Further Speculations on Data Transmission

Supposing that the most important and biggest traffic in data is between consoles and computers, then the network's facilities should be designed primarily for this traffic. Other kinds of traffic could use the system, but with slightly reduced efficiency.

The data will be coded as 8 bit characters in a standard code. The purpose of this note is to suggest how the user (man at one end, computer at the other) should instruct the communication system what he/it wants.

In the absence of other constraints, the method should be designed to be simple and natural to the user, and here the way in which he is used to instructing the operating system of the computer should be taken into account. There is no standard yet, indeed some on-line services such JOSS have been devised so the user need not be aware of an operating system. We can however use the sort of arrangement common to several well known multi-access systems including Project MAC.

The instructions to the system are called 'commands' and consist of the name of the command followed by parameters. In these interactive systems, the user is told when it is up to him to write a new command. In transitional systems he should normally be able to write fresh commands at any time when it is (syntactically) allowed.

If mathematical conventions are employed, the command would look like:

to (103948, what is the price of I.C.I. shares?)

where "to" is a primitive command that sends to subscriber 103948 the message which follows the comma.

I would suggest that the CRLF character is the signal to send a message, which consists of one line of typing. If the line exceeds the maximum allowed message size (100 characters?) it is sent with an indication that more is to follow from the same source.

Since the message may consist of commands to a computer system and these may ask to input data, enclosed in the parameters of the commands, and the data may include commands to the computer (such as input/output commands) and commands to the transmission network for

use in the reply, the bracketting structure may well be difficult to follow. Also, if there was an error in transmission, the effect could be odd.

In the use of commands mixed with instructions in a program, it is necessary to distinguish them. This can be done, as in ALGOL, by underlining, which avoids the need for reserving certain words from use as identifiers.

Suppose now, that commands to the computer are simply underlined, it may be best to have another non-escaping key giving a distinctive underline (double or wavy) to distinguish commands to the transmission system. Thus a command to input and file the number 1.234 under the name "*x*" might be:

to (103948, input (*x*, 1.234))

A helpful transmission system would allow a given console to establish special conventions for itself, within limits. Thus, if all transactions were done with a certain computer at address 103948, the above command could be abbreviated to input (*x*, 1.234), the destination being understood.

It might be necessary to restrain the use of double underlined commands as data in programs, because of the danger of misfunction. A special convention would be needed, which would restore the double underline at the destination.

Functions which might be called up by commands to the transmission network include:

1. Establishment of a fixed destination until further notice, to avoid unnecessary double-underlined commands.

2. Release of 1.

3. Request for source number and/or brief name for a particular message received.

4. Ditto for all messages. If a computer receives all its messages in sequence on one channel, with identifying numbers, the transmission system is carrying out most of the function of the input multiplexer used in some multi-access systems.

5. Use of a brief name as well as a number to ensure accuracy of aim of messages.

6. Reply to the last message received without giving the destination (but it may be printed as a check).

7. Local names for the destinations corresponding to frequently used services.

8. Universal name for nation-wide services.

9. Recording of messages by the system for legal verification, when requested.

10. Recording of message for later transmission if the called subscriber is disconnected.

11. Sending of a message two ways or return of a confirmation of receipt, on request, provided that the destination has a suitable terminal, for example is programmed to reply with a repeat.

12. Addition of the time of sending to a message, if requested.

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