MEMORANDUM

To: Ralph Alter, John Cole, Frank Heart, Dave Walden, Ben Barker
Joel Levin
From: Bernie Cosell

Subject: PDP-1 Software for the Net Handler

Date: December 29, 1971

I have taken a pass at designing the software to interface the PDP-1 to the network. I have kept several criteria in mind through this design. The two principle ones are that the software changes should be fairly easy and quick to make and that there's no need for the PDP-1 to be particularly speedy. I have, hence, generated a design which, though inefficient, will be very simple to implement.

All communications to and from the Net will occur through a user program, the Net Handler. The Exec will be modified to do nothing more complicated than pass information exactly as it comes to the Net Handler and take anything the Net Handler gives it and jam it out to the Network. In turn, the handler will look at almost none of the data going to or coming from the Network but will act as intermediary between the Fastrand and the Network. Hence for a program to communicate with the Network it would place any data it had for the Network onto the Fastrand where the handler would take it and push it out and would be monitoring the input queues waiting for responses. It would have to handle all of the responses, such things as destination dead and incomplete transmission -- it would be responsible for doing all those things itself. The Exec will have six iots added to it

The IOT's:

GETNET	Declares Process to be the "Net Handler"
RLSNET	Declares the caller to no longer be the Net Handler (the PDP-1's ready line will be down if there is no Net Handler)
NETIN	Take a message from the Network. Three returns: 1) you've got one, 2) error (ready line twitched), and 3) nothing coming.
NETOUT	Send a message out to the Network. Two returns: 1) the message has been sent, and 2) input from Network interrupting.
NETPOK	Wake up the handler. Used by programs to inform the Net Handler that there is output waiting to go to the Network.

NETSLP — Put the Net Handler to sleep. This would be a clock hang, except it will test the "NETPOK" flag. Similar to ADDLP and GETLP

The Net Handler will be a small user program whose job will be to monitor two things: an item on the drum and the input side of the Network. Whenever anything comes in over the network the network handler will take it in and add it to the "input queue". Whenever a message appears in its output list it will take that message and send it to the Network. It will discover whether there is anything on its output list or anything coming from the Network by doing a NETSLP, from which it will get woken up if either something is added to its output list (and a NETPOK is done), or if some data begins coming in from the network. The net handler will be transparent to all data going to the Network, and almost all of the data coming from the Network. The only messages from the net that the handler will do anything about itself are No Ops, which it will throw away, and "IMP going down". All other messages will be taken in and immediately put onto the input queue. Any program desiring to use network must look for its own responses in the queue. It must process its own RFNMs, LINK TABLE FULLs and any other sort of error message which pertains to it.

Whenever the net is "on", that is, there is a net handler, there will also be a "cleanup" program running. This program will have the job of monitoring the input queue and expunging messages which are too old or which have been marked by some other user program as being deletable.

I have attached my initial designs for the formats of the Fastrand queues.

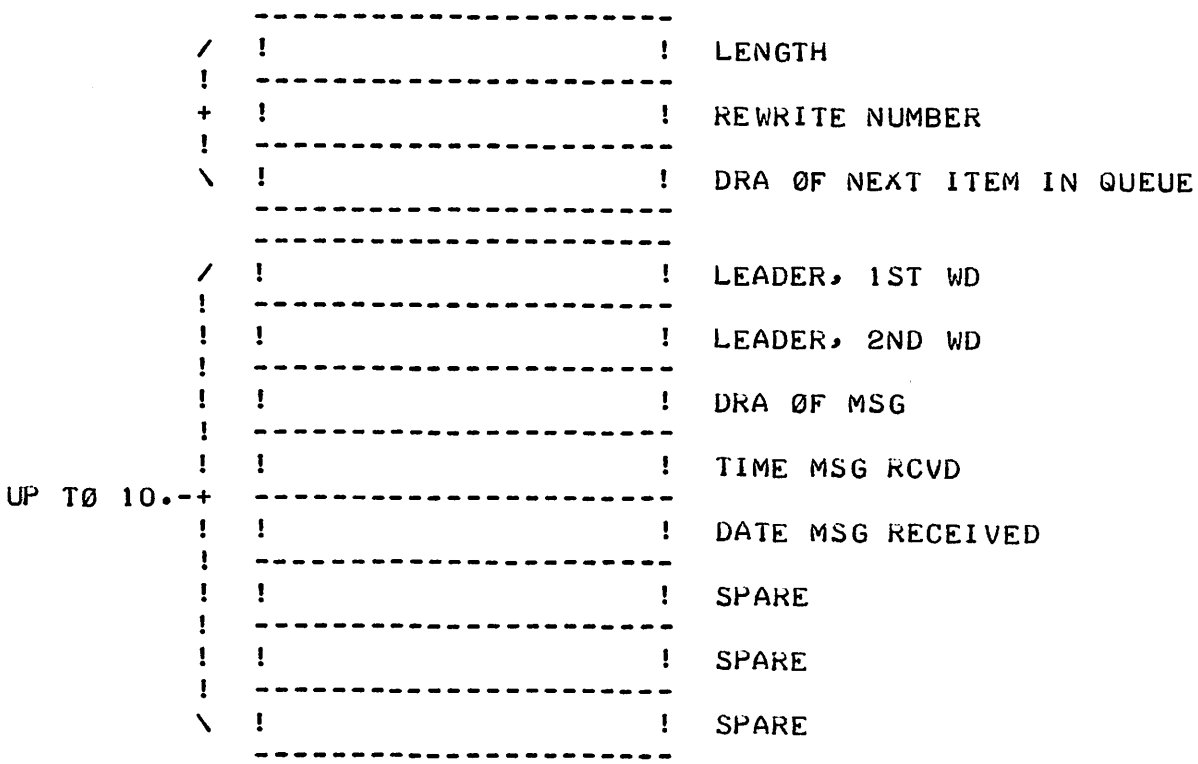
I have made an estimate of the manpower required for the software effort:

Regain familiarity with PDP-1 Exec & code new IOTs	1 man week
Reassemble and put up new Exec	1 man week
Write and debug Handler and Cleanup Programs	2 man weeks

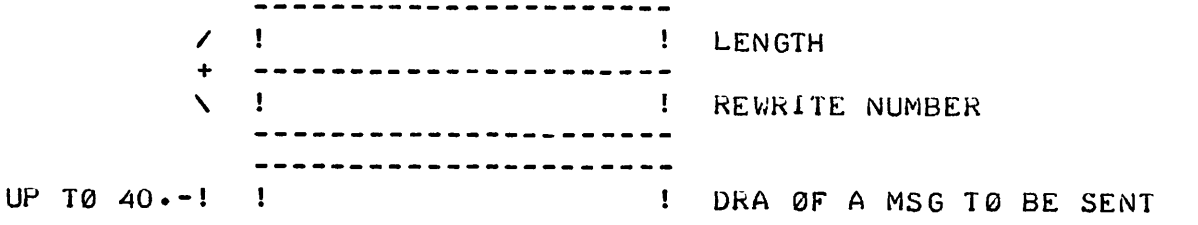
My guess is the software effort will require about 1 man month.

THERE ARE THREE INVARIANT NUMBERS FØR THE QUEUES:
DRA ØF FIRST ITEM ØN INPUT QUEUE
DRA ØF LAST ITEM ØN INPUT QUEUE
DRA ØF ØUTPUT LIST

FØRMAT ØF ITEMS ØN INPUT QUEUE:



ØUTPUT LIST FØRMAT



MESSAGE FØRMAT: