, most memos were put in an individual sealed envelope, with a string closure or taped. |
| Transporting | All mail needed to be transported. At UMDNJ, there were many ways of transport. The delivery person could physically pick up and deliver from local office to office. Another forms of transport were pneumatic tubes forming a system on train-track-like rails. Mail among different buildings and campuses, was transported by cars or trucks. |

The interoffice, inter-organizational paper-based mail system was therefore an interlocked system of parts. If you took away any one component, such as the ability to attach other materials or the use of folders, send attachments or make carbon copies, your ability to

function with co-workers is greatly impaired, and the system itself would become non-functioning.

II. EMAIL IS THE FULL-SCALE ELECTRONIC EMULATION OF THE INTEROFFICE, INTER-ORGANIZATIONAL PAPER-BASED MAIL SYSTEM

Up until 1978, though pioneers in electronic communication made contributions to the exchange of digital text messages across computers, there was no intention to emulate the interoffice, inter-organizational paper mail system.³ The origin and history of email, therefore, begins in 1978, when email emerged as a *direct* and intentional result of the challenge to replicate electronically the system of interlocking parts of the interoffice, inter-organizational paper-based mail system. This intentional challenge motivated the development of a FORTRAN IV computer software program called "EMAIL" in 1978.⁴ Two copyrights were issued for the program EMAIL as well as the *EMAIL's User's Manual* in 1982.⁵ Table 2 provides a list of all the parts that were incorporated into EMAIL, as denoted by a check mark "✓", from the parts of interoffice, inter-organizational paper-based mail system (derived from Table 1). Note, that, beyond reproducing the functional parts of the paper mail system, EMAIL also incorporated a set of *Integrated System Components* to ensure the implementation of the entire system in an electronic format (see last set of items in Table 2 below).

EMAIL is email, upper case, lower case, any case. It is important to note that the term "email", the juxtaposition of those five characters "e", "m", "a", "l" and "l", did not exist prior to 1978. All capitals were used in naming the software program since that was the naming convention for software program, subroutine and variable names at the University of Medicine and Dentistry of New Jersey, in Newark, NJ, where the program was developed. Moreover, at that time, the use of upper case for the naming of programs, subroutine and variable names, was also a carry over from the days of writing software programs using punch cards.

In 1978, systems for communications among widely dispersed computers were in existence, but they were primitive and their usage was largely confined to computer scientists and specialists. What was envisioned was something simpler, something that everyone, from secretary to CEO, could use to quickly and reliably send and receive digital messages.

It was determined that the essential features of an electronic system would include functions corresponding to the parts of Table 1, such as "Inbox", "Outbox", "Drafts", "Memo" ("To:",

³ Crocker, David. Framework and Function of the "MS" Personal Message System. Santa Monica, CA: RAND Corporation, December 1977.

⁴ Ayyadurai, Shiva, "EMAIL: Computer Program for Electronic Mail System", US Copyright Office, August 30, 1982.

⁵ Ayyadurai, Shiva, "EMAIL User's Manual", US Copyright Office, August 27, 1982.

“From:”, “Date:”, “Subject:”, “Body:”, “Cc:”, “Bcc:”), “Attachments”, “Folders”, “Compose”, “Forward”, “Reply”, “Address Book”, “Groups”, “Return Receipt”, “Sorting”. These capabilities were all to be provided in a software program having a sufficiently simple interface that needed no expertise in computer systems to use efficiently to “Send” and “Receive” mail electronically. It is these features that made the 1978 program “email” and that distinguished “email” from prior electronic communications.

TABLE 2
EMAIL – The Full-Scale Electronic Interoffice, Inter-organizational Mail System⁶

| Interoffice Mail System Parts | EMAIL Parts |
|---|-------------|
| Inbox | ✓ |
| Outbox | ✓ |
| Drafts | ✓ |
| Memo | ✓ |
| To: | ✓ |
| From: | ✓ |
| Subject: (70 chars width) | ✓ |
| Date: | ✓ |
| Body: | ✓ |
| Cc: | ✓ |
| Bcc: | ✓ |
| Attachments | ✓ |
| Folders | ✓ |
| Compose | ✓ |
| Forward (or Redistribution) | ✓ |
| Reply | ✓ |
| Address Book | ✓ |
| Groups | ✓ |
| Return Receipt | ✓ |
| Sorting | ✓ |
| Send | ✓ |
| Receive | ✓ |
| Scanning Mail | ✓ |
| Forwarding with RETURN RECEIPT (or registered memo) | ✓ |
| Editing | ✓ |

⁶ Ayyadurai, V.A.S., FORTRAN IV Code Samples, Submitted to US Copyright Office, 1982; submitted to Smithsonian Institution, February 16, 2012.

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| Broadcast Memo | ✓ |
| Sending Memo to Group | ✓ |
| Deleting | ✓ |
| Purging | ✓ |
| Updating Address Book | ✓ |
| Searching Address Group | ✓ |
| By Group | ✓ |
| By User Name (short name) | ✓ |
| By Last Name | ✓ |
| By Zipnode (node or location) | ✓ |
| Prioritization | ✓ |
| Archiving | ✓ |
| Carbon Copies | ✓ |
| Blind Carbon Copies | ✓ |
| Registered Memo | ✓ |
| Undeliverable Notification | ✓ |
| Retries | ✓ |
| Secure Delivery (Using username and password) | ✓ |
| Attachments | ✓ |
| Attaching to a memo | ✓ |
| Creating attachments from scratch | ✓ |
| Saving attachments | ✓ |
| Attachment editor | ✓ |
| Transmission of memo | ✓ |
| Multi-Level User Access - User, Manager, Postmaster, System Administrator | ✓ |
| Memo Formatting - Functions were included to make sure that a memo on the screen when printed looked somewhat like a typewritten memo. | ✓ |
| Printing | ✓ |
| Print all mail | ✓ |
| Print selected memos | ✓ |
| Print only the "envelopes", To, From, Subject, Date | ✓ |
| Formatted printing --- memo looked like typewritten one | ✓ |
| Exporting of Mail | ✓ |
| Export a single memo to a file | ✓ |
| Export a set of memos to a file | ✓ |
| Group Management --- Postmaster/Administrator Level | ✓ |

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| Creating Groups | ✓ |
| Deleting Groups | ✓ |
| Placing User in a Group | ✓ |
| Deleting User from a Group | ✓ |
| Displaying Groups | ✓ |
| Restricting Group Access --- which users could not send to certain groups. E.g. Only the Postmaster could send to 'ALL' | ✓ |
| Postmaster & Systems Administrator Functions | ✓ |
| Reports on mail usage by user | ✓ |
| Deleting aged mail | ✓ |
| Shutdown of the entire system | ✓ |
| Startup of the entire system | ✓ |
| Deleting Users | ✓ |
| Adding Users | ✓ |
| Adding a 'Zipnode', new network | ✓ |
| Deleting a Zipnode | ✓ |
| Disabling a User from logging in to the user interface | ✓ |
| Direct starting of mail transmission | ✓ |
| Integrated System Components | ✓ |
| Easy-To-Use User Interface | ✓ |
| Word-processor | ✓ |
| Integrated Attachment Editor | ✓ |
| Relational Database Engine | ✓ |
| Modular Inter-Process Communication Protocol | ✓ |
| Print Manager for Formatted Printing | ✓ |
| Systems Administrator Console | ✓ |
| Post Master Console | ✓ |

Beyond reproducing the functional parts of the paper mail system, the first email system incorporated a set of Integrated System Components (see last set of items in Table 2) making the system network-wide, highly reliable, and easy-to-use so anyone from secretaries to doctors to technical folks to executives could transition from the typewriter to the keyboard.

Email, with all the familiar features, which we take for granted today in programs such as Gmail, Hotmail and others, by definition, is the full-scale electronic emulation of the interoffice, inter-organizational mail system.

*"I don't believe Ray Tomlinson invented 'e-mail'....
[!]t's because I have a completely clear memory that
Ray was not even at the FTP meeting where we
decided to add mail to the protocol."⁷*

M A Padlipsky, 2000
And they Argued All Night

Misconceptions of Email

Sending text messages electronically could be said to date back to the Morse code telegraph of the mid 1800s; or the 1939 World's Fair where IBM sent a message of congratulations from San Francisco to New York on an IBM radio-type, calling it a "high-speed substitute for mail service in the world of tomorrow." The original text message, electronic transfer of content or images, ARPANET messaging, and even the familiar "@" sign were used in primitive electronic communication systems. While the technology pioneers who created these systems should be heralded for their efforts, and given credit for their specific accomplishments and contributions, these early computer programs were clearly not email.

Standard histories of the Internet are full of claims that certain individuals (and teams) in the ARPANet environment in the 1970s and 1980s "invented email." These claims have been compiled in the list below. For example, the "@" sign, early programs for sending and receiving messages, and technical specifications known as RFCs, have been claimed to be "email." But as some claimants have admitted, none of these innovations were intended as a system of interlocking parts Inbox, Memo, Outbox, Folders, Address Book, etc. the email system used today by more than 500 million people worldwide.

⁷ Padlipsky, M.A., (ARPANET contributor and author of more than 20 RFC specifications), "And they argued all night...", <http://tinyurl.com/8373917>, last accessed April 7, 2012.

Misconception #1: “Email” was created on the ARPAnet

Fact #1: Email was created at UMDNJ, not on the ARPAnet

This quote, *“Under ARPAnet several major innovations occurred: email (or electronic mail), the ability to send simple messages to another person across the network,”*⁸ is a misuse of the term “email.” The invention referenced here is command-line protocols for transferring text messages, not email as defined to be a system of interlocking parts, such as the 1978 EMAIL platform, the first full-scale electronic emulation of the interoffice inter-organizational paper mail system, defining “email” As the related references show, early workers in the field of electronic messaging had no intention to create a full-scale electronic version of interoffice or inter-organizational paper mail system^{9 10}, and in fact were not even allowed to work on creating an electronic system to replicate “letters”, e.g the interoffice memo.¹¹

Misconception #2: Ray Tomlinson “invented email”

Fact #2: Ray Tomlinson “did not invent email”, he modified SNDMSG for exchanging text messages across computers

This quote, *“Ray Tomlinson is credited with inventing email in 1972. Like many of the Internet inventors, Tomlinson worked for Bolt Beranek and Newman as an ARPANET contractor”*¹² misuses the term “email.” The invention referenced is a program called SNDMSG, which was a set of highly technical computer codes that a sender had to type to transfer a message from one computer to another. Tomlinson updated an existing SNDMSG command program to transmit text strings over a network connection. SNDMSG was not a system of interlocking parts designed for laypersons to transmit routine office communications, i.e. it was not designed to replicate the interoffice paper mail system. As related references show that SNDMSG was not only not email but also just a very rudimentary form of text messaging^{13 14}.

⁸ <http://inventors.about.com/od/estartinventions/a/email.htm>

⁹ *“At this time, no attempt is being made to emulate a full-scale, inter-organizational mail system.”* ---Crocker, David. Framework and Function of the "MS" Personal Message System. Santa Monica, CA: RAND Corporation, December 1977.

¹⁰ *“The level of the MS project effort has also had a major effect upon the system’s design. To construct a fully-detailed and monolithic message processing environment requires a much larger effort than has been possible with MS. In addition, the fact that the system is intended for use in various organizational contexts and by users of differing expertise makes it almost impossible to build a system which responds to all users’ needs. Consequently, important segments of a full message environment have received little or no attention and decisions have been made with the expectation that other Unix capabilities will be used to augment MS.”* --- Crocker, David. Framework and Function of the "MS" Personal Message System. Santa Monica, CA: RAND Corporation, December 1977.

¹¹ *“The idea of sending ‘letters’ using [the Compatible Time-Sharing System] was resisted by management, as a waste of resources.”* --- Van Vleck, Tom. “The History of Electronic Mail,” <http://web.archive.org/web/20110720215402/http://www.multicians.org/thvv/mail-history.html>

¹² <http://www.nethistory.info/History%20of%20the%20Internet/email.html>

¹³ *“The very simple systems (SNDMSG, RD and READMAIL) did not integrate the reading and creation functions, had different user interfaces, and did not provide sufficient functionality for simple message processing.”* --- Vittal, John. MSG: A Simple Message System. Cambridge, MA:

Misconception #3: The “@” symbol equals the invention of “email”

Fact #3: The “@” symbol separates the user name from the domain name

This quote, *“When [Tomlinson] is remembered at all, it is as the man who picked @ as the locator symbol in electronic addresses. In truth though, he is the inventor of e-mail, the application that launched the digital information revolution. And yet the breakthrough he made was such a simple evolutionary step that hardly anyone noticed it till later.”*¹⁵ is a misuse of the term “email”. The invention referenced is the use of the “@” symbol to distinguish two computers when sending a text message. The “@” symbol is not a necessary component of the system of interlocking parts, in some cases “-at” was used, or the “.” symbol as in the EMAIL system.

Some have mistakenly characterized the @ symbol as “underused”. As a point of fact, the @ symbol was the line kill character on Multics¹⁶, an early timesharing system, and created a character conflict for those Multics users¹⁷ trying to use Tomlinson's SNDMSG. As Pogran noted, *“Do folks remember that @ was the Multics line-kill character? We were opposed to Ray Tomlinson's famous (or is it infamous?) selection of @ as the character that separated the user name from the host name in email addresses. Early versions of ARPANET email specs allowed the use of space-a-t-space (i.e., “ at ”) in place of the @ to accommodate Multics (and the mail composition software I wrote used the syntax -at on the command line)”*¹⁸ The @ symbol was “underused” only to the extent that it interfered with some users' host environments.

North-Holland Publishing Company, 1981.

¹⁴ *“I don't believe Ray Tomlinson invented 'e-mail'. And not because of the quibble that we called it netmail originally, though that does offer an excuse to observe that I personally find the term 'e-mail' awfully cutesy, and references to 'sending an e-mail' syntactic slime. Nor because of the semi-quibble that 'mail' had been around intra-Host on several of the Host operating systems since well before anybody realized they were Hosts, though that one has a great deal of abstract 'historical' appeal. No, it's because I have a completely clear memory that Ray wasn't even at the FTP meeting where we decided to add mail to the protocol.”* --- Padlipsky, M.A., (ARPANET contributor and author of more than 20 RFC specifications), “And they argued all night...”, <http://tinyurl.com/8373917>, April 7, 2012

¹⁵ http://socrates.berkeley.edu/~scotch/innovation/inventing_email.pdf

¹⁶ *“Because the @ was a line kill character in Multics, sending mail from Multics to other hosts used the control argument -at instead.”* --- Van Vleck, Tom. History of Electronic Mail, www.multicians.org/thvv/mail-history.html, April 7, 2012.

¹⁷ *“Early versions of ARPANET email specs allowed the use of space-a-t-space (i.e., “ at ”) in place of the @ to accommodate Multics and the mail composition software I wrote used the syntax -at on the command line to begin composing an email...”* --- Pogran, Kenneth, ARPANET contributor www.multicians.org/mx-net.html, April 2012.

¹⁸ <http://www.multicians.org/mx-net.html>

Misconception #4: RFCs demonstrate “email” existed prior to 1978

Fact #4: RFC's were simply written documentation, neither an email computer program nor an email system

This quote, “...email underpinnings were further cemented in 1977's RFC 733, a foundational document of what became the Internet itself.”¹⁹ is a misuse of the term “email” because the RFCs (Request for Comments) and RFC 733 were written documentation not a computer program or code or a system. Moreover, this quote and others such as “In 1977 these features and others went from best practices to a binding standard in RFC 733.” are hyperboles. RFC 733 was drafted in November 1977 and was an attempt at standardization of messaging protocols and interfaces; it should not be conflated as “email underpinnings” with the electronic system of interlocked parts defining the interoffice paper mail system. The RFCs by their own admission²⁰ did not even dictate which features of the interoffice mail process would be included such as the basic components of user interfaces for message creation and reading.

RFC 733 was an attempted standard that was never fully accepted²¹. The very term ‘RFC’ means “Request for Comments”²². It was merely a document and only proposed an interface for message format and transmission, but said little about feature sets of individual electronic messaging or mail systems. As the opening of RFC 733 states:

“This specification is intended strictly as a definition of what is to be passed between hosts on the ARPANET. It is not intended to dictate either features which systems on the Network are expected to support, or user interfaces to message creating or reading programs.”

The RFCs’ authors, by their own admission, clearly state this was not their intention. RFCs were the command-line terminology at best, but not email.

¹⁹ Gizmodo.com, March 5, 2012,

<http://gizmodo.com/5888702/corruption-lies-and-death-threats-the-crazy-story-of-the-man-who-pretended-to-invent-email>, April 7, 2012.

²⁰ “This specification is intended strictly as a definition of what is to be passed between hosts on the ARPANET. It is NOT intended to dictate either features which systems on the Network are expected to support, or user interfaces to message creating or reading programs.” --- Crocker, DH, Vittal, JJ, Pogran, KT, Henderson, DA, Standard for the Format of ARPA Network Text Messages
<http://www.rfc-editor.org/rfc/rfc733.txt>

²¹ “Some of RFC #733's features failed to gain adequate acceptance.” --- Crocker, DH, Vittal, JJ, Pogran, KT, Henderson, DA, Standard for the Format of ARPA Network Text Messages

²² “Prospective users, system designers, and service offering companies often compile lists of potential services [of electronic mail systems]...Nobody claims that these lists are complete, and most often it is admitted freely that these lists represent a first cut synthesis of services offered by other communication facilities. Unfortunately, these lists mostly convey just a number of buzz-words which everybody interpreters in his own fashion.” --- Shicker, P. “Service Definitions in a Computer Based Mail Environment” Computer Message Systems. Ottawa, Canada: North-Holland Publishing Company, 1981. 159-171

Misconception #5: Programs for exchanging messages were “email”

Fact #5: These programs were not email, the full-scale emulation of the interoffice mail system

This quote “By the mid-1970s, other user-oriented e-mail programs arrived on the scene. Two of the more popular examples were ‘Hermes’ at Bolt, Beranek, and Newman, now BBN – a wholly owned subsidiary of Raytheon — and ‘Laurel’ which was in use at Xerox PARC,”²³ is a misuse of the term “email” since programs like Hermes and Laurel were not a system of interlocking parts for emulating the interoffice paper mail system. Laurel was really only one component, a front-end for the independent, lower-level Grapevine messaging platform²⁴. Though Laurel was beginning to incorporate some elements of the interlocked parts such as folders and the inbox, it was still like nearly all messaging systems of the period, heavily dependent on external system resources, and not designed as a system of interlocking parts. Furthermore, internal Xerox documentation (Ibid, pg. 7) shows that independent Grapevine component was still being prototyped with five dedicated servers in 1981, well after Ayyadurai’s EMAIL system had been in use routine communications at UMDNJ for several years. No word of Laurel or Grapevine would be publicly available until 1982, when the Xerox work would be published in the Communications of the ACM²⁵.

Hermes was similar. It was not a system of interlocked parts and not something user-friendly that an ordinary office worker could use. Users had to learn about 20 commands to use it²⁶. Another program PLATO, which was an invention for computer-assisted instruction which some reference as “email”, is one that Vallee’s comments also help to place in context relative to Ayyadurai’s EMAIL system.²⁷ In 1979, all known messaging systems were itemized in RFC 808

²³ Article titled “A history of e-mail: Collaboration, innovation and the birth of a system”

http://www.washingtonpost.com/national/on-innovations/a-history-of-e-mail-collaboration-innovation-and-the-birth-of-a-system/2012/03/19/gIQA0eFEPS_story_3.html

²⁴ “A client program of Grapevine generally obtains services through code...The primary clients of Grapevine are various mail interface programs, of which Laurel is most widely used.” --- Schroeder, Michael D., Andrew Birrell, and Roger Needham. “Experience with Grapevine: The Growth of a Distributed System.” ACM Transactions on Computer Systems 2.1 (1984): 3-23.

²⁵ “...the Grapevine system was first made available to a limited number of clients during 1980.” --- Birrell, A., Grapevine: An Exercise in Distributed Computing, birrell.org/andrew/papers/Grapevine.pdf :272.

²⁶ “In systems like SEND MESSAGE and its successors, such as HERMES, ON-TYME, and COMET, there is no provision for immediate response. A message is sent into a mailbox for later access by the recipient. No automatic filing is provided: any searching of message files requires users to write their own search programs, and to flag those messages they want to retain or erase. The burden is placed on users to manage their own files, and a fairly detailed understanding of programming and file structures is required. Both senders and receivers must learn about 20 commands, and if they misuse them they can jeopardize the entire data structure. Some messages may even be lost in the process.” --- Vallee, Jacques, (a principal investigator of ARPA and NSF messaging projects), Computer Message Systems. New York: McGraw-Hill, 1984.

²⁷ “The notes and memo systems are very similar to the ARPANET message systems, with the coordinators setting up access modes to define who gets in and at what level. A user can either respond to a note or create a new one. On the negative side, the system does not allow review of entries except in serial fashion. New messages generally cannot be sorted, filed, or ignored, although a sophisticated user can ‘transport’ various kinds of notes through buffers. Nor can it apply to them any facility to search for key words, to save information, or to recombine information. This implies a self-limiting feature—if the system were ever used heavily, users would spend all their time managing the flow of information. Clearly, this approach calls for powerful file management functions that had not yet appeared at the time of our survey of the

by the leading researchers who worked at the big universities, large companies and for the military.²⁸ Note, Laurel and PLATO do not appear on this list.

For a review of individual systems of the period, it is best to look at the 1979 RFC 808, which contains a “listing the names of all the [computer mail] systems anybody had ever heard of.”²⁹ The vast majority of the systems such as – MSG, MS, SNDMSG, RD, HERMES along them – all share a common ancestry, and inherit features (and deficiencies) from this heritage. John Vittal tried to distinguish the features and qualities of his MSG message system relative to its antecedents.³⁰

MSG started from a set of primitive message processing operations. Several of the commands listed above were not implemented in the initial version of MSG:

- o Creation: Answer and Forward
- o Motion: Move
- o File operations: Write
- o Marking: Mark and Unmark
- o User-interface and Profile: Koncise, Verbose, and Zap profile
- o Miscellaneous: Print date and Comment

It became clear, even before MSG was first publicly released, that the operations of Put and Delete were so commonly used together that a combining operation (Move) should be included in the functionality of the system. This was the first major modification.

system.” --- Vallee, Jacques, (a principal investigator of ARPA and NSF messaging projects), Computer Message Systems. New York: McGraw-Hill, 1984.

²⁸ “Dave Farber gave a bit of history of mail systems listing names of all the systems that anybody had ever heard of (see Appendix A).... It was noted that most of the mail systems were not formal projects (in the sense of explicitly sponsored research), but things that ‘just happened’.” --- RFC 808, Meeting at BBN, January 10, 1979, <http://tools.ietf.org/html/rfc808>.

²⁹ <http://tools.ietf.org/html/rfc808>

³⁰ Vittal, John. MSG: A Simple Message System. Cambridge, MA: North-Holland Publishing Company, 1981. Print.

COMPARISON WITH OTHER SYSTEMS

Many of the other CBMSs of the time have already been alluded to. The very simple systems (SNDMSG, RD and READMAIL) did not integrate the reading and creation functions, had different user-interfaces, and did not provide sufficient functionality for simple message processing.

On the other hand, two systems came very close to MSG. BANANARD gained acceptance, but seemed to not have the right functionality. The user-interface seemed to be a little too verbose for experienced

users. However, it is important to note that some users still prefer to use BANANARD. These tend to be users who view mail rather than respond to it.

In his conclusion, he was careful to stress the limitations of MSG's as a general communication tool:

However good MSG is, it is not perfect. Its major drawback is that it does not have a directly integrated message creation facility with the same style of user-interface as the rest of MSG. The result is that users are forced to use two separate interfaces for a single conceptual process -- dealing with mail. In addition, the decision to use SNDMSG limits users because it has no way to edit various fields of the message after a specific field has been completely specified, especially address lists.

MSG was at best a rudimentary text messaging client. It was lightweight messaging system, designed to aid users of the TENEX operating system. It served its purpose well, but was crippled by a limited feature set.

Why the USPS May Now Embrace Email

I. EARLIER REASONS FOR NOT EMBRACING EMAIL

The USPS cannot be blamed for its earlier reluctance in the late 1990's to embrace email. The misconceptions and misuses of the term "email", as discussed earlier, were likely the reason. We believe that the USPS associated email to be text messaging (one of the many misconceptions) and not a system of interlocking parts, e.g. an electronic version of the paper-based postal mail system. Had the true origin of email been clear to the USPS, it is likely that the USPS would have realized the relevance of email to its core business. The prevailing misconceptions misled USPS officials' in their earlier decision-making.

II. POSSIBILITIES FOR THE FUTURE

Email is the full-scale emulation of the interoffice, interorganizational paper-based mail system. The origin of email, as discussed, provides a new clarity on why the USPS may now embrace email. The mail system, whether it be paper or electronic, consists of a set of interlocked parts common across both, such as mailboxes (e.g. Inbox), registered mail (e.g. return receipt), security, notification, retries, sorting, address book, transport and delivery, universal accessibility regardless of skill (e.g. no one needs to be a postmaster or a computer scientist to send a paper mail or an email), etc. This fact makes email a natural extension of USPS core service offerings.

Today, in a world of privatized email service providers, where privacy and security are in question, the unparalleled history of law and jurisprudence for managing paper mail, provides, in our opinion, the American public, the opportunity for the USPS to deliver, a privacy-centric and secure platform, where email is provided as a universal civic utility. Clearly, there are many issues that need to be resolved towards meeting such an objective. However, the USPS, is uniquely poised to explore such possibilities, among others service offerings of email.

We look forward to receiving your feedback at: emallab@integrativesystems.org.