**Did V.A. Shiva Ayyadurai Invent E-mail? A Computer Historian Responds**

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Electronic mail, or e-mail, was introduced at the Massachusetts Institute of Technology (MIT) in 1965 and was widely discussed in the press during the 1970s. Tens of thousands of users were swapping messages daily by 1980. Meanwhile, [in 1978](http://www.vashiva.com/innovation/email/vashiva-inventor-of-email.asp), [V.A. Shiva Ayyadurai](http://en.wikipedia.org/wiki/Shiva_Ayyadurai), then a teenager, “designed and deployed” his own electronic mail system, called EMAIL, “for use at [the] University of Medicine and Dentistry of New Jersey.”

Here is the problem: Ayyadurai [claims to have](http://www.historyofemail.net/) thereby “buil[t] the first Electronic MAIL system.” He recently convinced a number of journalists and bloggers to repeat this claim as fact.

The Washington Post has asked me to provide a brief history of the early development of e-mail and an evaluation of Ayyadurai’s claims. I have found press coverage of the controversy shows ongoing confusion regarding several key issues, which I address here.

**What is electronic mail?**

Discussion of electronic mail goes back to the 1950s, when the United States Post Office began to plan its response to what was then called the “electronic age.” On November 2, 1959 the Appleton Post- Crescent’s [Fletcher Knebel wrote that](http://newspaperarchive.com/appleton-post-crescent/1959-11-02/page-6/) then-Postmaster General Arthur Summerfield was exploring the future possibility of “split second electronic mail.” Knebel went on to write that, in this new system, “a letter will cost 15 cents. A nickel to send – and a dime to bribe the electronic brain to forget what it read.”

In this early period, there was no clear dividing line between what we would now think of as e-mail and other forms of electronic message transmission such as fax or even the computerized routing of telex messages in a central switching center. For example, in 1971, advertisements appeared for “Mailgram, the new electronic mail service provided by Western Union and the United States Postal Service.” This was essentially a telegram delivered in the mail for $1.60.

Clearly, we need a more specific definition that captures the essence of computer-based electronic mail as it actually emerged. Here is one I developed in discussion with e-mail pioneers Ray Tomlinson, Tom Van Vleck and Dave Crocker:

Electronic mail is a service provided by computer programs to send unstructured textual messages of about the same length as paper letters from the account of one user to recipients' personal electronic mailboxes, where they are stored for later retrieval.

Electronic mail systems accomplish this in many different ways, and most add additional capabilities such as sorting messages, composing replies and sending very long messages. But this definition separates electronic mail as we understand it today from earlier kinds of electronic transmissions and from alternative media such as chat and text messaging.

**What Was The First Electronic Mail System?**

The earliest [well-documented](http://opinionator.blogs.nytimes.com/2011/06/19/did-my-brother-invent-e-mail-with-tom-van-vleck-part-one/) electronic mail system was part of the Compatible Time Sharing System (CTSS) at MIT. CTSS was one of the first timesharing operating systems. It allowed dozens of people to use a big IBM computer simultaneously, each working on their own files and running their own programs. Its “[MAIL” command](http://www.multicians.org/thvv/anhc-34-1-anec.html) had been proposed in a staff planning memo at the end of 1964 and was implemented in mid-1965 when Tom Van Vleck and Noel Morris, junior members of the institute’s research staff, took the initiative to write the necessary code. Hundreds of people had CTSS accounts and some accessed the system remotely over phone lines from other institutions. As Van Vleck [explained recently](http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6161671) in the March edition of the *IEEE Annals of the History of Computing*, these people used MAIL for a variety of personal and professional purposes.

Similar communications programs were built for other timesharing systems. One of the most ambitious and influential was [Murray Turoff’s](http://www.computer.org/csdl/mags/an/2012/01/man2012010092-abs.html) EMISARI. Created in 1971 for the United States Office of Emergency Preparedness, EMISARI combined private electronic messages with a chat system, public postings, voting, and a user directory. All were stored as entries in a consolidated database.

**When did mail between users of two different computers emerge?**

During the 1960s, it was common to connect a large number of terminals to a single, central computer. Connecting two computers together was relatively unusual.

This began to change in the 1970s with the development of the ARPANET, the ancestor of today’s Internet. The project was funded by the Department of Defense to interconnect the elite computer science researchers it supported at universities scattered across the country. ARPANET provided a test bed on which to experiment with a variety of network applications. Programming them was relatively easy, as the network itself handled the mechanics of sending and receiving data packets.

In 1971, Ray Tomlinson adapted the SNDMSG program -- originally developed for the University of California at Berkeley timesharing system -- to give it the ability to transmit a message across the network into the mailbox of a user on a different computer. Tomlinson worked for Bolt, Beranek and Newman, a technology [company responsible for building the ARPANET](http://www.bbn.com/about/timeline/arpanet), which, by this point, included about two dozen computers, each with many users. For the first time, it was necessary to specify the recipient’s computer as well as his or her account name. Tomlinson decided that the underused @ (for “at”) key would work to separate the two. To the surprise of the ARPANET’s creators, this “network mail” turned out to be its most popular application.

Because different ARPANET sites used different kinds of computers, a network-wide service such as mail could not be established simply by writing one program and asking each lab to use it. Instead, ARPANET users negotiated common standards for electronic mail transmission that would allow the development of compatible e-mail programs for different computers. These standards were published as a series of numbered Requests for Comments (RFCs). Thanks to this process, we have a much clearer picture of the development of ARPANET mail than we do for other early systems.

Capabilities evolved rapidly. Sending a message across the network was originally treated as a special instance of transmitting a file. So, a “MAIL” command was included in [RFC 385](http://www.ietf.org/rfc/rfc0385) in 1972. Because it was not always clear when or where a message had come from, [RFC 561](http://tools.ietf.org/html/rfc561) in 1973 aimed to formalize electronic mail headers (still with us today) including fields such as “from,” “date,” and “subject.” In 1975, [RFC 680](http://tools.ietf.org/html/rfc680) described fields to help with the transmission of messages to multiple users, including “to,” “cc,” and “bcc.” In 1977 these features and others went from best practices to a binding standard in [RFC 733](http://tools.ietf.org/rfc/rfc733.txt).

**Who Used Electronic Mail Before 1980?**

Public interest in electronic mail was rising rapidly during the late 1970s as part of a broader wave of enthusiasm for what was often called the “computer revolution” or “information society.” The social impact of electronic mail was explored in popular books such as Alvin Toffler’s [*The Third Wave*](http://en.wikipedia.org/wiki/The_Third_Wave_%28Toffler%29) (1980) and Starr Roxanne Hiltz and Murray Turoff’s [*The* *Network Nation*](http://www.amazon.com/Network-Nation-Revised-Communication-Computer/dp/0262581205) (1978).

Queen Elizabeth II of England [sent her first electronic mail message](http://www.royal.gov.uk/LatestNewsandDiary/Factfiles/80factsaboutTheQueen.aspx) while [ceremonially opening a building in the British Royal Signals and Radar Establishment](http://www.computerhistory.org/timeline/?category=net) in 1976. Jimmy Carter’s 1976 campaign team used e-mail for internal communication. Gary Thurek, an enthusiastic marketer for the Digital Equipment Corporation sent a [message remembered as the first spam](http://www.computerworld.com/s/article/9046419/Unsung_innovators_Gary_Thuerk_the_father_of_spam) to around 400 APRPANET users in 1978.

**What was new about Ayyadurai’s system?**

In a word, nothing. It was an impressive accomplishment for a teenager, but even  [Ayyadurai’s own description of its capabilities](http://www.vashiva.com/innovation/email/vashiva-inventor-of-email.asp) includes no features that had not already been used in other electronic mail systems.

The [Westinghouse Science Talent Search](http://www.vashiva.com/pdf/vashiva_westinghouse_entry.pdf) entry reproduced on his Web site describes a simple electronic mail system running on an HP/1000 timesharing minicomputer. It served “several hundred users” via terminals hooked into a central computer through modems and other links. CTSS MAIL had used similar techniques to serve a larger user population. Ayyadurai’s [diagram of the system](http://blogs.smithsonianmag.com/aroundthemall/2012/02/a-piece-of-email-history-comes-to-the-american-history-museum/), as posted on the Smithsonian’s *Around the Mall* blog, seems to show two computers exchanging messages (the lower left portion is illegible on the original), but this was also far from novel.

The Smithsonian itself has [explained that](http://americanhistory.si.edu/news/pressrelease.cfm?key=29&newskey=1465), in accepting Ayyadurai’s offer of the materials describing his program, the museum did not endorse his claim to have “invented” e-mail. The system will still be of interest to historians as a representative example of a low-budget, small scale electronic mail system constructed from off-the-shelf components, including the HP/1000’s communications, word processing, and database programs.

Ayyadurai [has claimed](http://theemaillab.org/vashiva_ayyadurai.asp) that his system was the first to be inspired directly by interoffice paper mail, or to be usable by office workers. As early as September 13, 1976, Business Week ran a story headlined “When the Interoffice Mail Goes Electronic,” profiling this new field. By 1980, electronic mail systems aimed at the office environment were readily available from companies such as DEC, Wang, and IBM. They had [even been developed](http://www.computerhistory.org/revolution/networking/19/382/2130) for early personal computers such as the Apple II.

Xerox is widely regarded as having created the most advanced office information technology of the era. Researchers at its PARC laboratory created many of the key technologies of later personal computers, including Ethernet, laser printing, and the graphical user interface approach used by Windows and other modern operating systems. [By 1978](http://www.bitsavers.org/pdf/xerox/alto/Whole_ALTO_World_Newsletter_1977-1980.pdf), the year Ayyadurai developed his EMAIL system, the PARC e-mail software, Laurel, ran on the user’s local computer, was operated with a mouse, and pulled messages from the PARC server to a personal hard drive for storage and filing. Laurel, [as you can see in this video](http://www.youtube.com/watch?v=M013_1TQ_5g) clip [from the 1996 PBS documentary “Triumph of the Nerds,”](http://www.pbs.org/nerds/part3.html) split the screen into several window panes to simultaneously display the text of one message and a list of other messages.

Laurel set the template for modern e-mail client programs such as Outlook Express. An even more advanced e-mail capability was commercialized with the [Xerox Star](http://en.wikipedia.org/wiki/Xerox_Star), launched in 1981.

**What is the nature of Ayyadurai’s claim?**

The most striking thing about Ayyadurai’s claim to have “invented” e-mail is how late it comes. In the late 1990s, when he led a company focused on automating e-mail replies, [his Web site](http://web.archive.org/web/20001018135705fw_/http%3A/www.dremail.com/flash/dremail/index.html) called him merely a “pioneer in E-Mail technology.”

The delay, from what I can tell, was not a result of false modesty. Ayyadurai, author of *[The Internet Publicity Guide: How To Maximize Your Marketing And Promotion In Cyberspace](http://www.amazon.com/Internet-Publicity-Guide-Marketing-Cyberspace/dp/1880559609)*, describes himself as the “[world's foremost authority on integrating systems of medicine](http://www.vashiva.com/systems-biology/vashiva_siddha.asp)” and [creator](http://www.integrativesystems.org/research/projects/sysviz/overview/) of the discipline of [Systems Visualization](http://en.wikipedia.org/wiki/Systems_visualization). [He has claimed to be](http://en.wikipedia.org/wiki/Special%3AContributions/Vashiva)  an MIT faculty member, even though his actual job of [lecturer](http://web.mit.edu/policies/2/2.3.html#sub8) does not give him [faculty status](http://web.mit.edu/policies/2/2.1.html). At least some of the many labs, institutes, and initiatives he claims to lead appear to have little substance beyond his own Web pages. For example, his [MIT Email Lab](http://theemaillab.com/home.asp) was launched [February 2012](http://www.networksolutions.com/whois-search/theemaillab.com) on one of his private Web sites. Unusually, for a laboratory, its Web page mentions no MIT faculty, research activities, facilities, grants, or working papers. It does prominently feature his descriptions of e-mail history, his definitions of e-mail, and press clippings. Around March 12, the site ceased to make any mention of an affiliation with MIT, except for [at least one reference in his biography](http://theemaillab.org/vashiva_ayyadurai.asp) featured on the Web site.

Ayyadurai registered the domains historyofemail.net on [July 2, 2010](http://www.networksolutions.com/whois-search/historyofemail.net) and inventorofemail.com on [July 5, 2010.](http://www.networksolutions.com/whois-search/inventorofemail.com) That was around the time the description “Inventor of the World’s First E-Mail System” [appeared on his existing Web site](http://web.archive.org/web/20100616153900/http%3A/www.dremail.com/). Somewhere along the road, [according to the Post](http://www.washingtonpost.com/blogs/omblog/post/origins-of-e-mail-my-mea-culpa/2012/03/01/gIQAiOD5kR_blog.html), he hired a public relations firm. On Aug. 30, 2011 he registered at Wikipedia and set about [editing the entry on “email](http://en.wikipedia.org/w/index.php?title=Email&oldid=447670028).” Editors repeatedly blocked his edits, and he made [angry pleas](http://en.wikipedia.org/wiki/User_talk%3AVashiva) for them to stop. He was [soon barred](http://en.wikipedia.org/w/index.php?title=Special:Log/block&page=User%3AVashiva) from making further changes.

A collection of [press clippings](http://www.vashiva.com/news.asp) on his Web site show that Ayyadurai had more success in convincing bloggers of his version of the history of e-mail. An August 2011 blog story published by “The Next Web” celebrated the [29th anniversary of his invention of email](http://thenextweb.com/shareables/2011/08/30/today-is-the-30th-anniversary-of-email-as-copyrighted-by-this-man/) “as copyrighted by [Ayyadurai]” and was picked up around the Web, including [the Huffington Post](http://www.huffingtonpost.com/2011/08/30/email-turns-29-infographi_n_941699.html?ncid=edlinkusaolp00000003). Fast Company’s Web site was soon [reporting](http://www.fastcompany.com/1780716/can-technology-save-the-us-postal-service) the advice of “the man who designed email as we know it” to the United States Postal Service. TIME’s TechLand posted a [lengthy online interview](http://techland.time.com/2011/11/15/the-man-who-invented-email/) with “The Man Who Invented Email.” The Washington Post was no more credulous than these other publications. But the story’s transition from blog to print brought it greater scrutiny and, ultimately, an [apology from the newspaper](http://www.washingtonpost.com/blogs/omblog/post/origins-of-e-mail-my-mea-culpa/2012/03/01/gIQAiOD5kR_blog.html)’s Ombudsman.

**What influence did Ayyadurai’s work have on later systems?**

As far as we know, none.

Nothing in the portfolio of evidence on Ayyadurai’s Web site suggests that his system was widely known or that its technical details were ever published in a peer-reviewed or academic journal or other widely-distributed publication. It is therefore hard to see how the world would have found out about any novel features it possessed. His strongest evidence for impact is the publication of the name of his entry in the awards booklet of the 1981 Westinghouse Science Talent Search and a [1980 report](http://www.vashiva.com/innovation/email/inv01.asp) in the West Essex Tribune, which described his “design and implementation of [an] electronic mail system.”

Winning the Westinghouse competition, or even being a national finalist, might attract attention but, in fact, he was merely awarded “honors” -- a distinction shared by [12 youngsters in New Jersey](http://www.vashiva.com/innovation/email/inv02.asp) alone that year. The West Essex Tribune did no single out anything about the system as novel, but did call it sophisticated and useful. The publication also did not explain the concept of an electronic mail system to its readers, most likely because many of them were already familiar with the concept.

**What about Ayyadurai’s “first U.S. copyright on email”?**

Journalists reporting on Ayyadurai [frequently confuse](http://freedomforip.org/2012/02/23/does-wapo-really-believe-shiva-ayyadurai-invented-e-mail-how-confusion-over-ip-can-affect-the-real-world/) the kinds of intellectual property protection provided by copyright, patent, and trademark. For example, Callie Crossley of WGBH erroneously stated on March 12 that he “[owns the copyright to the term email, and the concept](http://www.wgbh.org/programs/The-Callie-Crossley-Show-855/episodes/Mon-31212Innovation-Hour-USPS-Goes-Electric-36918).” Patents protect inventions and will be awarded only to the initial creator of an invention. So, being awarded a patent reflects at least a preliminary judgment of novelty. Trademark protection can be applied to a new word or phrase to enforce exclusive commercial use. Ayyadurai does not hold a patent for the invention of “EMAIL,” or a trademark on the word.

I also find that Ayyadurai has contributed to this confusion. His [history of e-mail states](http://www.vashiva.com/innovation/email/vashiva-inventor-of-email.asp) that “August 30, 1982 marks the 29th Anniversary of EMAIL, marked by the formal issuance of the copyright for ‘EMAIL’ by the US Copyright Office.” He implied that copyright to his program gave him ownership of its title when he wrote that the Associated Press must have been “unaware of U.S. Copyright for ‘EMAIL’” when it decided to stop hyphenating “e-mail” last year.

Under the [Copyright Act of 1976](http://en.wikipedia.org/wiki/Copyright_Act_of_1976) Ayyadurai would have owned the copyright to his program whether it was registered or not. Copyright prevents anyone from duplicating his code without his permission. All that the “[Certificate of Copyright Registration](http://www.vashiva.com/innovation/email/inv03.asp)” featured prominently on Ayyadurai’s Web site proves is that in 1982 he mailed documentation of his work, a fee, and a handwritten form to the U.S. Copyright Office. The office deposited his payment and [filed the printout](http://cocatalog.loc.gov/cgi-bin/Pwebrecon.cgi?v1=1&ti=1,1&Search%5FArg=Ayyadurai&Search%5FCode=NALL&CNT=25&PID=8jQpsvzQt6BI8UuVSH2tPU7CWtM&SEQ=20120304224043&SID=1), then stamped the form, added a registration number, and mailed it back to him.

This did not reflect a judgment that the program was in any way novel, and it provided him with no rights over the concept of e-mail or the word “e-mail.” Nobody can copyright a word. Copyright protection [explicitly excludes ideas, titles, and short phrases.](http://www.bitlaw.com/copyright/unprotected.html) So the code of Ayyadurai’s program is covered by copyright, but not its title of “EMAIL.” Consider a musical example. Lou Reed wrote a song called “Rock and Roll.” So did Led Zeppelin. Both songs were copyrighted by their respective publishing companies. Neither of them owned the term “Rock and Roll” as a result of writing these songs. Neither of them had to show that they had invented rock music to receive the copyright. Neither of them coined the phrase (that was 1950’s DJ [Alan Freed](http://rockhall.com/inductees/alan-freed/bio/)).

**Did he create the word “email”?**

“Electronic mail” was widely discussed in the 1970s, but was usually shortened simply to “MAIL” when naming commands. However, the Oxford English Dictionary (3rd edition online) gives a June 1979 usage of “e-mail,” so Ayyadurai was not the first to use this contraction in print.

The program name “EMAIL” is not mentioned in the 1980 newspaper article on Ayyadurai but does appear on the documentation he submitted to the Smithsonian and in his [1981 Westinghouse competition submission](http://www.vashiva.com/pdf/vashiva_westinghouse_entry.pdf). By that year, the name EMAIL was already used by [CompuServe](http://en.wikipedia.org/wiki/Compuserve). Compuserve had offered timesharing computer access and electronic mail to businesses for years. In 1979 it launched a new service, aiming to sell otherwise wasted evening computer time to consumers for the bargain price of roughly $5 an hour. A trademark application (later abandoned) that CompuServe made for “EMAIL” listed 1981/04/01 as its first use by the company, which fits with this [May 1981 message](http://groups.google.com/group/fa.human-nets/browse_thread/thread/d59645da6fd2ff3b/602219cd306c10d7?hl=en&q=email#602219cd306c10d7) mentioning CompuServe’s “EMAIL program.” By January 1983 “Email™” (for trademark) was [part of CompuServe’s advertising campaign](http://blog.modernmechanix.com/2008/05/23/compuserve-trademarked-the-word-email/).

For years, CompuServe users could [type “GO EMAIL”](http://adsabs.harvard.edu/full/1984IAPPP..17...11H) to read their messages. Whether Ayyadurai or CompuServe was the first to adopt “EMAIL” as a program name, it is clear that CompuServe popularized it.

**Who invented e-mail?**

Ayyadurai is, to the best of my knowledge, the only person to have claimed for him or herself the title “inventor of e-mail.”

E-mail has no single inventor. There are dozens, maybe hundreds, of people who contributed to significant incremental “firsts” in the development of e-mail as we know it today. Theirs was a collective accomplishment, and I have found theirs to be a quiet pride (or at least it was until recent coverage of Ayyadurai provoked them).

E-mail pioneer Ray Tomlinson [has said](http://www.nethistory.info/History%20of%20the%20Internet/email.html) of e-mail’s invention that “Any single development is stepping on the heels of the previous one and is so closely followed by the next that most advances are obscured. I think that few individuals will be remembered.” As far as I know, none of them have hired public relations firms to remedy this.

However, there are billions of us who clearly didn’t invent email. V.A. Shiva Ayyadurai is one of the billions of people who didn't invent email. No hedges or qualifiers needed.

**Where else can I read about the history of e-mail?**

The history of ARPANET electronic mail, and its evolution by the 1980s into Internet electronic mail, is by far the best documented facet of email’s history. It is clearly told by historian Janet Abbate in her book, [*Inventing the Internet*](http://www.amazon.com/Inventing-Internet-Inside-Technology-Abbate/dp/0262511150/ref%3Dsr_1_1?s=books&ie=UTF8&qid=1331063146&sr=1-1), for a general audience in Katie Hafner’s readable [Where Wizards Stay Up Late](http://www.amazon.com/Where-Wizards-Stay-Up-Late/dp/0684832674/ref%3Dsr_1_2?s=books&ie=UTF8&qid=1331063146&sr=1-2) and in detail in Craig Partridge’s paper [“The Technical Development of Internet Email.”](http://www.computer.org/csdl/mags/an/2008/02/man2008020003-abs.html)

Developments at Xerox PARC are also well documented. The 1978 Laurel manual is included in this file of documentation for the Alto system. The story of PARC, and the commercialization of its technology in the Star, is told in Michael A. Hiltik’s book [*Dealers of Lightning*](http://www.amazon.com/Dealers-Lightning-Xerox-PARC-Computer/dp/0887309895).

Less has been written on pre-APRANET electronic mail or on more recent developments. I summarized the development of electronic mail as a commercial product in my chapter “Protocols for Profit: Web and E-mail Technologies as Product and Infrastructure" in the 2008 book [*The Internet and American Business*](http://www.amazon.com/Internet-American-Business-History-Computing/dp/0262514818)*.*