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## **E-mail addressing: the worst of all worlds?**

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### Abstract

This memo is a critique of Internet e-mail addressing, with particular reference to its suitability for use in a general purpose interpersonal communication medium as opposed to its present use largely within a restricted community.

The critique focusses on the differences between e-mail addresses and other forms of addressing with which very many lay people are intimately familiar.

This memo does not offer any solutions to the issues raised; rather it is hoped to provoke some debate on the matter. The author would be particularly interested in views from those whose natural language does not use the Roman (western) alphabet.



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## [1. Introduction](#)

E-mail is a communication technology which has grown out of a scientific and technical community of computer users, many coming from an American or Western European cultural background. It is relatively recently that the use of communication using electronic computers has been extended to a population who are not computer technicians. Even today, e-mail is used mainly by corporate information workers and computer users.

Many of us who can and do use e-mail on a regular basis see it as a relatively cheap, efficient and powerful tool for communicating with other people around the world. Quite naturally, we would like to see many more people avail themselves of the considerable advantages of this type of technology.

Many members of the general population are excluded from making effective use of e-mail as a means of communication. Identifiable reasons for this are:

- o The cost of equipment and facilities required.
- o The level of apparently spurious technical knowledge needed to operate the system.

Ongoing developments seem to be very effectively driving down the costs, and efforts on many fronts seem to be reducing the requirement for technical knowledge (user interface developments, system auto-configuration, network appliances, special-purpose systems, etc.)

But the area of addressing presents a continuing conceptual barrier to e-mail use for non-technical users. This thesis is explored in the remainder of this memo.



## **2. Human addressing techniques**

There are (at least) two techniques for addressing which are widely used and understood by the non-technical population:

- o Postal addresses
- o Telephone numbers (including fax numbers)

Postal addresses are often applied by hand (and are always capable of being applied by hand), and may employ an arbitrary range of symbols.

Telephone numbers are generally applied by direct entry on a telephone device, as a sequence of numbers and, possibly, star ("\*") and hash("#") characters.

(By "applied", it is meant here that this is how the addressing information is specified to the communication system uses the address to locate the addressee.)

In either case, the equipment needed to apply the address is very compact and simple to operate (a pen, or a numeric keypad).

In each case, the system of addressing works well and with international scope. In the case of hand-written postal addresses, the full range of local symbols (e.g. accented letters, non-Roman alphabets, ideograms) may be used so the address can be expressed in a form which is familiar to the user. In the case of telephone numbers the address is reduced to a very small set of symbols so that (at worst) there are only 12 new symbols that the user must learn in order to use and apply the address.

## **3. E-mail addressing issues**

What are the requirements for an e-mail address?

- o It has to be applied by the sender of a message.
- o It also has to unambiguously specify the e-mail destination to a purely mechanical communication system.

The first requirement suggests that the mechanism for applying an address should be very simple for a human user. The second suggests that address entry must in some way interface directly to the communication system.

So where does Internet e-mail addressing fall short? It is the author's contention that it is in the compromise between an address

which is meaningful to a human user, and the requirement for machine-usability. SMTP e-mail addresses are defined in [RFC 821](#)

and [RFC 822](#) [1,2] as consisting of a sequence which may contain any of the 128 US-ASCII characters 0-127. The result is an address which is often quite long, only partially meaningful to human users, yet generally requires a relatively bulky and complex item of equipment (an alphanumeric keyboard, typically with more than 80 keys) to apply the address.

While e-mails are mostly text messages generated on computers by correspondents used to working with the Roman alphabet, the requirement for a alphanumeric keyboard to enter the address is not an issue, as it is also needed to prepare the message. But as one looks to multimedia messaging in which typed text may not play a part (e.g. fax images, photographs, voice, video, etc.) it is not difficult to imagine a variety of messaging terminals for which an alphanumeric keyboard would have no part to play in preparing a message.

If the alphanumeric keyboard were a truly user-friendly device, its complexities might be forgiven. But for a large majority of the world's population it would be as alien as hand-written Chinese characters to a typical American or European.

The essence of the problem, then, is that the character set used for Internet e-mail addressing, while it may have suited the community for whom e-mail was originally developed, is both too large and too limited.

#### **4. Conclusions**

The Internet e-mail addressing scheme has been presented provocatively as "the worst of all worlds" by virtue of the fact that it has neither of the virtues of two current widely-used addressing schemes: postal addresses (easy for users to understand) or telephone numbers (easy for users to enter mechanically).

This is not intended to belittle the inspired seminal work of the Internet e-mail system designers. Internet e-mail has provided sterling service to the community for which it was designed, and many more besides. In those days, nobody really considered that the Internet would grow to become a truly global communication system accessible to all. Just as the Internet community have had to review the fundamental IP addressing system to deal with unexpected levels of adoption, maybe it is also necessary to review e-mail addressing mechanisms to achieve a scope of deployment not anticipated by the original design.

The most obvious example of a widely adopted addressing scheme which is accepted by an automated communication network is

telephone numbers. They are easy to enter, reasonably compact and provide unambiguous call routing.



It seems that there are two approaches which might be adopted: to move toward a minimal addressing scheme similar in style to the telephone number plan, or to move toward a truly user-friendly addressing scheme which can express the full variety of addressing that users are used to dealing with, and develop technologies (e.g. OCR, voice recognition) to apply such addresses using simple, compact terminal equipment.

This memo has concentrated on SMTP e-mail addresses, but similar arguments might also be applied to the system of Universal Resource Identifiers (URIs) employed by the World Wide Web. URIs are defined in [RFC 1630](#) [3] to contain a substantial subset of US-ASCII characters. Even allowing for hexadecimal coding, characters are limited to an 8-bit character set (2 hex digits). Other electronic messaging systems may also be seen to suffer from similar restrictions.

## **5. Security considerations**

Security considerations are not discussed in this memo.

## **6. References**

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