

## Information on Printing through COM

Last week Jim Norton asked me to provide Colonel Russell and Susan Lee with information about printing a document of about 200 pages and without special formatting problems through COM. An earlier message supplied cost information. This memo provides backup information.

## Who Does what,

The only people really experienced with COM these days are Dean Meyer and I. We will be glad to do that part. Susan Lee or any really experienced NLS user could also do it with a little help and study of the Output Processor Users' Guide, or some combination. If we do formatting on the West Coast or collaborate with Susan it may take a little longer because of the need to communicate your reaction to drafts.

## Size

Documents printed via COM in graphic arts type faces come out in about in 40% fewer pages than the typed or line-printer drafts. Cost should be calculated accordingly.

## Format:

The least time-consuming course is to create the layout by choosing one of our ready made formats for which a program exists to create the layout. Programs insert output processor directives much more quickly than humans and with fewer errors. We have recently made some additions and small changes in the format programs and sent tapes to DDSI so they can make new samples (hjournal,24020,). As soon as we get proofs I will send them to Susan.

If you need to insert directives by hand to get the layout you want, Susan can work from the Output Processor's Usersguide and should feel free to ask questions.

## Illustrations:

If you have figures, you must set aside blank space of the correct size and shape so they may be added later in the printing process. Use the GYBL or GYBS directives. You have to do that by hand.

## Production Cycles.

The first time through I would try a run off a few pages, say 10, to see if the formatting works as you expected and looks right when you actually see it. Such a run need not be with finally approved copy.

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When you have set up the directives, output it as described in (journal, 12214, "Output;") [Page 78 of the hardcopy Output Processor Users' Guide]. Ask DDSI to mail copy flow proofs to you.

6b

Note the following about sending tapes to DDSI:

6b1

We normally ask ISI to put files onto tape outside their normal business hours.

6b1a

DDSI works weekends and will pick up tapes on weekends.

6b1b

ISI now has two categories of Login, Login and GLOG. Writing on Tape requires GLOG which in our case works just like login except you begin with G.

6b1c

Most of the operators at ISI seem to know the scenario.

6b1d

The telephone number of DDSI has changed to (213)477 1401. The telephone company seems to shuffle numbers pretty fast down there and has given the old number to a McDonald's hamburger stand.

6b1e

Anyone can do the process, but only Dean and I have actually done it. Either of us will be glad to do it if you don't want to.

6b1f

When you have seen the first proofs, repeat the trial cycle or go on to process the whole file. In either case, again ask DDSI for copyflow proofs.

6c

DDSI makes a microfilm copy which is the source of the copyflow proofs. When you have a copyflow proof that satisfies you, call them ask them to either print for you or make plates, normally "KP-5's". Plates are the things that are mounted on the press in offset printing.

6d

Printing:

6e

At this point you can do one of three things:

6e1

Ask DDSI to send you the plates and print them at your local printer. If you have illustrations this is the course I suggest.

6e1a

Ask DDSI to send ARC the plates and we can print them through SRI's facilities.

6e1b

Ask DDSI to vend the printing job in LA. They assert they

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are willing to do that with a quote for each job, but we have not tried it.

6e1c

## Cost:

7

Covered in an earlier message. See also (journal, 23549,) for various DDSI prices.

7a

## Time:

8

When things are going smoothly we get proofs from DDSI in 3-5 working days depending on how weekends fall (DDSI and we work on weekends but transportation doesn't.) But, with accidents and your time to study the proofs I would allow a week. That means the whole cycle will probably take a month excluding lengthy delays on your part to study proofs or make changes. Three weeks to six weeks is a reasonable PERT range.

8a

## Schedule for the Introduction of NLS-8 to Office-1 Users

This document is sent to you for your review and comments. We hope it falls easily into your plans. If you have comments, please let me know this week. I'll check later in flight so to speak. I would like to know from those of you who care, what way you think is best for your users to get this message...directly? or from each architect forwarding the schedule to local people? Jim

## Schedule for the Introduction of NLS-8 to Office-1 Users

As most of our Office-1 users already know, the ARC Development staff has been working for many months on a new version of NLS, now known as NLS-8. It is nearly ready for release by the ARC Applications group to all NLS users at Office-1, after extensive trial use and bug-seeking by our staff. Also, an advance version of NLS-8 has been used at Office-1 on a trial basis by the Workshop Architects from each user organization, since early September.

1

On Monday, October 15th, we will bring up our most current, checked-out version of NLS-8 for all Office-1 users as the start of a two-week invited preview period.

2

NLS-8 will be accessed as "PREVIEW" until November 1st. At that time it will be accessed as "NLS."

2a

Old NLS (NLS-7), now in use, will continue to be accessed as "NLS" until November 1st. At that time, it will be accessed as "OLDNLS" until November 15th, at which time it will be removed from active use at Office-1.

2b

NLS-8 documentation is expected to be ready and delivered to each site's Architect by October 15th.

3

This will include an NLS-8 cue-card, Primer, command Summary, and Old-to-New Command Listing. In addition, several teaching aids for NLS-8 are being developed.

3a

NLS-8 questionMark and HELP features will also aid users in adapting to changed and added features.

3b

Training sessions at those sites needing changeover assistance are being planned.

3c

We will direct the Office-1 users' attention to this schedule by a login message on Monday October 7th, to be repeated for several days starting the day PREVIEW becomes available for general use.

4

Our aim is to introduce NLS-8 to all users, while providing access to NLS-7 so as to permit users who now rely on NLS-7 in their daily work to learn NLS-8 while still being able to function in demanding situations with their knowledge of NLS-7. It is important, however, that we minimize the period of running both versions, for this situation increases the load on the system.

5

We hope this schedule will encourage as smooth a transition as possible for both experienced and new users.

6

Trip Report - Future Management and programs of the Arpanet

We are backing up a bit to get a good head start! Please disregard journal item 24093 received yesterday - it inadvertently contained an initial file instead of the journal item file - Jake and Adrian

## Trip Report - Future Management and programs of the Arpanet

At the end of the Arpanet Book Meeting (HJOURNAL, 24066, 1:w), Dr. Licklider made these brief comments about the future of the Arpanet:

1

## I. FUTURE MANAGEMENT

1a

ARPA is now considering transferring the management of the network to either RADC (Rome Air Development Center) or DCA (Defense Communications Agency). ARPA has not formally chosen either of these nor ruled out other possibilities, and neither of these agencies has agreed to take over the management task. However, there is a good possibility that one or the other of these agencies will eventually take over management of the Arpanet.

1a1

Arpa will continue to fund research on the network as it has in the past, and the Net will be used for about the same uses as the present.

1a2

## II. FISCAL 76 BUDGET

1b

Licklider sees the Fiscal 76 budget being funded at roughly the same amount as Fiscal 75.

1b1

## III. PROGRAMS

1c

Current programs will be condensed into seven categories. ARPA feels it can better manage and defend its programs before Congress if there are fewer of them.

1c1

## A. Basic Research Programs

1c1a

1. Artificial Intelligence Systems including knowledge-based computer systems and intelligent terminals.

1c1a1

2. Image Understanding Systems including picture processing, graphics, and some AI signal processing (Fournier, LaPlace, etc.)

1c1a2

3. Advanced Memory Technology including high density, low power storage, very large data base systems, and data storage concepts.

1c1a3

## B. Exploration or Applied Development

1c1b

1. Computer speech including speech understanding, speech compression, and speech recognition on the network.

1c1b1

## Trip Report - Future Management and programs of the Arpanet

2. Software Science and Technology including automatic programming, the NSW program, distributed computing, NIC development, and TENEX. (The NIC was defined to also encompass a performance Measurements Lab, and some aspects of database management but no further elaboration was given.)

1c1b2

3. Command Control Communications Systems covering roughly Bob Kahn's ACQT program, including network security, but not programming climate dynamics. This latter work will be transferred to and sponsored by NSF with NOAA also being involved. This transfer is due to the fact that the program will now include world food supply data and will be more appropriately funded by NSF. ARPA will phase out of this program by Fiscal 76 or 77.

1c1b3

4. Distributed Networks Program including Aloha, Arpanet, etc. ARPA is also phasing out of this program. It will fund the use of the network but research will switch to the Air Force Command Control Communications Systems.

1c1b4

NOTE: Dr. Licklider pointed out that this condensation of programs is not finalized yet and is open to comments by any interested or involved party.

1c1c

## C. Miscellaneous Questions, Answers, and Comments

1c1d

1. ARPA expects to have much tighter network access control later this year. The network will be fractionated into subnets sharing phone lines, etc.

1c1d1

2. ARPA may or may not fund a project to acquaint opinion leaders in DOD and government intelligence agencies with the Arpanet. Lukasic is in favor of doing this. ARPA would like outside comments. There is a process of belt-tightening in DOD which Dr. Licklider thinks should create a climate for more use of the Arpanet aids by DOD personnel.

1c1d2

3. Sutherland asked if there were plans to charge "real" money for network use. Fields replied that ARPA's aim is to charge all people for actual use of network facilities. They now have a charging mechanism for all government agencies. Gene Stubbs of ARPA will work out a charging algorithm for non-government network subscribers.

1c1d3

4. Sutherland asked if the charge to a host might



## Trip Report - Future Management and programs of the Arpanet

conceivably cost more than the mini-computer that constitutes the host. Answer was yes, that is possible. TIPS and IMPs (i.e. hosts) will be charged a flat fee regardless of usage, so that effectively costs/no. of hosts = host fee. ARPA is open to other suggestions for charging, but they had to define a system by fiscal 75 so that the network would be transferable.

1c1d4

There is a problem as to whether the present setup and use of the network is economical. Last year few new hosts were added due to the fact that nets in general were under fire. Licklider thinks the Arpanet now uses 3-20% of the possible load. The new managers of the net will deal with these problems in more detail.

1c1d4a

5. What is the future of the Arpanet? DOD agencies, ARPA Contractors, and national security agencies can have access. Individual users or new hosts outside those categories will be admitted on a case by case basis. High speed lines are not currently being upgraded. Sattelite communication band widths may be upgraded in the future, probably on a limited research basis. Licklider sees the Arpanet continuing until commercial and defense nets comparable to the Arpanet are available for transfer of Arpanet functions. This will be at least 78 or 79 for defense nets and probably longer for commercial ones.

1c1d5

6. Licklider feels that the sociometry of the Arpanet needs to be explored. ARPA needs to know who talks to whom, who uses what, etc. The inference here is that some emphasis might be placed upon this area of research.

1c1d6

1d

Lineprocessor; Summary of My Sept 74 Trip to SRI=WASH to Debug the Their Workstation

My trip to the east has been very educational. I decided to make this trip with Rodney to get a feel for the needs and problems related to operating Lineprocessor Workstations at the clients location. I have classified my findings and conclusions into three categories: (organization, user, repairman) with sub-categories: (problems, needs),

1

A) organization

2

1) LINEPROCESSOR WORKSTATIONS

2a

problem

2a1

We now have several clients using Lineprocessor Workstation: Bell Canada, Hudson, ARPA, SRI=Wash and Menlo, NSRDC, etc. Almost all of them are experiencing trouble of one kind or another.

2a1a

need

2a2

We must assist the client with configuring his Workstation and insure that it is operational and reliable. To do this we must build in wide margins of safety until we really understand the operating characteristic of Workstations at remote sites, which, at this time, we do not, -- At this stage of Lineprocessor development and application we need to design very carefully.

2a2a

One person should be assigned the responsibility of the clients equipment. His goal should be to see to it that the equipment is operational and working reliably (Hardware and Software). My opinion is that this means this person will have to visit each site for a few days after installaion to work with the equipment first hand and assist in ringing out any problems. In addition, to become familiar with that particular installation and clients needs --there is no better way than first hand experience --it is really different out there.

2a2b

The person responsible must be knowledgeable of both hardware and software and be a consistent NLS user.

2a2b1

This person will need to work very closely with Rodney for hardware fixes and debugging and a software person for software fixes and debugging.

2a2b2

I propose that we establish a team whose goal is to get Lineprocessor Workstations operational and working reliably.

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Their Workstation

I would be willing to be the person responsible and recommend Dave Hopper for the software person and, of course, Rodney for the hardware person, Dave is already in applications and has been very much involved with the user problems we are now experiencing and is becoming more and more familiar with Lineprocessor technology,

2a2c

To summarize:

2a2d

What I am proposing and saying we must do is the following:

2a2d1

A) Form a debugging team composed of three people,

2a2d2

1. - person overall responsible

2a2d2a

(Initially visit each new site to insure that the workstation is operational and working reliably.)

2a2d2a1

2. - person to help fix and help debug the hardware

2a2d2b

(Initially to help build a reliable Lineprocessor workstation, later to help maintain the clients system and give general consulting services)

2a2d2b1

3. - person to help fix and help debug the software

2a2d2c

In addition, the client will need some long term help from this team after initial installation is complete and the system is working reliably,

2a2e

A Workstation connection is very complex and involves many elements supported by many vendors. These vendors will not be capable of debugging or maintaining the clients over-all system. ARC will have to provide this support or put them in contact with a company that can. It is of my opinion that we will not be able to find such a company that will be able provide this type of support for several years and in the interm--and I think for the better--we will have to provide it ourselves. To do this we will need to include in our proposals money to pay for such service. Off the top of my head I think this means \$40/mo (budgeting) to handle Lineprocessor repairs, and something like two or three trips a year for helping (after initial installation is complete) with major problems. In addition some hardware consulting will be required. How much is very hard to estimate but I would guess one man week/yr (They will also require

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applications software help but I am not estimating that here),

2a2e1

A) User

3

1) TROUBLE SHOOTING AIDS

3a

problem

3a1

At present the trouble-shooting aids available to the user are at best poor. When the user thinks he has a problem there is no simple way for him to diagnose it. The reset button, echo test, and other test programs help but much more is needed,

3a1a

For example, if by some fluke the terminal type gets deassigned (which has happened to me on several occasions) a reset does not always restore. -- The user should be informed of his state after each reset (like echoing state restored in the tty window or perhaps include another field in the NLS feedback word -- Requiring him to read the Lineprocessor status light is not a good solution; many users will not have the Lineprocessor located where they can see it, and besides since all the action is on the screen and the user's attention is focused there, it seems to me that status information should be displayed there,

3a1b

Another example which I have experienced in many cases (at least all that I can recall)-- when something goes wrong (breaks or errors) the user can still interact fairly well with Tenex Exec. -- If this is true (and even if not) we should provide, at Tenex Exec level a program the user can run to diagnose his problem. This program should be capable of reaching out and testing each element of the Lineprocessor connection: Tip, modems, phone lines, Lineprocessor, copy printer, Mouse, Keyset, Display. -- such a program would be extremely useful--and as I see it--is what we must provide if we are to meet our contractual obligation to our clients and get them to view these complex tools favorably and use them in their daily activities,

3a1c

needs

3a2

Test program that can be run from a remote terminal (local or distant to the site) and would test as many of the Lineprocessor elements as possible: TIP, modem, line, modem, Lineprocessor, Keyset, Mouse, display. The program should operate similar to Don's Echo test program and should assume

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that there is effectively a switch at each element that could be switched to loop back that element. Any microprogramming required in the Lineprocessor should be part of the operating system (The user should not be required to remove a card and install special PROMS). It is possible hardware wise, and might have an advantage trouble shooting wise, to disconnect the display and connect an acoustic coupler in its place. This would allow the program to talk to both ends, Hmmm?

3a2a

2) TROUBLE LOG AND AUTOMATIC RECOVERY

3b

problem

3b1

Most of the troubles I have analyzed make little sense when analyzed by themselves. We will have to collect them all and analyze them as a group to see sensible patterns.

3b1a

I have seen many "Lineprocessor error 1000" (which is an overrun of the Lineprocessor display buffer). This leaves me with the feeling that the Lineprocessor is operating within a very narrow communication timing zone (safety zone) -- If this is the case we should change it.

3b1b

The user generally incorrectly diagnosis the trouble he is having. For example, I find errors which they attribute to noise very much dependent on which NLS version is being used and how they are connected and at what speed. For instance, the error rate is minimal (acceptable) when operating at 300 baud with an acoustic coupler a dial-up phone net, yet occasional errors are still encountered similar to the ones encountered when connect to the 4800 baud modem.

3b1c

needs

3b2

We should build in as many automatic recovery mechanisms as possible. If the Lineprocessor can detect errors it should be able to ask for a retransmission. The automatic recovery should have safety guards to prevent cyclic effect.

3b2a

Detected errors should be logged (on-line file) and classified whenever possible. We cannot expect the users to report all errors. If we expect to build a reliable Lineprocessor Workstation we must collect the error history.

3b2b

I envision the following sequence of events happening when an error is detected: Lineprocessor detects error, Lineprocessor passes error status to host, request

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retransmission; the host would then write the error in a file and if possible, write an error message in the display....

3b2c

We should build a Lineprocessor program that is solid with a particular version of NLS. --as solid as we can make it, When we design, we should not push the design so that sometimes the function works and sometimes it does not and I have the feeling that we are doing this in some cases,

3b2d

3) COPY PRINTER PROGRAM (LPPRINT)

3c

problem

3c1

The copy printer LPPRINT program has bugs. Everytime I have used it gets an NLS INTERNAL ERROR: "string too long". These errors occur whether one is using the display or not,

3c1a

need

3c2

To fix whatever it is that is wrong, Also someone should investigate to see what can be done to improve print speed, perhaps we could have two different modes of operation; one that would give priority to the display, and another that would give priority to the printer? I think something like this is necessary because many times the user has a need to get a hardcopy of a document in a hurry (high speed printing: 1200 baud) and would be willing to give up his display to get it. On the other hand there are times when he is not in such a hurry and would prefer priority be given to the display,

3c2a

4) SCREEN REFRESH (view=specs f)

3d

problem

3d1

View=spec f only refreshes part of the screen. It seems to me that it should refresh all. For instance, if text data errors are encountered the only way of insuring their removal is to push the reset button -- it would be easier to do a view=spec f,

3d1a

need

3d2

Provide a view=spec that allows the user to refresh the whole screen,

3d2a

5) SPURIOUS TEXT WRITTEN ON SCREEN

3e

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problem 3e1

The following string, with some variation on the end, occasionally appears on the screen. This happens when the Lineprocessor is moving text on the screen and proceeds a line of text that was suppose to be erased but was not,

3e1a

W 1'<K1o tikp7\_N% or ...-K% or ...9%

3e1b

need 3e2

Someone to investigate and determine how this can happen,

3e2a

6) NO INVISIBLES 3f

problem 3f1

Not having invisibles is really a drag,

3f1a

need 3f2

Provide invisibles

3f2a

7) TELETYPE WINDOW MESSAGES 3g

problem 3g1

When a user prompts a process (output processor, etc) at the completion of the process the status written in TTY window is not removed, -- I know that the state of the process is reflected with >... and > C; but there is a conflict with leaving the message in the TTY window after the process is completed,

3g1a

example:

3g1b

DURING

AFTER

3g1c

output quickprint in progress      output quickprint in progress

3g1d

>...

> C;

3g1e

needs 3g2

Program NLS? to remove the message after process completed, or perhaps change the message to say just "QUICKPRINT",

3g2a

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8) BACK-UP COMMUNICATION CONNECTION FOR LINEPROCESSOR WORKSTATION 3h

problem 3h1

If the modems break the user must wait until the modems are repaired to us the Lineprocessor Workstation. If he has important work to complete this may be very costly. 3h2

need 3h3

Applications should install a back-up communication system (dial-up acoustic coupler system if possible). This could serve two purposes: one as an alternate communication link when client systems break down, and two for demonstration purposes by the Applications staff. 3h3a

B) repairman 4

1) Access to User or TIP site 4a

problem 4a1

Several TIP sites are secure sites which means if we do not have proper security clearance and visitor passis the site must provide an escort for us at all times when we want to work at the TIP site and he must stay with us at all times. 4a1a

need 4a2

Obtain security clearances and passes (if possible; for 1 year?) to each secure site. 4a2a

2) test equipment 4b

problem 4b1

We do not have enough test equipment to adequately debug and maintain Lineprocesor Workstations. 4b1a

need 4b2

Purchase more equipment. 4b2a

1) character catcher 4b2a1

2) portable NLS terminal 4b2a2

3) back-up modem connection 4b2a3



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4) portable scope

4b2a4

Response to questions from Jeff Rothenberg about their use on NLS  
backend

Questions are answered in JGR's proposed format, namely:

i) does NLS (as it exists now, assuming the proposed MESS interface, but no other modifications) provide a reasonable way to implement the feature ?

ii) can you write down one or two alternative procedure call sequences which might be used to do it?

iii) are there any problems (e.g., efficiency, restrictions, things I haven't thought of, etc.) which occur to you?

#### 1. Searching/replacing

a. Is there a way to implement an iterative replace which finds all occurrences pointer), (sic) so that the whole file is always searched? Can this be turned on and off easily? [NOTE: because of the editing glitch -- see sic -- I may be misinterpreting the question.]

i) in NLS now:

yes, but there are several things of interest to discuss here; a) searching using ADDRRESS EXPRESSIONS, b) searching using L10 string analysis, c) the substitute primitive, and d) the replace primitive.

a) searching with address expressions:

one specifies a search by "xxx" or 'x followed by optional qualifiers (= <NUMBER>w means that the match must only succeed on the <NUMBER>th occurrence of xxx or x is in the context of a WORD, = <NUMBER>s means that only a certain <NUMBER> of statements are to be searched, and = <NUMBER>c means find the <NUMBER>th occurrence of xxx or x. In all of these if <NUMBER> (a number) is omitted, it is assumed to be 1 and if w is not specified, c is assumed and if s is not specified, infinity is assumed.) The routine CADDEXP takes a string of this type and a pointer into a file and updates that pointer to point to the last character of the matched pattern specified or to -1, meaning no match was made.

Please note that this match is an exact match for the xxx or x given.

It would be quite simple for You to write another

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routine which took similar parameters and did much more complicated matching, searching forward and backward. However, CADDEXP will search only forward in the file (from front to end) as currently implemented. This is a recognized deficiency that no-one has yet complained about -- searching backward may be an unnecessary frill but is also not difficult to implement.

2a1a1c

Please note that an address expression may contain many address elements concatenated together. For example, you may choose to move up a couple of levels in the file hierarchy before beginning the search or perhaps two levels up from a named node, as in

example .2u "wrong"=w

which would find the (only) node named example (if there are more than one node named example you would specify which one), go up two levels in the file and search for the word wrong.

2a1a1d

b) searching with L10 string analysis

2a1a2

L10 provides us with very sophisticated string analysis and modification facilities. These are not restricted in use to just system personnel, but rather many of our user's know how to describe quite complex searches with this language. You will be able to dynamically compile and/or load pre-compiled L10 string analysis code into NLS. You will be able to use it in certain builtin ways and may even be able to define new procedures and call them through MESS,

2a1a2a

describing the case matching algorithm you specified in later questions presents no problems for the L10 string system, in fact one can do much, much more,

2a1a2b

c) substitute

2a1a3

IN NLS now, one performs such a replacement throughout some structural entity, such as a node and all its substructure. This primitive does the searching and replacement without interacting with the user and reports the number of replacements when it is through. This can easily and often is applied to an entire file and even allows the user to replace all occurrences of a by b and b by a in one operation.

2a1a3a

My recommendation would be that you invest the modest

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man power needed to turn this primitive into the type you desire, since we have wanted this for some time anyway and just have not found time to change it. 2a1a3b

d) replace primitive 2a1a4

this primitive is used to make a single replacement of a certain type of textual or structural entity. For example, it might be invoked to replace a word, pointed to by a text pointer, by the text in a string or by another word in the file, pointed to by another text pointer. 2a1a4a

It cannot be used to replace text that crosses statement boundaries in one operation. This will require two calls to it if you need to do this (How you divide the new text between statements is perhaps a problem, however.). 2a1a4a1

ii) procedure call sequences: 2a2

a) CADDEXP 2a2a

caddexp(tp1, tp2, da, startresulttp); 2a2a1

tp1, tp2, and startresulttp are text pointer (as described in the NLS procedure calls document) and are passed by address within NLS and probably by value through MESS. tp1 and tp2 define the address expression you wish interpreted. This could be passed through MESS as a string and we could create the tp1 and tp2 for you. startresulttp points to the starting point for the interpretation and upon return points to the resulting location in the file or contains a -1, which means that it could not find whatever you asked for. This procedure also generates a SIGNAL when it cannot find things == CHECK THIS!!! 2a2a1a

Examples of address expression elements (can be concatenated together, separated by <SPACE>) that I would expect you to use (NOTE: an address is of the general form DIRECTORY,FILE,INFILE=ADDRESS. We are discussing here only the INFILE=ADDRESS component. The DIRECTORY and FILE portions may be omitted, in which case the connected directory and current file are assumed, respectively.): 2a2a1a1

name (searches for a node named NAME 2a2a1a1a

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"xxx" (searches for the next occurrence of the string xxx)	2a2a1a1b
.n (moves to the next node in the file)	2a2a1a1c
.b (moves backward in the file one node)	2a2a1a1d
.s (moves to the successor node == next brother)	2a2a1a1e
.p (moves to the predecessor node == previous brother)	2a2a1a1f
.d (moves down to first son)	2a2a1a1g
.u (moves up to father)	2a2a1a1h
.o (moves to the top of the file)	2a2a1a1i
.oe (moves to the end of the file == by chasing the structure)	2a2a1a1j
.t (moves to the tail == last brother)	2a2a1a1k
.h (moves to head == first brother)	2a2a1a1l
01234 (moves to node with system assigned name 1234 == called SID)	2a2a1a1m
1A15C (moves to node with hierachical location 1A15C)	2a2a1a1n
.r (returns to previous location in this file)	2a2a1a1o
.fr (returns to previous file)	2a2a1a1p
*NAME (finds next occurrence of a node with name NAME)	2a2a1a1q
!NAME (searches current branch for a node named NAME)	2a2a1a1r
&NAME (seaches current file then user's external name list == specified in user profile == for a node named NAME)	2a2a1a1s

The external name list provides a level of indirection for names. The list actually

Response to questions from Jeff Rothenberg about their use on NLS  
backend

says where to go by providing a node name  
NAME and another address to follow. 2a2a1a1s1

da is the address of a display area record and is used  
only to gain access to the file-return and  
statement-return rings for that window. I think we  
will be changing this procedure to take the needed  
pointers and not a da address. 2a2a1b

The file return ring keeps track of the last n (10  
to 25) files that the user has been in during this  
session. For each such file, there is a statement  
return ring which keeps track of the last m (10 to  
25) places within that file that the user has been  
during this session. This ring also keeps track of  
the view parameters that were in effect when he  
was last there. 2a2a1b1

b) as seggen, sortkey, and conan filter or as Program to  
execute or procedure to call thru mess 2a2b

more on this later 2a2b1

c) CSUBSTA and CSUBGRO 2a2c

This primitive takes the following parameters: 2a2c1

a list of ordered pairs, the first element of each  
pair being the old text and the second being the  
replacement text. I believe 600 characters worth of  
such specification is currently allowed. 2a2c1a

an entity type over which to perform the substitution 2a2c1b

the context in which the old text must appear in order  
to be replaced (e.g. word, text, number, visible  
string of printing characters). 2a2c1c

the address in the file of the entity over which to  
perform the operation 2a2c1d

a boolean flag indicating whether or not to apply  
other filters before the test is made (e.g. restrict  
the depth into the file structure, disallow node names  
to be changed, provide your own complex filtering via  
an already compiled L10 string analysis). 2a2c1e

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viewspecs which tell it what filters to impose if it  
is to impose additional filters. 2a2c1f

d) creptex 2a2d

creptex(old1, old2, new1, new2); 2a2d1

old1, old2, new1, and new2 are text pointers, old1  
and old2 point to the text that is to be replaced  
(must point into the user's file), new1 and new2  
point to the replacement text which may be in the same  
file, another file or a string that the user typed in. 2a2d1a

iii) problems and considerations: 2a3

subst does not interact with user, no facility for multiple  
interpretations in addexp, addexp only returns pointer to  
last char after a search. 2a3a

c, (sic) Can the file be searched by first going forward (or  
backward) to the end (beginning) of the file and then backward (or  
forward) to the beginning (end) of the file? 2b

1) in NLS now: 2b1

The searches specified in address expressions now allow one  
to search forward in the file, but not backward. The  
primitives do exist to search a single statement at a time  
and to move forward or backward in the file. However, this  
would seem to be somewhat inefficient to me. 2b1a

I would recommend that if this is important to you, that we  
work together to add this facility to address expressions. 2b1b

ii) procedure call sequences: 2b2

use caddexp (see above) 2b2a

iii) problems and considerations: 2b3

Could be done a statement at a time but this would require a  
mess call and return for each statement searched. This may  
prove reasonable but seems pretty expensive to me. I would  
propose the addition of the character < and > to mean  
perform the search backward or forward, respectively (or  
some other such conventions). You might also consider such  
things as allowing the user the ability to specify that the  
text to be found must appear at the begining/end of a

Response to questions from Jeff Rothenberg about their use on NLS backend

line/paragraph. Or perhaps that the text must be in a line containing some other text. Or not containing some text, 2b3a

d. Is there an efficient way to count the number of occurrences (matches) which a search/replace finds, report this number and ask for confirmation BEFORE actually performing the replacements? (This must be in a way that still allows each occurrence to be confirmed individually before it is made,) 2c

i) in NLS now: 2c1

No, I would suggest that this be added to the CSUBGRO/CSUBSTA primitives. 2c1a

It is also not currently possible to confirm each occurrence individually. I would suggest that you add this. 2c1b

ii) procedure call sequences: 2c2

iii) problems and considerations: 2c3

e. Once an iterative replace has been performed ( and confirmed), so that a number of replacements have been made at once, is there a way to undo all those replacements at once ? (that is, return the file to the state it was in before the last command == in this case a replace == was performed?) What about undoing selectively by looking at each occurrence again and allowing each one to be undone? 2d

i) in NLS now: 2d1

Undoing in NLS is at a very primitive level at present. One can update his file before an edit of this type and Delete Modifications if he does not like the results of the edit. This is a costly way to do UNDO and does not allow backing up to an arbitrary level. We once designed a way to put a true lisp-like undo facility into the nls file system but never got it implemented. It seems you have two choices for implementing the UNDO facility: 2d1a

1) do it all in your process, saving nodes before they are changed and keeping whatever data structures are necessary to back things up. This is not an unreasonable approach since you can copy nodes to and UNDO (NLS) file and copy them back to do the undo. Problems may arise when you try to UNDO selectively made replacements, if you do not have a good handle on which nodes are being changed and how many times a node has been changed. 2d1a1



Response to questions from Jeff Rothenberg about their use on NLS  
backend

2) implement the undo facility in the nls file system so that blocks are not reused until the edit has passed out of the history list. This is not difficult, just scary, since we depend on a very reliable file system and any screwing with it is subject to very careful and unforgiving scrutiny.

2d1a2

ii) procedure call sequences:

2d2

Not applicable

2d2a

iii) problems and considerations:

2d3

From our standpoint, we both win if you make additions to NLS plus there is a much larger chance that they will work and work efficiently without unnecessary fork-to-fork interactions. Therefore, I would recommend that we help you add this undo facility to NLS. This seems to consist of two principle tasks: 1) change NLS file system to not reuse blocks right away and 2) build a history list and portrayal mechanism. Although the portrayal to the user of what he has done can be easily separated, the history list should really be updated by nls whenever it changes a node in a file. It may not always be possible for you to detect these changes from outside.

2d3a

2. In searching (and also replacing), there are several questions about the kind of matching allowed

3

a. What kind of control is there over the case of the items matched? Is there a way to ignore case when matching?

3a

i) in NLS now:

3a1

with address expressions, no == should be added. with L10 string analysis, yes, but only in a fairly clumsy manner.

3a1a

ii) procedure call sequences:

3a2

iii) problems and considerations:

3a3

b. Does NLS allow "arb" or "class" matching operators?

3b

i) in NLS now:

3b1

Only in L10 string analysis code. We have wanted to add this for some time now but have not gotten to it.

3b1a

Response to questions from Jeff Rothenberg about their use on NLS  
backend

ii) procedure call sequences: 3b2

iii) problems and considerations: 3b3

THIS arb feature should be added to both CSUBGRD and to  
address expressions (caddexp). We wanted to get this done  
for NLS-8 but did not get to it. 3b3a

3. In moving text, there is often a need for some equivalent to the  
"q-register" facility in TECO, which effectively provides string  
variables which can be assigned values of arbitrary strings pulled out  
of the text, and which can be used to deposit this text (or copy it)  
to other locations. What are the capabilities of NLS in this regard? 4

i) in NLS now: 4a

This would best be implemented using a copy to a named node in  
the user's files or a system file. I would recommend that this  
be implemented entirely outside of NLS. 4a1

ii) procedure call sequences: 4b

For example, the user might specify that he would like a branch  
in his file moved to a register name SAVE. You would then  
insert a statement named SAVE in some system file, say, and  
then move the specified branch to be the substructure of SAVE.  
Later when the user wanted SAVE moved into his files, you would  
move the substructure of SAVE to his specified location and  
delete the node SAVE. 4b1

savestid = cinssta(qregstid, levdwn, name1, name2); 4b1a

inserts the reg "SAVE", assuming name1 and name2 point to  
some appropriate text, like SAVE or (SAVE) or SAVE!,  
depending on what you use for name delimiters. 4b1a1

cmovgro(savestid, levdwn, userstid, userstid, 0, 0); 4b1b

moves the branch specified by the user (userstid) to be  
the substructure of SAVE 4b1b1

savestid = aestring(\$!save", qregstid); 4b1c

get the stid of the qreg branch named SAVe (supplied by  
user). This assumes the existence of a trivial routine  
you or we would write that would take a string and a  
starting stid and call caddexp with the right parameters. 4b1c1

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backend

startstid = aestring(s".d", savestid);	4b1d
get the stid of the down of savestid,	4b1d1
endstid = aestring(s".t", startstid);	4b1e
gets the stid of the tail of the substructure pointed to by startstid,	4b1e1
cmovgro(newuserstid, userlevel, startstid, endstid, 0,0)	4b1f
moves the braanch to wherever the user wanted it (newuserstid),	4b1f1
cdelsta(savestid, 0,0);	4b1g
deletes the qreg save,	4b1g1
iii) problems and considerations:	4c
this seems to present no problems unless the inter-fork communication turns out to be horendously inefficient.	4c1

\*\*DRAFT\*\* JEW 1 OCT 74 8:06PM

JEW 1-OCT-74 18:02 24114  
The Network IPC Package

For comment,

INTRODUCTION

1

The Network Inter-Process Communication Package (package name=\$NETIPC) contains those procedures and data structures which a remote environment requires to employ the inter-process communication services of the host environment's Transmission Control Program (TCP). The package contains procedures for opening and closing full-duplex connections, sending and receiving letters, resetting connections, and interrupting foreign processes. It also contains Transmission Control Blocks (TCBs) as external data structures.

1a

Networks, Hosts, Processes, and Ports

1b

The universe consists of one or more "networks" of "host" computers, in each of which run one or more separate "processes", each with zero or more "ports" through which the process, via its host's Transmission Control Program (TCP), receives from or sends data to other processes within the universe.

1b1

Connections, Sockets, and Letters

1c

Processes exchange finite-length strings of eight-bit bytes called "letters" over full-duplex "connections" (established by their TCPS) linking a port in one process with a port in the other. Network, host, process, and port collectively define a "socket" to which one end of a connection is conceptually tied. Throughout this document, the following shorthand denotes a socket (or family of sockets):

1c1

SOCKET\* ==> LIST (netid% INTEGER, tcpid% INTEGER, prcid%  
INTEGER / EMPTY, portid% INTEGER / EMPTY) /  
EMPTY

1c1a

Connections are established either explicitly via the OPNCON procedure, or implicitly at the first attempt to send or receive a letter on the connection. Connections are always explicitly closed, via the CLSCON procedure.

1c2

PROCEDURES

2

Open connection

2a

sOPNCON (portid, fgnsck, wait)

2a1

This procedure establishes a connection between the host environment's port PORTID and foreign socket FGNSCK. If FGNSCK specifies a family of sockets, the invoking environment is assumed willing to accept connection to any member of the family.

2a2

Depending upon the value of WAIT, the procedure either completes the connection before returning, or (if necessary) returns on terms RPRT after queuing the request for a background process. In the latter case, the invoking environment must probe for the procedure's completion by means of PCPSUP's RESUME primitive.

2a3

Argument/result types:

2a4

portid= INTEGER  
fgnsck= SOCKET\*  
wait = BOOLEAN

2a4a

2a4b

2a4c

Close connection

2b

sCLSCON (portid, wait)

2b1

This procedure closes the connection of which the host environment's port PORTID is a part. All letters previously queued for the connection via SNDLET will be transmitted before the connection is actually closed. Similarly, zero or more calls to RCVLET (including any currently outstanding) may be required before the connection can be closed, to drain the connection of letters from the foreign process.

2b2

Depending upon the value of WAIT, the procedure either fully closes the connection before returning, or (if necessary) returns on terms RPRT after queuing the request for a background process. In the latter case, the invoking environment must probe for the procedure's completion by means of PCPSUP's RESUME primitive. Meanwhile, it should issue the required calls to RESUME and/or RCVLET.

2b3

Argument/result types:

2b4

portid= INTEGER

2b4a

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The Network IPC Package  
Procedures

wait = BOOLEAN

2b4b

Send letter on connection

2c

sSNDLET (portid, fgnsck, letter, wait)

2c1

This procedure first (if necessary) establishes a connection between the host environment's port PORTID and foreign socket FGNSCK, and then transmits the letter LETTER to the connected process. If the connection already exists, FGNSCK must be consistent with that specified when the connection was opened (e.g. EMPTY). Otherwise, if FGNSCK specifies a family of sockets, the invoking environment is assumed willing to accept connection to any member of the family.

2c2

Depending upon the value of WAIT, the procedure either waits for end-to-end acknowledgment of the letter before returning, or returns on terms RPRT after queuing the letter for transmission by a background process. In the latter case, the invoking environment must probe for the procedure's completion by means of PCPSUP's RESUME primitive. Meanwhile, it may, if it wishes, issue additional calls to SNDLET and thus queue several letters for transmission.

2c3

Argument/result types:

2c4

portid= INTEGER  
fgnsck= SOCKET\*  
letter= BITSTR  
wait = BOOLEAN

2c4a  
2c4b  
2c4c  
2c4d



Receive letter sent on connection 2d

SRVLET (portid, fgnsck, maxsize, wait => letter, excess) 2d1

This procedure first (if necessary) establishes a connection between the host environment's port PORTID and foreign socket FGNSCK, and then accepts delivery of the next letter LETTER from the connected process. If the connection already exists, FGNSCK must be consistent with that specified when the connection was opened (e.g. EMPTY). Otherwise, if FGNSCK specifies a family of sockets, the invoking environment is assumed willing to accept connection to any member of the family. Unless it's EMPTY, MAXSIZE specifies the length in bytes to which the letter is to be truncated, if necessary, before being returned to the invoking environment. If the letter is truncated, EXCESS specifies the number of bytes of the letter which remain to be retrieved with a subsequent call to RCVLET; otherwise, EXCESS is EMPTY.

2d2

Depending upon the value of WAIT, the procedure either waits for the letter's arrival before returning, or (if necessary) returns on terms RPRT after queuing the request for a background process. In the latter case, to actually obtain the letter, the invoking environment must probe for the procedure's completion by means of PCPSUP's RESUME primitive. Meanwhile, it may, if it wishes, issue additional calls to RCVLET, thereby queuing additional retrieval requests.

2d3

Argument/result types: 2d4

- portid - INTEGER 2d4a
- fgnsck - SOCKET\* 2d4b
- maxsize- INTEGER / EMPTY 2d4c
- wait - BOOLEAN 2d4d
- letter - BITSTR 2d4e
- excess - INTEGER / EMPTY 2d4f

Interrupt connected process 2e

SINTCON (portid) 2e1

This procedure aborts all outstanding SNDLET and RCVLET requests associated with the connection (which must nevertheless be completed via PCPSUP's RESUME primitive), and interrupts the foreign process attached to the host environment's port PORTID.

2e2

Argument/result types: 2e3

portid= INTEGER 2e3a

Reset connection 2f

SRSTCON (portid, wait) 2f1

This procedure resets (and closes) the connection of which the host environment's port PORTID is a part. All outstanding SNDLET and RCVLET requests associated with the connection are aborted (but must nevertheless be completed via PCPSUP's RESUME primitive before the connection is fully reset).

2f2

Depending upon the value of WAIT, the procedure either fully closes the connection before returning, or (if necessary) returns on terms RPRT after queuing the request for a background process. In the latter case, the invoking environment must probe for the procedure's completion by means of PCPSUP's RESUME primitive. Meanwhile, it should issue the required calls to RESUME.

2f3

Argument/result types: 2f4

portid= INTEGER 2f4a

wait = BOOLEAN 2f4b

Convert socket to internal/external form 2g

sCNVSCK (sck => cnvsck) 2g1

This procedure independently acts upon elements NETID, TCPID, PRCID, and PORTID of SCK, returning their external forms (strings) if their internal forms (integers) are specified, and vice versa. EMPTY elements are ignored. 2g2

Argument/result types: 2g3

sck = LIST (netid% INTEGER/STRING/EMPTY, tcpid% INTEGER/STRING/EMPTY, prcid% INTEGER/STRING/EMPTY, portid% INTEGER/STRING/EMPTY) 2g3a

cnvsck= LIST (cnvnetid% STRING/INTEGER/EMPTY, cnvtcpid% STRING/INTEGER/EMPTY, cnvprcid% STRING/INTEGER/EMPTY, cnvportid% STRING/INTEGER/EMPTY) 2g3b

DATA STRUCTURES 3

SLCLPRC Host environment's socket family 3a

This read-only data structure identifies the host environment by specifying its network's NETID, its host's TCPID, and its own PRCID. 3a1

Data structure type: 3a2

slclprc: SOCKET\* 3a2a

STCBS Transmission Control Blocks for host environment's ports 3b

This read-only data structure is a list of the Transmission Control Blocks (TCBs) for each of the host environment ports whose state is other than EMPTY. 3b1

Unlike the rest of the data structure, the RTRYCNT field of each TCB -- which specifies the number of times each letter sent on the connection is to be retried, if necessary, before the attempt is abandoned and the connection closed -- is writable by the invoking environment 3b2

Data structure type: 3b3

stcbs: LIST (LIST ( 3b3a  
portid: INTEGER, 3b3a1  
fgnsck: SOCKET\*, 3b3a2  
rcvwin: LIST (nextseq% INTEGER, bytcnt% INTEGER), 3b3a3  
sndwin: LIST (nextseq% INTEGER, bytcnt% INTEGER), 3b3a4  
connstate: INTEGER 3b3a5  
[OPEN=2 / SYNSND=3 / SYNRCV=4 / ESTABL=5 / CLSWT=6 /  
CLSSING=7 / LISTEN=8 / SYNWT=9], 3b3a5a  
awtsndcnt: INTEGER, 3b3a6  
awtrcvnt: INTEGER, 3b3a7  
rtrycnt: INTEGER), ... ) 3b3a8

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**\*\*DRAFT\*\* sNETIPC**  
**The Network Inter-Process Communication Package**

1-OCT-74

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sNETIPC is a network inter-process communication tool, an interface to Vint Cerf's internetwork Transmission Control Program (TCP), that operates within the setting provided by the Procedure Call Protocol (PCP == xxxxxx), with which the reader of the present document is assumed familiar.

JBP 2=OCT=74 09:42 24117

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SRI=ARC; Clerk: JBP; Origin: < POSTEL, GLOSSARY,NLS;3, >,  
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A.1 Glossary

Abbreviations

- AEN  
another eightbit number
- ALL  
A host to host protocol command to allocate buffer space to the sending NCP in the receiving NCP.
- ANTS  
ARPA Network Terminal System
- ARPA  
AdVanced Research Projects Agency of the Department of Defense
- ARPANET  
AdVanced Research Projects Agency Computer Network
- ASCII  
American Standard Code for Information Interchange, The character encoding used in the network.
- BBN  
Bolt, Beranek, and Newman, Inc, Cambridge, Massachusetts.
- BKY  
The operating system used at Lawrence Berkeley Laboratories for the CDC 6600 computer.
- CCBS  
Center for Computer-based Behavioral Studies at University of California, Los Angeles.
- CDC  
Control Data Corporation
- CLS  
A host to host protocol command to close the connection.
- DEC  
Digital Equipment Corporation
- DMS  
Dynamic Modeling System, A host computer on the ARPANET at MIT.
- EBCDIC  
Extended Binary Coded Decimal Interchange Code, The character encoding used primarily by IBM computer systems.
- FCP  
File Control Program
- FTP  
File Transfer protocol
- IBM  
International Business Machines
- ICP



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Initial Connection Protocol  
 IPC  
 interprocess communication  
 IMP  
 Interface Message Processor  
 LBL  
 Lawrence Berkeley Laboratory  
 MCP  
 The operating system for the Burroughs 6700.  
 MIT  
 Massachusetts Institute of Technology  
 Multics  
 Multiplexed Information and Computing Service, the  
 operating system for the Honeywell 6180 computer  
 designed and implemented at MIT's project MAC.  
 NCC  
 Network Control Center at BBN.  
 NCP  
 Network Control Program  
 NIC  
 Network Information Center at the Augumentation  
 Research Center Of Stanford Research Institute,  
 Menlo Park, California.  
 OS/MVT  
 An IBM operating system for the 360 series of  
 computers.  
 PDP  
 Programmed Digital Processor  
 RAND  
 The RAND Corporation  
 RFNM  
 Ready For Next Message  
 RFC  
 request for connection  
 RTS  
 Receiver to Sender request for connection, A host  
 to host protocol command.  
 SDC  
 System Development Corporation  
 STR  
 Sender to Receiver request for connection, A host  
 to host protocol command.  
 TCF  
 Terminal Control Program  
 TENEX  
 The operating system designed and implemented by  
 BBN for the DEC PDP 10 computer.  
 TIP  
 Terminal Interface Processor

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UCLA  
University of California, Los Angeles

UCSB  
University of California, Santa Barbara

UCSD  
University of California, San Diego

UI  
University of Illinois

VM  
An IBM operating system for the 370 series of computers.

#### Terms

another eightbit number  
The user program specified portion of the socket number.

ARPA Network Terminal System  
A particular small host system designed to interface a wide variety of terminals and peripherals to the ARPA network. This system was designed and implemented by the Center for Advanced Computation at the University of Illinois. The system operates on a DEC PDP11 computer.

connection  
The form of interprocess communication provided to the user level processes by the NCPs in the host computers. A connection is a logical simplex stream of data from one port of one process to another port of another process in the network.

control message  
A message (of the regular type) that contains host to host commands.

File Control Program  
That module in the operating system that controls the access to files by the user processes.

File Transfer Protocol  
The protocol that specifies the communication interaction required to move blocks of data (files) between host computers in the network.

full duplex  
A channel in which data can flow in both directions simultaneously.

half duplex  
A channel in which data can flow in both directions, but may only flow in one direction at a time.

header

The control information at the beginning of a packet.

host

A computer attached to an IMP. A host does not necessarily offer services to other computers in the network.

Initial Connection Protocol

The sequence of actions taken by user level programs to establish a pair of connections between a user program and a service program.

Interface Message Processor

The packet routing computers which are the nodes of the ARPA network. An IMP is connected to between 1 and 5 other IMPs and to between 0 and 4 hosts. No more than 7 total IMPs and hosts can be connected.

interprocess communication

The facility for one process to communicate with another process.

leader

The first 32 bits of a message, containing address and control information. The most important fields in the leader are: the message type, the link number, and the host address.

link number

A parameter in the leader that selects a logical communication channel between the source and destination hosts.

message

The unit of transmission between a host and an IMP, up to 8096 bits.

Network Control program

The program module added to the operating system that interfaces the user processes to the IMP and controls the communication between hosts by implementing the host to host protocol.

packet

The unit of transmission between IMPs, up to 1008 bits.

port

The input or output identifier associated with a particular data stream of a process. For example a Fortran logical unit number or a data set reference number, or an assembly language data control block.

prefix

A 40 bit block immediately following the leader and containing the byte size and number of bytes of following text.

process

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- A program in execution with its associated address space, registers and location counter,
- protocols  
The rules of behavior, in particular, the allowed formats and sequences of communication between two processes.
- regular message  
A message from the host to the IMP or from the IMP to the host that is the normal data carrying type. When following the host to host protocol a regular message may carry either a set of control messages or a users data.
- request for connection  
Either of the host to host protocol commands STR or RTS.
- Ready For Next Message  
A message from the IMP to the host indicating that the previously sent message on the same link number as this RFSM was received by the destination IMP and has begun transmission into the destination host.
- socket  
The terminus of a connection. The network wide name of an input or output port associated with a process.
- Telnet  
The protocol (or the programs that implement it) that specifies the communication interaction such that a user on one system gains access to the services of a second system as if he were a local user of the second system.
- Terminal Interface Processor  
An extension of the IMP to allow a variety of terminals to access the ARPA network. The TIP contains the NCP and User-Telnet programs as well as the terminal handling code in the same processor as the IMP. In addition there is a BBN constructed multi-line controller for up to 63 terminal.
- simplex  
A channel in which data can flow in one direction only.
- Terminal Control Program  
The program module in the operating system that controls the flow of data between the interactive terminals and the user processes.
- virtual  
Being something in effect, but not in actuality. For example a virtual memory might be one that a user process accesses as if it were a large linear

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core resident set of memory words, when in actuality the memory is managed by the operating system using paging and mapping such that only a small portion of the users set of memory words are in core at any particular time.

## Problems inserting invisibles in Process Command forms

In trying to build a process command form containing command-accepts, some very weird things were happening. It was virtually impossible to put a space next to a command-accept - the space ended up in some other spot or else the command-accept shifted position. All command-accepts were inserted after inserting a control-v and I was working in dnls. There have been problems in the past with invisibles doing weird things but they were rarely used. However, since people will now be using them more in process command forms, thought someone might want to investigate this. Jake

WHAT IS A SIMPLE DRAWING?

WHAT IS A SIMPLE DRAWING?

1

In planning for the inclusion of a graphical capability in NLS, there exists an endless list of options and facilities which could either be implemented, provided for in future expansions, or eliminated for lack of probable need. The list below attempts to catalog the classes of drawings to be considered for the first pass. Extensions, comments or exceptions are most welcome.

1a

BLOCK DIAGRAMS

FLOWCHARTS

CIRCUIT DIAGRAMS (electric, hydraulic, pneumatic, pipe, duct, welding, others)

1b

This class of drawings has at least the following properties:

1b1

Input is highly dependent on the interaction of the user. That is, users will be creating these drawings directly and on-line. Very few programs exist which take normal data structures and produce these diagrams, (for example take an L10 file and create a flowchart). On the other hand, these drawings can provide an input for analytical routines. (for example simulation models)

1b1a

The user calls heavily on templates provided both by both public and private libraries.

1b1b

Text is used in several ways:

1b1c

Labels are used to identify templates and are essentially a part of the template.

1b1c1

Notes are added to the drawing which are associated with a particular incidence of a template.

1b1c2

Notes are added which are associated with the total drawing.

1b1c3

In addition to the use of templates, the user produces linework directly whose structure is best known to him during creation, but which he quickly forgets and which may possess no clear spacial organization.

1b1d

2D PLOTTING

CHARTS (BAR, PIE, OTHER)

RULED TABLES

1c

Properties:

1c1

## WHAT IS A SIMPLE DRAWING?

while the user wants help in creating these interactively, he provides little linework input. Furthermore, the linework he does provide is drawn in a rather structured way. (for example points on a graph, percentages for a pie chart, values or relative levels for a barchart) The templates here are programs, not data as in the diagram case. Interactive generation of scales, bars etc are computed and displayed from parametric data provided by the user.

1c1a

These diagrams are frequently computed without user interaction.

1c1b

Since these drawings are communication tools, text is selected both for its content and its spacial relation in the aesthetics of the display.

1c1c

### 3D PLOTTING REPRESENTATIONS OF 3D OBJECTS BY LINE DRAWINGS

1d

#### Properties:

1d1

The user requires sketching aids such as perspective guidelines. In addition, the quality of the finished product is a strong function of the artistic talent of the user.

1d1a

Linework may enter completely from another source.

1d1b

Structure is difficult to use because lines in the drawing are members of many subclasses dictated by the user as he goes. Moreover, membership in these subclasses changes from time to time as the editing or creation task proceeds.

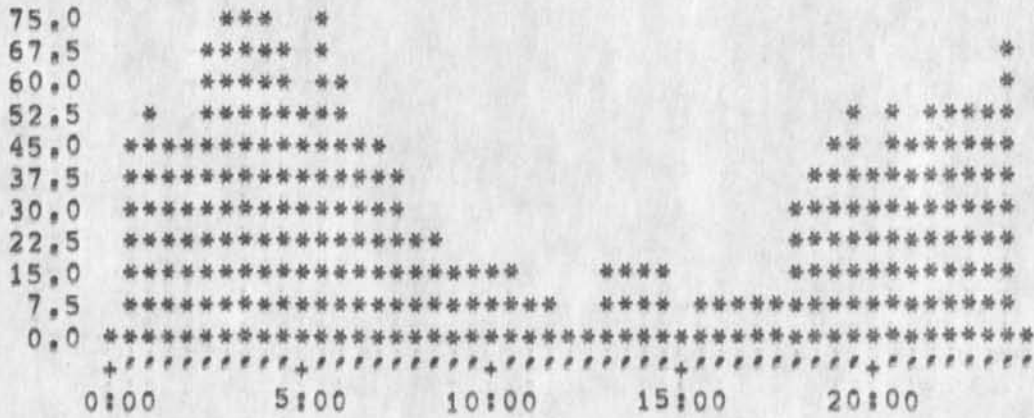
1d1c



Superwatch Average Graphs for Week of 9/22/74

TIME PLOT OF AVERAGE IDLE TIME FOR WEEK OF 9/22/74  
x axis labeled in units of hr:min, xunit = 30 minutes

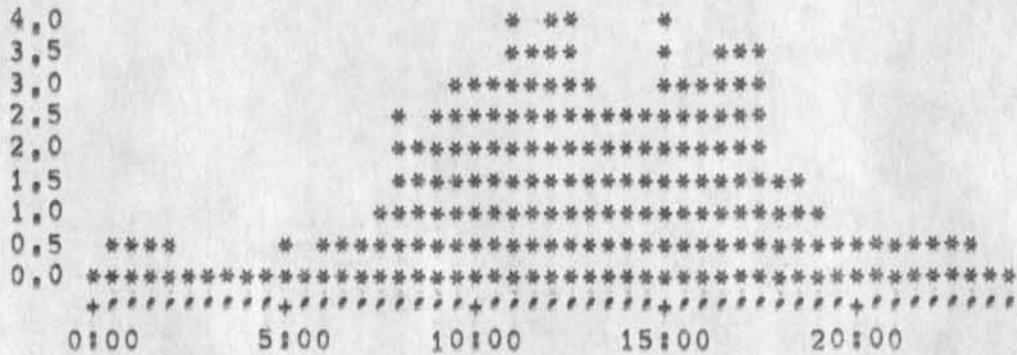
1



1a

TIME PLOT OF AVERAGE NUMBER OF GO JOBS FOR WEEK OF 9/22/74  
x axis labeled in units of hr:min, xunit = 30 minutes

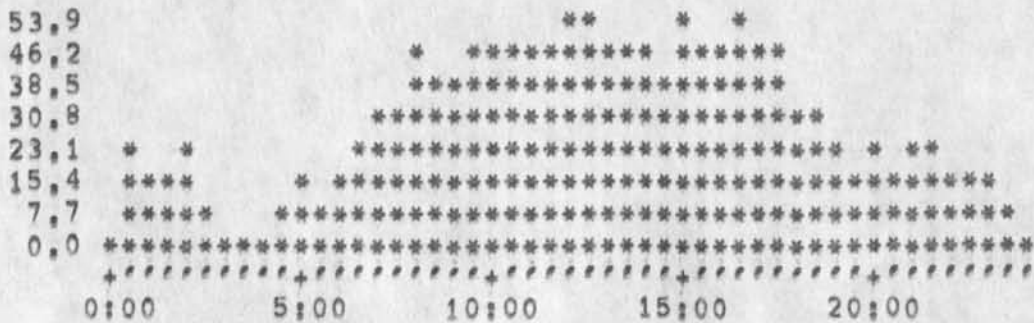
2



2a

TIME PLOT OF AVERAGE PER CENT OF CPU TIME CHARGED TO USER ACCOUNTS  
FOR WEEK OF 9/22/74  
x axis labeled in units of hr:min, xunit = 30 minutes

3

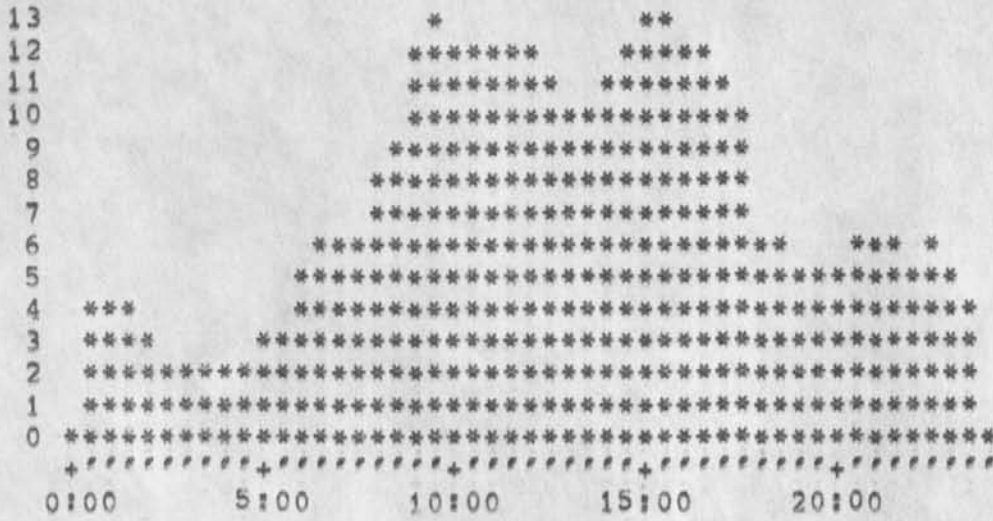


3a

TIME PLOT OF AVERAGE NUMBER OF USERS FOR WEEK OF 9/22/74  
x axis labeled in units of hr:min, xunit = 30 minutes

4

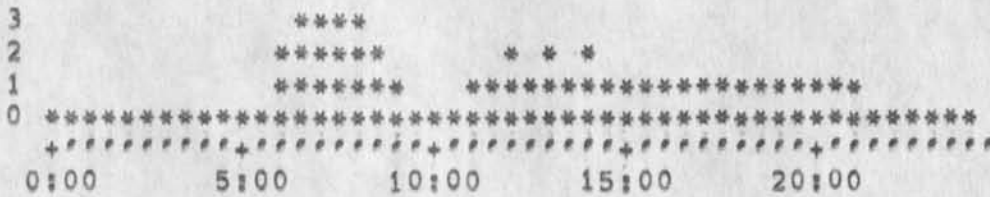
Superwatch Average Graphs for Week of 9/22/74



4a

TIME PLOT OF AVERAGE NUMBER OF NETWORK USERS FOR WEEK OF 9/22/74  
x axis labeled in units of hr:min, xunit = 30 minutes

5

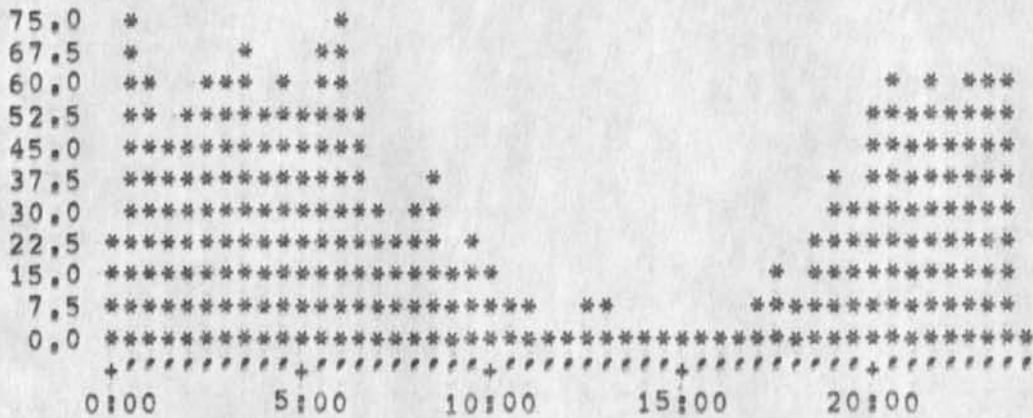


5a

Superwatch Average Graphs for Week of 9/15/74

TIME PLOT OF AVERAGE IDLE TIME FOR WEEK OF 9/15/74  
x axis labeled in units of hr:min, xunit = 30 minutes

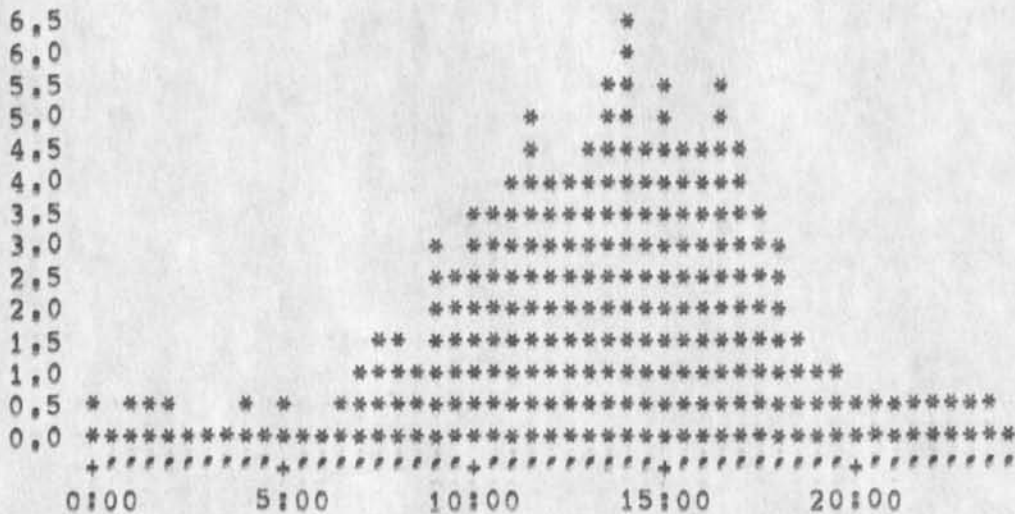
1



1a

TIME PLOT OF AVERAGE NUMBER OF GO JOBS FOR WEEK OF 9/15/74  
x axis labeled in units of hr:min, xunit = 30 minutes

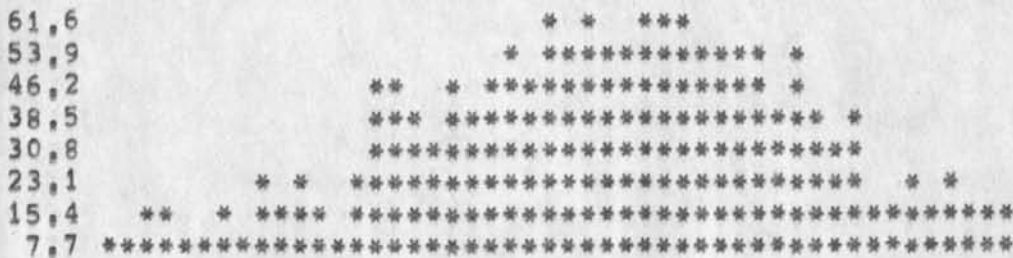
2



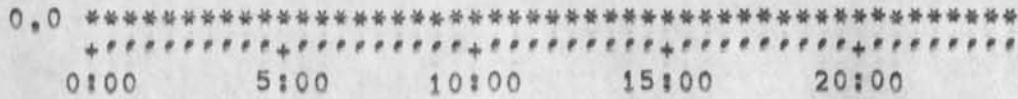
2a

TIME PLOT OF AVERAGE PER CENT OF CPU TIME CHARGED TO USER ACCOUNTS  
FOR WEEK OF 9/15/74  
x axis labeled in units of hr:min, xunit = 30 minutes

3



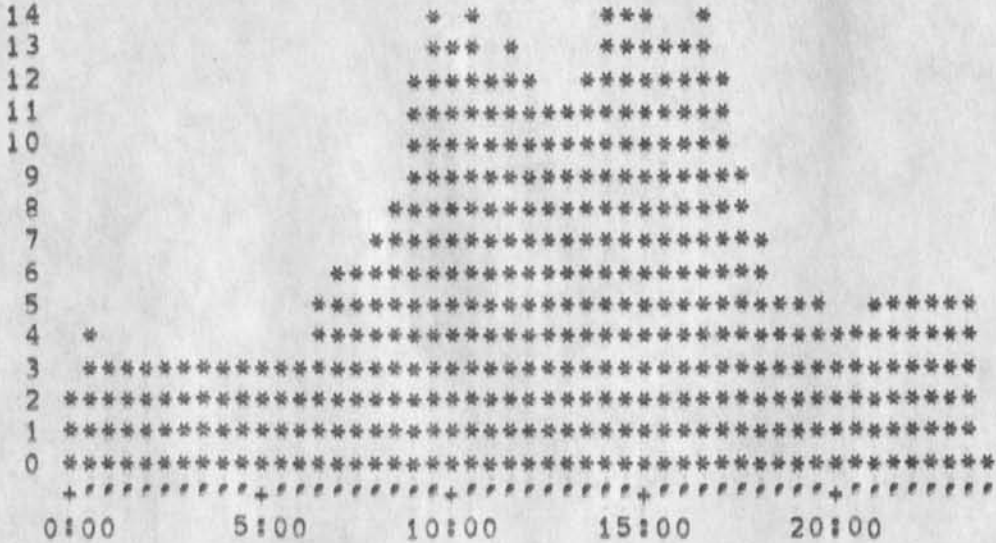
Superwatch Average Graphs for Week of 9/15/74



3a

TIME PLOT OF AVERAGE NUMBER OF USERS FOR WEEK OF 9/15/74  
x axis labeled in units of hr:min, xunit = 30 minutes

4



4a

TIME PLOT OF AVERAGE NUMBER OF NETWORK USERS FOR WEEK OF 9/15/74  
x axis labeled in units of hr:min, xunit = 30 minutes

5



5a

RLL tasks; on slowness of ARC and OFFICE-1.

Jim: Doug has asked me to look into the source of the slowness of the ARC and OFFICE-1 machines. Since no one else seems to be interested to do this and it falls within the analysis area, I have most happily accepted the task of making some inquiries and gathering some statistics.

1

Basically I take this task to mean two things: (1) to qualitatively measure the state of sluggishness (slowness, etc.) and (2) to offer some reasons for this condition based upon discussions with our systems guys and superwatch stats as well as any other data easily obtained.

1a

This will mean I will contact Sue Lee, Jeff Peters for their knowledge of superwatch and Don A for his.

1b

Also, each development guy for his input (why he thinks the system is bad news now a days)

1c

Jim Bair and Sue Lee and Kirk K. for gathering feedback items that relate to the slowness of the system.

1d

These could be correlated with superwatch stats to see what the picture was like when they registered the complaint. I am not sure this will produce anything meaningful but it is easy to do and it might show something.

1d1

Do I have your permission to look at the superwatch figures and ask Jeff to do any necessary tasks related to getting more of them?

1e

Also are there any restrictions on this overall task? Believe I should talk to some users also.

1f

Finally, how does one look at statistics if one cannot even log on and have the system load at 9.00? That is, let this be an official complaint about the slowness of the ARC machine and the difficulty in getting a slot position.

1g

Postel == DRAFT == Glossary == DRAFT == 3 OCT 74

(J24131) 3-OCT-74 10:55;;; Title: Author(s): Jonathan B.  
Postel/JBP; Distribution: /JAKE( [ ACTION ] ) DCE( [ INFO-ONLY ] ) ;  
Sub-Collections: SRI-ARC; Clerk: JBP; Origin: < POSTEL,  
GLOSSARY,NLS;3, >, 26-SEP-74 16:00 JBP ;;;; ;####;

## A.1 Glossary

## Abbreviations

AEN  
another eightbit number

ALL  
A host to host protocol command to allocate buffer space to the sending NCP in the receiving NCP.

ANTS  
ARPA Network Terminal System

ARPA  
AdvAnced Research Projects Agency of the Department of Defense

ARPANET  
AdvAnced Research Projects Agency Computer Network

ASCII  
American Standard Code for Information Interchange, The character encoding used in the network.

BBN  
Bolt, Beranek, and Newman, Inc, Cambridge, Massachusetts.

BKY  
The operating system used at Lawrence Berkeley Laboratories for the CDC 6600 computer.

CCBS  
Center for Computer-based Behavioral Studies at University of California, Los Angeles.

CDC  
Control Data Corporation

CLS  
A host to host protocol command to close the connection.

DEC  
Digital Equipment Corporation

DMS  
Dynamic Modeling System, A host computer on the ARPANET at MIT.

EBCDIC  
Extended Binary Coded Decimal Interchange Code, The character encoding used primarily by IBM computer systems.

FCP  
File Control Program

FTP  
File Transfer Protocol

IBM  
International Business Machines

ICP

Postel -- DRAFT -- Glossary -- DRAFT -- 3 OCT 74

Initial Connection Protocol

IPC  
interprocess communication

IMP  
Interface Message Processor

LBL  
Lawrence Berkeley Laboratory

MCP  
The operating system for the Burroughs 6700.

MIT  
Massachusetts Institute of Technology

Multics  
Multiplexed Information and Computing Service, the operating system for the Honeywell 6180 computer designed and implemented at MIT's project MAC.

NCC  
Network Control Center at BBN.

NCP  
Network Control Program

NIC  
Network Information Center at the Augmentation Research Center of Stanford Research Institute, Menlo Park, California.

OS/MVT  
An IBM operating system for the 360 series of computers.

PDP  
Programmed Digital Processor

RAND  
The RAND Corporation

RFNM  
Ready For Next Message

RFC  
request for connection

RTS  
Receiver to Sender request for connection. A host to host protocol command.

SDC  
System Development Corporation

STR  
Sender to Receiver request for connection. A host to host protocol command.

TCP  
Terminal Control Program

TENEX  
The operating system designed and implemented by BBN for the DEC PDP 10 computer.

TIP  
Terminal Interface Processor



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UCLA  
University of California, Los Angeles

UCSB  
University of California, Santa Barbara

UCSD  
University of California, San Diego

UI  
University of Illinois

VM  
An IBM operating system for the 370 series of computers.

### Terms

another eightbit number  
The user program specified portion of the socket number.

ARPA Network Terminal System  
A particular small host system designed to interface a wide variety of terminals and peripherals to the ARPA network. This system was designed and implemented by the Center for Advanced Computation at the University of Illinois. The system operates on a DEC PDP11 computer.

connection  
The form of interprocess communication provided to the user level processes by the NCPs in the host computers. A connection is a logical simplex stream of data from one port of one process to another port of another process in the network.

control message  
A message (of the regular type) that contains host to host commands.

File Control Program  
That module in the operating system that controls the access to files by the user processes.

File Transfer protocol  
The protocol that specifies the communication interaction required to move blocks of data (files) between host computers in the network.

full duplex  
A channel in which data can flow in both directions simultaneously.

half duplex  
A channel in which data can flow in both directions, but may only flow in one direction at a time.

header

The control information at the beginning of a packet.

host

A computer attached to an IMP. A host does not necessarily offer services to other computers in the network.

Initial Connection Protocol

The sequence of actions taken by user level programs to establish a pair of connections between a user program and a service program.

Interface Message Processor

The packet routing computers which are the nodes of the ARPA network. An IMP is connected to between 1 and 5 other IMPs and to between 0 and 4 hosts. No more than 7 total IMPs and hosts can be connected.

interprocess communication

The facility for one process to communicate with another process.

leader

The first 32 bits of a message, containing address and control information. The most important fields in the leader are: the message type, the link number, and the host address.

link number

A parameter in the leader that selects a logical communication channel between the source and destination hosts.

message

The unit of transmission between a host and an IMP, up to 8096 bits.

Network Control program

The program module added to the operating system that interfaces the user processes to the IMP and controls the communication between hosts by implementing the host to host protocol.

packet

The unit of transmission between IMPs, up to 1008 bits.

port

The input or output identifier associated with a particular data stream of a process, for example a Fortran logical unit number or a data set reference number, or an assembly language data control block.

prefix

A 40 bit block immediately following the leader and containing the byte size and number of bytes of following text.

process

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- A program in execution with its associated address space, registers and location counter.
- protocols**  
The rules of behavior, in particular, the allowed formats and sequences of communication between two processes.
- regular message**  
A message from the host to the IMP or from the IMP to the host that is the normal data carrying type. When following the host to host protocol a regular message may carry either a set of control messages or a users data.
- request for connection**  
Either of the host to host protocol commands STR or RTS.
- Ready For Next Message**  
A message from the IMP to the host indicating that the previously sent message on the same link number as this RFXM was received by the destination IMP and has begun transmission into the destination host.
- socket**  
The terminus of a connection. The network wide name of an input or output port associated with a process.
- Telnet**  
The protocol (or the programs that implement it) that specifies the communication interaction such that a user on one system gains access to the services of a second system as if he were a local user of the second system.
- Terminal Interface Processor**  
An extension of the IMP to allow a variety of terminals to access the ARPA network. The TIP contains the NCP and User-Telnet programs as well as the terminal handling code in the same processor as the IMP. In addition there is a BBN constructed multi-line controller for up to 63 terminal.
- simplex**  
A channel in which data can flow in one direction only.
- Terminal Control Program**  
The program module in the operating system that controls the flow of data between the interactive terminals and the user processes.
- virtual**  
Being something in effect, but not in actuality. For example a virtual memory might be one that a user process accesses as if it were a large linear

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core resident set of memory words, when in  
actuality the memory is managed by the operating  
system using paging and mapping such that only a  
small portion of the users set of memory words are  
in core at any particular time.

Talk with Kibler, 20 Sep 74, on CBI, Anastasio, Mann

JCN == special note

Talk with Kibler, 20 Sep 74, on CBI, Anastasio, Mann

I visited with Col. Austin Kibler in his office, 20 Sep 74. He is interested in but out of touch with the CBI "Community Workshop" that is funded by his office, ARPA's Human Resources Research Office (HRRO). Expects to have a new man replacing O'Sullivan in the program by Jan 75; meanwhile he seems very willing to handle details. 1

Kibler's understanding was somewhat different from mine. He says that Bill Mann at ISI is funded to "organize the CBI Community Workshop." He thinks the plan is for ISI (Mann) to set up the community and get it going, and for ETS (Anastasio) to evaluate it. He tried to call them then and there to corroborate, but couldn't reach them. He promised to do so soon and get back to me. I explained our Jan. 16 "Utility New Year," and that CBI plans would need settling soon. 2

He was quite rusty on specifics of Utility Service, seemed quite caught at slot price -- said something like, "I'll have 15 PLATO terminals tied in, does that mean I'll have to buy \$600K/yr?" I told him that the ratio would be far less than one slot per potential-user terminal. This tells me, though, that we need soon to learn more specific details about the CBI Community. 3

Kibler mentioned that ISI is modifying the PLATO terminals to work on the ARPANET, (Leaves open the questions we discussed last year with Roland Bryant of UCSB about this modification possibly being upward compatible with DNLS via a Line Processor). 4

Talk with Kibler, 20 Sep 74, on CBI, Anastasio, Mann

(J24132) 14-OCT-74 08:39;;; Title: Author(s): Douglas C.  
Engelbart/DCE; Distribution: /SRI=ARC( [ INFO=ONLY ] ) ;  
Sub=Collections: SRI=ARC; Clerk: JML;

Talk with Bob Young of HRRD, 20 Sep 74, on Decision Analysis  
Community

Special action by RWW, JCN



Talk with Bob Young of HRR0, 20 Sep 74, on Decision Analysis  
Community

I visited ARPA's Human Resources Research Office (HRR0) on 20 Sep 74. HRR0's director, Col. Austin Kibler, talked at some length about the CBI Community see (24132,). To fill me in on their newer (possible) network community, composed of researchers and users of computer aids in Decision Analysis, Kibler introduced me to Bob Young, HRR0 program manager for that activity.

Bob's background is in political science -- I gather he has a PhD (at least advanced grad work) from USC. He didn't have much background knowledge on us, so I gave him some verbal description and left him copies of the "Community" (12445,) and "AKW" (14724,) papers.

He has a contract to Jim Matheson at SRI. He said that he'd try to visit us next time he comes to see Jim.

Note: We've had quite a few contacts on this "Decision Analysis" possibility before. Seems to be important potential here -- for general AKW environmental support of D=A work, and for D=A Community support. I gathered that from prior discussion with Matheson and one of his guys that their contract could include study of new environments to put their D=A processes in -- of which NLS could be candidate.

In a short (like one hour) discussion with Matheson last year, about his system's "decision-tree" analysis features, I got a strong feeling that it would be quick and straightforward to map some of his tools into NLS, using hierarchical NLS-file text structure for holding probability figures, cross-reference links, annotative notes, etc.

This would provide new special tools for viewing, manipulating, and analyzing.

In a longer-term evaluation, it would seem to offer very high payoff in the D=A world to integrate its tools into an AKW whole system. Some D=A tools in NLS, plus others in "outside, reach-through" processes. To have access in AKW also to data-base management systems, data analysis systems, dialog support systems, etc., would add a lot for the decision analyst.

Watson should contact Matheson to keep in touch with this integration-development possibility.

Norton should contact Young, get him to visit -- co-ordinate hosting with Watson.

Talk with Bob Young of HRR0, 20 Sep 74, on Decision Analysis  
Community

(J24133) 14-OCT-74 08:45;;; Title: Author(s): Douglas C.  
Engelbart/DCE; Distribution: /SRI-ARC( [ INFO-ONLY ] ) ;  
Sub-Collections: SRI-ARC; Clerk: JML;

DCE 14-OCT-74 08:49 24134

Proposal Possibility, Output Processor direct to XGP

Action requested of Development == follow through

## Proposal Possibility, Output Processor direct to XGP

I visited IPT offices on 20 Sep 74. The XGP came up in discussion with Al Blue and Fred Edwards. They had had the impression that we were funded to interface the "Xerox Graphic Printer" that they now have there. I told them, "No, but we'd really appreciate support for making a clean, direct interface to our Output Processor. They said we should approach Connie McLindon, who apparently has just recently been given responsibility for the XGP (prior responsibility was IPTO's),

1

Talked with Connie later. She'd be interested in cost and time estimate -- might well consider funding it. A new Key Data employee is being assigned to the XGP, is to be trained by the ISI man this week (of 23 Sep) at ARPA.

2

Note: Key Data is contractor that built and operates ARPA's in-house management-information system; Connie is manager of their service.

2a

I'd like to have this followed up by Development -- hopefully leading to a funded, specific task entered into Development's downstream commitment list in an orderly fashion.

3

Proposal Possibility, Output Processor direct to XGP

(J24134) 14-OCT-74 08:49;;; Title: Author(s): Douglas C,  
Engelbart/DCE; Distribution: /RWW( [ ACTION ] ) SRI=ARC( [ INFO=ONLY ] )  
; Sub-Collections: SRI=ARC; Clerk: JML;

Talk with Kibler, 20 Sep 74, on AKW Methodology research

I visited Col. Austin Kibler, director of ARPA's Human Resources Research Office (HRRO), 20 Sep 74 (see associated reports == 24132, 24133, 24137,). This note concerns potential relevance for HRRO support of R & D work in AKW systems, in the levels above the hardware and software.

1

I gave him a general picture of needs and possibilities there, and said that it would seem highly appropriate to me that HRRO would split support with IPTO at that interface == HRRO taking "higher levels" and IPTO "lower levels."

2

I'm sure that he didn't get an explicit picture from this short, verbal explanation. I agreed to send him a thinkpiece (if I could get one generated). Note: I withheld mention of our prior "Analysis" proposal that supposedly went to HRRO == I'd want to reconsider what we'd send him.

3

Talk with Kibler, 20 Sep 74, on AKW Methodology research

(J24135) 14-OCT-74 08:54;;; Title: Author(s): Douglas C.  
Engelbart/DCE; Distribution: /SRI-ARC( [ INFO-ONLY ] );  
Sub-Collections: SRI-ARC; Clerk: JML;

Talk with Carlson, 20 Sep 74, and NSW thoughts

Special content for Norton, watson (esp. on MULTICS/Backend possibility)



Talk with Carlson, 20 Sep 74, and NSW thoughts

I dropped by ARPA's IPT offices to meet Lt. William Carlson, who has recently transferred from duty in Air Force (Pentagon) to IPTO -- he will be NSW program manager.

1

Besides becoming acquainted, I wanted to open a discussion on the NSW approach to serving its later users. It is very important in my eyes that there be a close human linking between the rest of our AKW Community and the users of the NSW "workshop." Explicit roles that cover most of what we now lay on our KW architects is necessary within NSW's own "circle," I feel, and also a great deal of extra value would be derived if the NSW people carrying these roles were in close working relationship with KWAC -- indeed, if they naturally were regular members of KWAC.

2

I at least opened these topics with Carlson, and believe that he isn't either blind or negative to them. I think it is time to establish planning dialogue within NSW regarding CSD service, user training, usage development, analysis, feedback, etc.

3

It is planned that an NSW user will see a large array of "tools," of which NLS is but one subset. It is all the more appropriate that each user has a "local" workshop architect to turn to, and that each architect must not be captive to the developers/servers of the tools, and that the architects form a coherent, highly intercommunicative body to serve in developing usage and in providing evaluation and tool-development guidance.

4

NSW should, in my eyes, expend explicit resources on the "architect's" functions (whatever name they give to the role) -- selecting and training them, giving them special technical support and workshop services to support their keep-ahead learning, their services to their users, their active involvement with other architects and with evaluation and new-technique development, etc.

5

It is not at all inconsistent to include architects serving within the NSW domain in our approach to organizing and supporting "Workshop Architects". We explicitly state that an architect is there to serve his users, in his organization's structure of activities, needs, and values. We try to encourage his study and use of other computer tools than NLS. Our special requirements are that

6

- 1) The architects work seriously at knowing their tools (NLS included) very well,
- 2) They stay in active, collaborative communication within their community of architects, and
- 3) They all begin their mutual, collaborative activity using the

6a

6b

Talk with Carlson, 20 Sep 74, and NSW thoughts

same set of collaborative-support tools and techniques (as made available via the AKW Utility), and

6c

4) To improve upon these will collaborate toward necessary evolution of what the Utility makes available to all of its clientele.

6d

We assume that the Utility will become a retailer-broker that arranges access to many services (besides NLS) for its clientele -- but that it emphasizes coherence in the interfacing.

7

Other special topics:

8

Other DoD NSW groups -- Carlson is interested in NSW participation by more than just Air Force groups. I gave him my previous-day contacts from NAVCOSSACT, Doug McKenzie and Al Sorkowitz (see my report -- 24142,). He plans to contact them. I will try to dig up and forward to him the contact I made with Army Systems people last Spring -- and others, too.

9

Non-DoD "NSW groups" -- Carlson says that the current support structure for NSW would preclude formal participation by non-DoD groups. I explicitly outlined how we'd like to extend our application clientele beyond DoD, that our Utility was planned to be a retailer-broker service that would arrange for access to as many services as would be practical. In particular, we would be interested in enlisting non-DoD government agencies, and non-governmental organizations, into a collaborative Software Engineering Augmentation Community (SEAC); I assumed that we could within a few years arrange access to pretty much any of the tools that ARPA's NSW was employing. Also, we'd want to encourage active cross-collaboration and close tracking between DoD NSW and non-DoD SEAC. Effective collaboration might thus be achieved across institutional boundaries.

10

Carlson seemed quite open to this (and ARC should definitely pursue development of a non-DoD SEAC).

10a

Other NSW tools -- Carlson dropped a comment something like, "...but then most of the NSW tools won't be available in Office-1." Made me realize that I didn't know what other tools were being considered, outside of compilers, debuggers, and probably some file- and data-management systems. I guess my question is, "are any NSW tools being planned for that we wouldn't assume must be part of the AKW for software teams and large software projects?" Tools to support planning, review, control (of time, dollars, configuration), maintenance, operations, etc...?

11

NLS Backend in MULTICS -- I mentioned our current attempts to

Talk with Carlson, 20 Sep 74, and NSW thoughts

raise support for systematic mapping of NLS Backend into other operating environments, with a plan for maintaining (practically) automatic capability to map machine-independent master=NLS source code into any such Backend Environment. Carlson replied that "if we (NSW, AF??) became sufficiently convinced that NLS was an important enough tool, we'd be interested in supporting a mapping onto MULTICS." (important for us to keep on top of this issue == who needs what degree of perceived "importance" to NLS?)

12

Talk with Carlson, 20 Sep 74, and NSW thoughts

(J24136) 14-OCT-74 08:59;;; Title: Author(s): Douglas C.  
Engelbart/DCE; Distribution: /SRI=ARC( [ INFO=ONLY ] ) ;  
Sub=Collections: SRI=ARC; Clerk: JML;

## Some Comments on ARPA Perception of AKW Utility

During evening discussion with Licklider on 19 Sep 74, and talks next day with Kibler, Blue, and Edwards, I gathered the following perceptions of our AKW Utility.

1

Licklider still feels that it is too expensive, and resents its not being up more than 6 days x 16 hrs. His perception of the cost side makes him unmoved by the fact that if people want to pay for 7 days x 24 hrs (or approaching that), it is easy to arrange -- otherwise, how can we possibly provide it? He apparently uses data from an MIT program that periodically tests each host's operational status. His data are analyzed on basis of 7 days x 24 hrs, and he seems harshly to deny that Office-1 has a good performance record.

2

To me this is a very perplexing stance. He goes on to point out that the AI groups, who casually distribute the keep-it-running trouble shooting among their all-hours researchers, consistently have very high up-time records. Lick feels that ARC's staff must not be as interested in its work if we, too, don't have our workers around anyway at all hours. The comparison is ludicrous -- I pointed out one of the most salient incongruities: if they had to keep the service up for other people, what would be their performance? (Lick did seem to absorb this point with acknowledgement of change of perspective.) I mentioned also that our project-committed developers were stretched very thin, that there are countless personal-time scheduling complications when they must co-operate closely on a large system, so they can't be working around the clock. I didn't say many relevant things beyond this -- e.g., that our software staff is probably much smaller than the number of software people swirling around any of his AI sites.

3

Lick had a specific gripe about OFFICE-1 not having a "standard" set of SNDMSG, RD, etc services -- mentioned something about UpperCase and TAB conventions. [Q on my part: Why isn't this problem in the lap of the TENEX-system developers?]

4

DCE 14-OCT-74 09:02 24137

Some Comments on ARPA Perception of AKW Utility

(J24137) 14-OCT-74 09:02;;; Title: Author(s): Douglas C.  
Engelbart/DCE; Distribution: /SRI=ARC( [ INFO=ONLY ] ) ;  
Sub=Collections: SRI=ARC; Clerk: JML;

## Interest in NLS Speech Strings and AI Engineering

I happened to raise the topic of our long-held hopes to incorporate speech-string manipulation capabilities into NLS, to both Bob Kahn (with Bill Carlson standing by) in the IPT offices on 20 Sep 74, and to Licklider the previous evening. Both seemed to pick up on it quickly, with interest. Lick said that he'd like to have the possibilities presented to the Speech Understanding Group. I can't remember any explicit follow-up agreement with Kahn -- he did seem to like the notion of getting "AI Engineering" involved in the AKW domain.

1

Action: I should see that we generate a thinkpiece ASAP -- including enough participation from Development at least to estimate feasibility and costs.

2

Perhaps consider a thinkpiece on "AI Engineering in AKW Systems."

3

DCE 14-OCT-74 09:09 24138

Interest in NLS speech strings and AI Engineering

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Visit Log: 4 Sep 74, Monroe Postman, City of San Jose, NSF UTS  
Technology Agent

This is a follow up on Postman's earlier discussion with Pam Kruzic -- c.f. Dirk's memo of 21 Aug (Gjournal, 23836,). I had a short telephone conversation with him yesterday; today's visit is to explore potential of using AKW techniques in line with the NSF Urban Technology System work, involving 27 U.S. cities. See the following external-document items: giving information about this UTS Program (23848,), and describing a proposed "Technology Agent's Data System" (TADS), by Postman (23849,).

1

In the latter, Postman outlines possible data-system support for this community of technology agents -- basic dialogue support, documentation aids, and community intelligence (to paraphrase in our terms). A very good start in formulating a special-interest-community knowledge workshop, as we use the terms in (12445,).

1a

General conditions in Postman's hoped-for promoting of his scheme: He would like, over next three months, to run a prototype activity that would accumulate demonstrable results; then demonstrate to support a proposal for establishing a real support activity.

2

This "Urban Technology System" is a three-year Program, already under way. Have a very interested community -- 25 agents have already voiced positive interest in such a system (as polled by Postman, apparently, with respect to the substance of his XDOC'd memo -- 23849,).

2a

They are all selected "technology-transfer" specialists.

2a1

They have common problems, they are aware of danger of "re-inventing the wheel", etc; they recognize and want a systematic means of collaborating.

2a2

His current thinking about this prototype demonstration activity:

2b

He'd like access to NLS at the Utility.

2b1

Would like to connect all 27 cities.

2b2

He has approached TYMSHARE, and believes that they will give him some sort of cost break for TYMNET service. (Recognizing that the next stage would preferably use ARPANET).

2b3

Half of the cities now have terminals; he can get money to lease terminals for the rest of them.

2b4

initial activity to support this: Simple "mailbox" communication, with a simple categorization/search capability

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so that the accumulated dialogue can be divided into problem areas, potential-solution areas, etc.

2b5

In support of a subsequent promotion for full support of the community-collaboration system, he would plan to demonstrate his early-working system, that he pictures involving essentially all of the 27 cities and their technology agents.

2c

He left here directly for a meeting in Spokane (one of the cities involved) where there is to be a meeting of the agents. He expected to convey as much as he could to them. Took ten copies of (12445,), and single samples of (12209,), (22979,).

3

Our response (Note: JCN was available for the last 25 minutes of Postman's visit, to establish personal contact. We both projected similar basic response to Postman).

4

We think that it would be rushing things to try, on a shoestring budget, to get a prototype system going that a) involves all of the cities, and b) is seriously considered to be capable of upward evolution toward the full potential that we can already demonstrate with our system.

4a

We don't want to become involved, at no income to us, in such a venture if it is trying to start out on that scale without adequate funding.

4a1

We advise that he scouts out the support possibilities, and decides upon what level of demonstrable activity would be needed to sell a proposal. We feel that there are many activities in full swing already within our AKW Applications clientele that would provide excellent and adequate demonstration of any of the basic concepts involved.

4b

We offer to provide support to him in the way of: documentation, reprints, hosting and giving demonstrations to groups involved in his promotion, etc.

4c

We are quite prepared to negotiate with him the "franchise" for nucleating this community, according to the basic, initial principles that we have established.

4d

Action: Wait to hear from him.

5

Citations to the references he took:

6

D. C. Engelbart and W. K. English, "A Research Center for

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Technology Agent

- Augmenting Human Intellect", AFIPS Proceedings, Fall Joint  
Computer Conference, 1968, Washington, D.C. (XDOC == 3954,) 6a
- D. C. Engelbart, "Intellectual Implications of MULTI-ACCESS  
COMPUTER NETWORKS", A paper for the Proceedings of The  
Interdisciplinary Conference on Multi-Access Computer Networks in  
Austin, Texas, April 1970. (XDOC == 5255,) 6b
- D. C. Engelbart, COORDINATED INFORMATION SERVICES for a  
DISCIPLINE- OR MISSION-ORIENTED COMMUNITY, paper presented at the  
Second Annual Computer Communications Conference, San Jose,  
California, 24 January 1973, (Journal, dated 12 Dec 72 ==  
Mjournal, 12445,1: xhmz) 6c
- D. C. Engelbart, R. W. Watson, J. C. Norton, THE AUGMENTED  
KNOWLEDGE WORKSHOP, paper presented at the National Computer  
Conference, New York City, June 1973. (IJOURNAL, 14724,) 6d
- Augmentation Research Center, "Output Processor Users' Guide," 23  
Aug 73, (Journal == 12209,) 6e
- ARC/NIC Staff:, "ARPANET Directory," June 1974 (journal ==  
22979,) 6f

DCE 14-OCT-74 09:12 24139

Visit Log: 4 Sep 74, Monroe Postman, City of San Jose, NSF UTS  
Technology Agent

(J24139) 14-OCT-74 09:12;;; Title: Author(s): Douglas C.  
Engelbart/DCE; Distribution: /SRI=ARC( [ INFO-ONLY ] );  
Sub-Collections: SRI=ARC; Clerk: JML;

Talk with Meeland and Crandall, 17 Sep 74, On Rehabilitation Engineering AKW NP

John Crandall is currently a part-time consultant with SRI. He has extensive background in the area of Rehabilitation Engineering. Tor Meeland is one of our SRI-DC marketing staff. They looked me up -- had previously talked with Susan Lee (see her note of 9 Sep 74 -- 23931,). Meeland and Crandall seem to have a very likely prospect for an AKW-supported special community, each member of which could be one of the Rehabilitation Engineering R & D Centers being established at appropriate research-hospital sites around the country. I gathered that there were to be 8 to 10 of them, each funded at up to \$1 million/year.

Crandall seems fairly well acquainted with Joseph Traub, an executive in a Federal agency (whose name slipped by me). Traub apparently is responsible for establishing these Centers, and the process is only partially complete.

Crandall, Meeland and I settled on a plan to try out, on SRI and Traub:

Crandall would find an organizational home-site within SRI, where RE is a natural subject (at least in the community-augmentation schema), Meeland will help.

Crandall will work out a proposal with Traub, aimed at step-by-step augmentation of Traub's RE-Center Community (RECC).

First step, slot and terminal for Crandall (as RECC architect) and Traub's small office force. Crandall gains skill/knowledge first, then helps Traub's office convert. May be co-located, or may be Crandall at SRI-DC.

Second step, Crandall and Traub, after gaining adequate experience, conditionally plan and launch subsequent stages involving possibly a Community Information Center and gradually bringing each RE center into full AKW participation.

Crandall already has contact somehow with Alex Tachmindji of ARPA; he will see if Traub's agency can gain use of ARPANET.

(Note: subsequent contact produces "No" here -- would have to use other communication.)

Crandall subsequently talked with Traub, who was explicitly interested. Apparently Traub put a limit at like \$100k on what he could allocate for each Center's participation. This would be a nice figure, but until we and he learn more of our mutual NP, I don't take that figure as meaning much more than a signal of explicit interest in what he so-far understands.

Talk with Meeland and Crandall, 17 Sep 74, On Rehabilitation  
Engineering AKW NP

Crandall indicated that the RE-Center funding has been "mandated" -- which I gather conveys a higher sense of guarantee than normal program-fund allocation, 5

He also mentioned that Kissinger had committed the U. S. to fund a \$10 million rehabilitation program in Egypt, (including possible support to an RE Center in Cairo), as part of the recent treaty negotiation. Apparently this is a high-visibility, high-priority task dropped directly upon Traub's shoulder. Not clear if/how this Center might sensibly be involved in the RECC, 6

Action: Crandall checking ARPANET prospects; he'll also draft a proposal. Jim Norton needs to tie in here. Meeland to look for SRI-org "home" for project (and Crandall). 7

Note: Dave Brown had earlier passed through and learned of this; he sent me a memo dated 30 Aug 74 describing the basic situation (XDOC -- 23783,). I had missed seeing that memo. Oliver Whitby had also come by SRI-DC later, and expressed interest. 8

Note: Meeland, Crandall and I settled on the foregoing, gradual and evolutionary approach after a number of excursions into wilder possibilities - Cairo on line, communities of handicapped people, etc. It is apparent that there is plenty of potential here, as in many areas we're discovering. But it is important to approach each in a measured way, and to develop experienced architects and a solid core of seasoned users before launching large schemes. 9

Talk with Meeland and Crandall, 17 Sep 74, On Rehabilitation  
Engineering AKW NP

(J24140) 14-OCT-74 09:19;;; Title: Author(s): Douglas C.  
Engelbart/DCE; Distribution: /SRI-ARC( [ INFO-ONLY ] );  
Sub-Collections: SRI-ARC; Clerk: JML;

Talk with Greehan, 19 Sep 74, on Postman's proposal for community of city technology agents

Since the visit from Monroe Postman on 4 Sep 74 (see --- 24139, ), I have talked with Postman at his home on the phone before I left for my Washington trip. He had found, in his regional meeting at Spokane, considerable interest in his proposal, and in the prospects of using our Utility. He was still at a loss as to how to support an experiment, since the funding available through the regular program wouldn't begin to cover it. I told him that while in Washington I would check to see if I could find some leads for support.

1

I approached Fran Greehan, in SRI-DC, on 19 Sep. Greehan and I had made an earlier trip to NSF, during my visit to Washington last July, and had had this NSF program described to us. I outlined the situation as described in (24139, ). Fran thought that the whole idea seemed quite salable, pointing out that "productivity in local government" was a commonly used "in term" these days. Fran advised that we make use of two people at SRI in Menlo who already are involved with similar programs:

2

Tom Anyos, in our Physical Sciences Division, has a NASA project on technology transfer.

2a

Egils Milbergs, in Urban and Social Systems Division, has been involved in an NSF project in the "R & D Incentives Program."

2b

Greehan said that while he could scout out the Washington picture in Research and Development incentives, it would be better if first we checked with Egils.

3

The way we left it was that I would check with both of the above two men; if either had contacts or was interested in making further inquiries, he would probably be a better person to do it than Greehan. If neither of them had a relevant need, nor was particularly interested, we could come back to Greehan who would be happy to help.

4

When thinking of approaching some Group X in National Science Foundation in order to get funds to support augmenting a project under Group Y of NSF, I asked Fran if this had a plus or minus impact upon the people we were approaching. Fran says that it's definitely viewed as a plus if one branch of the Foundation can logically give complementary support to the pursuits of another branch.

5



Talk with Greehan, 19 Sep 74, on Postman's proposal for community of city technology agents

(J24141) 14-OCT-74 09:27;;; Title: Author(s): Douglas C. Engelbart/DCE; Distribution: /SRI-ARC( [ INFO-ONLY ] ); Sub-Collections: SRI-ARC; Clerk: JML;

Discussions, 19 Sep 74, with McKenzie and Sorkowitz of NAVCOSSACT

I had received a telephone call from Doug McKenzie, of NAVCOSACT, on 10 Sep 74. He explained that he had been pursuing systems and techniques that might be usable within their own environment; they apparently are exploring the possibilities of "augmenting" their own software people. He said that they had a dual UNIVAC 1108, and a dual UNIVAC 1110. They were toying with possibilities of an associated network of minicomputers as a user-support front end. I think they had also been considering connecting to the ARPANET. Their main interest in this regard was to provide support for their developmental programmers, which included as McKenzie termed it "in-house word processing." We made a tentative date at that time for him and several others to visit ARC on November 4th.

1

On the morning of 19 Sep, in Washington, I contacted McKenzie saying that I found myself with enough time that perhaps we could get together. He and Al Sorkowitz came by SRI-DC for several hours in the early afternoon. I discussed our approach to word processing, to augmenting a Knowledge Workshop, to the potential support for software engineers, etc., and gave them some demonstration on the Line Processor with Display NLS (even though the operation was still a bit flaky from the communication problems).

2

They explained further that their organization is basically responsible for all of the support software to all of the departments of the Navy. This does not include application programming for them all, but does include the compilers and all of the basic support systems. They have over 400 professional staff, programmers, analysts, mathematicians, etc.

3

McKenzie characterized their operation as "a large software shop to do all the Navy's systems work." Apparently they concentrate on large strategic systems, management information systems, command and control, etc. They stated that most of NAVCOSSACT's computer installations were for their own use in systems development, but that when they had spare capacity they were also in the business of serving Navy groups with machine service.

4

Note: McKenzie mentioned that most of their users are on the WWMCCS; so that most of their software is aimed to operate on these Honeywell machines.

4a

McKenzie said that he was extremely impressed with our system; he apparently has looked at many support systems, and he felt that ours was better by far from what we had shown them. They still had many questions -- e.g., possibilities of their somehow taking NLS or Utility service into their environment. They had heard about NSW, and were very much interested in it also. It appears they are just as likely to join in with NSW for a common pursuit as they might be in starting something on their own. I told him this would be a very

Discussions, 19 Sep 74, with McKenzie and Sorkowitz of NAVCOSSACT

sensible approach. I also mentioned that if they wanted to buy in independently to our Utility support service they could be related but somewhat independent.

5

Note: The next day I gave their names to Bill Carlson, who was very much interested in contacting them for possibly joining into his NSW program.

5a

Action: Perhaps one telephone call during October to verify that they will indeed come on November 4th, otherwise wait until that time to get follow-up details. Apparently on that visit McKenzie and Sorkowitz will be accompanied by their mutual boss.

6

I promised to send Doug McKenzie some of our background literature. His full mailing address is as below: see DCE for address

7

Discussions, 19 sep 74, with McKenzie and Sorkowitz of NAVCOSSACT

(J24142) 14-OCT-74 09:32;;; Title: Author(s): Douglas C.  
Engelbart/DCE; Distribution: /SRI=ARC( [ INFO-ONLY ] ) ;  
Sub=Collections: SRI=ARC; Clerk: JML;

Talk with Capt. Jefferson, DCA, 19 Sep 74, on AKW use for system development

Captain Robert Jefferson, USN, is currently assigned with the Defense Communications Agency. I first learned from him from a memo of his (XDOC -- 23784,) giving what appeared to be a minority report about future planning for command control systems within the Defense Communications overall system. Jefferson had a very advanced view (to my mind) in his approach of involving the organization and methodology of a Group with the implementation of new tools; this being essentially our "AKW System" approach. Apparently Jefferson had read at least one of our 1973 papers before writing that thinkpiece. 1

Jefferson is the deputy leader now of the Special DoD Study Group on Internetting (the head of it is Dr. Robert Lyons of DCA). I found Jefferson in one of the SRI-DC offices and stopped to talk. We quickly found common ground in talking about the new systems. I told him that I had liked his report very much. 2

The main item to report here is the conclusion that we developed during our discussion; that the best place for DCA to consider the first application of the Augmented Knowledge Workshop techniques would be to support the system developers who do the planning, implementing, and operational installation etc, for their new large systems. Jefferson very quickly caught the "bootstrapping" flavor of this and seemed to respond very positively. 3

We (ARC) have an agreement with Phil Whalen's Systems Evaluation Department, in SRI's Engineering Systems Division, that they will be the interface group for dealing with the DCA applications of our Augmented Knowledge Workshop techniques. This mainly results from the highly secret nature of much of the DCA applications. We are establishing this approach for any application which tends to have secret type of an application conditions; e.g., a qualified intermediate systems group will do the actual inside-system analysis and contact work behind the secrecy barrier, and we will do all of our dealings with this intermediate group (and perhaps some with the ultimate client) through totally open technique-oriented dialogue. 4

I will bring to Phil Whalen's attention the discussion above, and urge him to give strong attention towards shaping the evolution of any DCA applications towards the first stage of applying the tools in support of the system developers. 5

Talk with Capt. Jefferson, DCA, 19 Sep 74, on AKW use for system development

(J24143) 14-OCT-74 09:36;;; Title: Author(s): Douglas C. Engelbart/DCE; Distribution: /SRI-ARC( [ INFO-ONLY ] ) BC( [ INFO-ONLY ] ) ; Sub-Collections: SRI-ARC; Clerk: JML;

Discussions and demos with NSA groups, 17 and 18 Sep 74

One of the main reasons for my Washington trip of the week Sep 16 through 20 was to take part in a series of demonstrations and meetings with various groups from the National Security Agency (NSA). Jean Iseli of MITRE, a long-time acquaintance via the Network, has been involved for some time in planning activities for NSA's approach to putting their computers on an internal ARPANETlike network. Jesse Hill is an acquaintance of some standing also. An NSA employee, he was very active along with Iseli in organizing the successions of meetings.

1

One group of perhaps ten people came to SRI-DC on Tuesday morning September 17 between about 9:15 and 12 noon. I gave a fairly informal chalkboard talk and DNLS demonstration (the communication link from the TIP was in very flaky shape so the Line Processor kept hanging up). Despite the Line Processor problems, I seemed to get most of the points across and in general the demonstration seemed to satisfy what Jesse and John were after. These people apparently were management-oriented types, representing various activities within the Agency that were going to be touched in one way or another by the advent of the Network.

2

On Wednesday morning, 18 Sep 74, another (slightly larger) group came for a like period of time. These people were more technically oriented than the first group. The discussion took a different path, the demonstration was similarly flaky, but in all again it seemed to provide some new insights and useful information to them.

3

On Wednesday afternoon, Jean Iseli, (a MITRE management guy) Bill Woodward, Phil Whalen (SRI-Menlo; re his relationship here, see -- 24143,4), and I went out to Fort Meade. Jesse Hill hosted us; he set us up in a large conference room. A miscellaneous group of perhaps 20 people in all showed up and the more or less open dialogue between me (standing at a blackboard) and different of the groups lasted until perhaps 5:00. We covered many of the specific technical and methodological approaches by which a distributed workshop can be given coherence via a frontend, via a control meta-language, via modularity and via "reach-through" facilitation from a core workshop into such special-purpose application systems as a large database management system. These features were discussed in some detail. I also discussed moving the Backend onto other machines, and the need for human technology-transfer agents (what we call "Architects") in the development of new habits and patterns of usage for novel technology among a user community. I tried hard to relate all of these issues directly to the situation that they were bound to find in their new network.

4

I spent considerable time on Tuesday morning outlining the "market" dynamics when a network is viewed as a "transportation

Discussions and demos with NSA groups, 17 and 18 Sep 74

system." So in general I covered quite a few of the basic conceptual components of our whole approach,

4a

Towards the end of Wednesday afternoon, the discussion concentrated between Tom Hassig and me. Tom is the man responsible for the total implementation of their internal network. He had a number of questions pertaining to cost and payoff of NLS and the problems they would have in justifying paying for its inclusion in their plans. I emphasized that we would feel safer if any such utilization experimentation went at a slow and evolutionary pace. But I also emphasized (for perhaps half an hour) the high payoff potential if NSA would begin its exploration or at least a major part of it by applying our AKW techniques to the augmentation of their system developers. I used a number of the bootstrapping arguments to build our case, and I had a hopeful feeling that I was making headway with them.

5

Two men who were at one of the morning demonstrations, and at the Wednesday afternoon open discussion, were to be responsible for what was described loosely as the "NIC of the NSA network." I gathered that they were in a fair state of puzzlement about their challenge, possibilities, and problems. Their only comment when asked if they had questions Wednesday afternoon was that "we've got all the food for thought that we can handle right now; we'll have to digest it first." I gathered that they will be the ones for whom Mil Jernigan will work.

6

One man seemed particularly interested in the possibilities of moving the NLS Backend into another system. He apparently has a Burroughs 6700 in which the support of NLS in this fashion might be a very logical application. It seemed as though if they found NLS to be useful they might be interested in supporting some of this transfer work. I didn't catch his name, but Iseli or Hill could provide it.

7



Discussions and demos with NSA groups, 17 and 18 Sep 74

(J24144) 14-OCT-74 09:40;;; Title: Author(s): Douglas C.  
Engelbart/DCE; Distribution: /SRI-ARC( [ INFO-ONLY ] ) BC( [ INFO-ONLY ]  
); Sub=Collections: SRI-ARC; Clerk: JML;

Talk with John Crandall, 19 Sep 74, on binary keyset NP for deaf and dumb

John Crandall, whom I had earlier talked with about the Rehabilitation Engineering possibilities ( see report == 24140, ), got in touch with me Thursday 19 September 1974 for a specific talk. He has a daughter who is deaf as well as handicapped with cerebral palsy. He has been very active in organizations to help deaf and dumb people. He had been struck with the simplicity of our binary keyset, and wanted to know what I thought of the possibilities for its use as a communication device for the deaf or dumb.

1

He mentioned the need for both deaf and dumb people to be able to use public telephone systems to be able to communicate, but that the problems of either not being able to hear or not being able to talk were very difficult. He pictured tone-keying devices that a keyset could actuate, and at the other end some kind of tone transducer that could provide a visual readout. He felt that small, light-weight devices to work at either end could be made and that the keyset seemed an ideal type of entry device.

2

I mentioned to him our earlier experiments with tactile stimuli in the fingers, so that indeed the same 5-bit keying pattern could be received via the finger stimulation at the receiving end. I told him of the notions we'd had about a light glove-like device that would allow a user to stroke his chords by drumming his fingers on any hard surface and to receive via the stimulation of his fingers by vibration or electrical stimulus from the glove.

3

We didn't carry this to conclusion, but with his enthusiasm and contacts, it does seem possible that he might want to promote some development projects along this end. For my part I would like to see the handicapped people be given a leg up in this fashion, and I also feel that the non-handicapped, having simple input and output portable transducers of this kind, could extend the flexibility of use of computer augmentation tools. So for me there's a double payoff, and I would welcome further progress along this line.

4

Talk with John Crandall, 19 sep 74, on binary keyset NP for deaf and dumb

(J24145) 14-OCT-74 09:47;;; Title: Author(s): Douglas C. Engelbart/DCE; Distribution: /SRI=ARC( [ INFO-ONLY ] ) ; Sub-Collections: SRI=ARC; Clerk: JML;

Applications Software Areas of responsibility--Preliminary outline

Hardware Support	1
Diagnostic programs	1a
for debugging remote site hardware	1a1
these often have to be modified for individual problems	1a1a
User Development Support	2
Bug/glitch interface to software specification, etc.	2a
Staff instruction in	2b
Operations procedures	2b1
System organization	2b2
Subscriber-programmer support	2c
NLS verification	3
Source file	3a
NLS run file	3b
Internal NLS functions	3c
Software specification, checkout, and acceptance	4
NLS modifications	4a
Don't forget we need a multi-host journal system before Office=3 arrives	4a1
User programs	4b
Analysis programs	4c
Maintainance	5
Journal Files	5a
Catalog storage management	5a1
User catalog production support	5a2
Dual-site consistancy	5a3

Applications Software Areas of responsibility--Preliminary outline

Crash recovery	5a4
Group allocation system	5b
Operations Support	6
Tymshare liason	6a
Tenex problems	6a1
These might involve contacting KEV, WRF, DCW, or BB&N.	6a1a
Journal maintainance procedures	6a2
General Opertions procedures	6a3
NLS Development Support	7
Enough time must be spent doing things in the software to keep current on its layout and functioning. It is also nescessary to know which development programmers are knowledgable in which areas. As a practical matter, this implies taking continuing responsibility for the areas of the system where one becomes significantly more proficient than others.	7a
Internal NLS	7a1
user Programs	7a2
Lineprocessor	7a3
PDP11	7a4
operating system	7a4a
frontend development	7a4b
Network protoCol	7a5

DCE 3-OCT-74 15:26 24154

About system-loading, service billing, usage policy

RWW and JCN, special attention please

About system-loading, service billing, usage policy

Re, LOADING & USAGE: The level of dissatisfaction with responsiveness at both ARC and OFFICE-1 machines has reached the point where I need to see better hard data and to reach a better understanding of related plans and possibilities.

1

Jim Norton told me and Dick Watson yesterday morning that he would see that: hard data were extracted from Superwatch records, that Robert Lieberman's new charter in Applications Group would cover this analysis, and that Robert would have direct responsibility for hitting this particular analytic problem right away.

1a

I talked with Robert this morning; my understanding of his pursuit seemed to match his, except for priorities (apparently Jim hadn't had time before he left to relate to Robert his agreement to provide hard analytic figures soon). In response to our discussion, Robert expects to proceed as follows:

1b

Inform Jim Norton of his general plan and keep coordinated and in touch;

1b1

Learn basic Superwatch operation from Jeff Peters and Susan Lee (later approach Don Andrews for specialized consultation if needed);

1b2

Make his immediate priority in this analysis be on understanding enough about the situation to increase my understanding and approval of what's happening to a state satisfactory to me -- perhaps impelled by my potentially not being satisfied, further study about alternatives of usage policy, operating policy/practice, TENEX scheduler, two-NLS service, more core, etc, etc, to the point where between Jim and me is reached agreement toward effective policies or other remedial action to be taken.

1b3

I asked also to be shown whatever records of problems and dissatisfaction the Utility had experienced. Robert would ask Jim Bair for these.

1b3a

Some relevant recent SNDMSGs:

1c

J02-1259 WATSON: You're Playing with Fire  
Distribution: ENGELBART, NORTON  
Sent: 2-OCT-74 1259-PDT

1c1

Enclosed is message from Carlson which confirms other reports that keep appearing from RADC and others that we can not seem to learn to not only charge high prices but give good service also in terms of response. The load

About system-loading, service billing, usage policy

average here is now 12 and intolerable. Once more I repeat my advice beef up the memory and get a decent drum system for your Office 1 and 2 and lets stop pretending we can support all the people being loaded onto Office 1 and here or there won't be customers for any of us

1c1a

2-OCT-74 1227-PDT CARLSON at USC-ISI; OFFICE-1 RESPONSE  
Distribution: NORTON AT SRI-ARC, carlson, lloyd, crain,  
watson at sri-arc  
Received at: 2-OCT-74 12:29:12

1c1b

I WAS JUST FORCED TO LOG OUT OF OFFICE-1 AND USE TECO AT ISI FOR THE THIRD TIME THIS WEEK BECAUSE THE RESPONSE WAS SO BAD THAT I COULDN'T GET ANY WORK DONE. THE SYSTEM IS CLEARLY BEYOND THE KNEE IN THE RESPONSE TIME VERSUS NUMBER OF USERS CURVE. THAT SEEMS TO IMPLY THAT TOO MANY SLOTS HAVE BEEN SOLD. WE MUST SOMEHOW LIMIT THE NUMBER OF SIMULTANEOUS USERS SINCE I CAN ONLY CONCLUDE THAT THE SYSTEM IS NOW USELESS TO EVERYONE,

1c1b1

It  
It is only fun to work on or with computers in an interactive mode when you can get some work done. Those Fortran guys are killing us and they are not NSW people (there are two on now). Discouraged Dick

1c1c

J02-1304 WATSON: Back to Q4  
Distribution: ENGELBART, NORTON  
Sent: 2-OCT-74 1304-PDT

1c2

Charles says lets go back to Q 4 load average of 6. Please let me know when its in effect. Dick

1c2a

J03-0611 NORTON: More Memory at Office-1  
Distribution: HARDY, watson, engelbart, norton  
Sent: 3-OCT-74 0611-PDT

1c3

Martin: The following sndmsg from Pollack tells us that they CAN add 64k memory for 5500/month right now at office-1,,,by Oct 14. We MUST do this. Please go into action,,,requisition, PO after tlking with pollack and Floyd. RADC does NOT control the configuratin,,,there are too many buyers for them to do so , so i dont think the potential approval delay will effect us. If there is to be one, certainly duane stone (beside me) will approve it),

1c3a

Also, though this addition of memory is not the result of a study determining the optimum wat to reconfigure, ti appears to be the only quick affordable way to go. With the user



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responses we are getting, the return of vacationers, the growing sophistication of use, multiple output processing, NSA coming and attitudes that demand attention and action from us WE MUST DO IT AND FAST, SO go into action for me please and inform me today before 1pm yer time of the state you get it to today., or cal me at (315) 330 3857 to discuss if you want.

1c3b

Here's Pollack's sndmsg,  
2-OCT-74 16:32:18,723  
Net mail from site OFFICE-1 rcvd at 2-OCT-74 16:32:16  
Date: 2 OCT 1974 1630-PDT  
From: POLLACK at OFFICE-1  
Subject: ADDITIONAL MEMORY FOR OFFICE-1  
To: NORTON, NORTON at ARC  
cc: POLLACK

1c3c

SUCCESS, WE CAN ADD 64K TO OFFICE-1 ON OCT 13, ON-LINE OCT 14.

1c3c1

THERE ARE CERTAIN ADVANTAGES IN HAVING MORE 10'S THAN ANYONE ELSE AROUND,

1c3c2

COST: 5500/MONTH THRU END OF CONTRACT, WE WOULD BE ABLE TO LOWER THE PRICE FOR NEXT YEAR IF YOU DECIDED TO MAKE IT PERMANENT.

1c3c3

HOW DOES THAT SOUND? I'VE BEEN A LITTLE FASTER WITH THE RESULTS THIS TIME THAN I WAS WITH THE TOTAL SYSTEMS COSTS, SORRY FOR THAT, HOPE THIS MAKES UP FOR IT,

1c3c4

PLEASE LET ME KNOW AS SOON AS POSSIBLE WHAT YOU WANT TO DO . THANKS EDWARD -----

1c3c5

J03-0631 NORTON: Fire distribution: WATSON, norton, engelbart  
Sent: 3-OCT-74 0631-PDT

1c4

Playing with fire is the name of the game,

1c4a

Related topic -- SERVICE COSTS, CHARGING POLICIES FOR ARC USAGE OF UTILITY SERVICE,

2

Dick Watson's NSW budget is quite pinched, for Producing the results that all parties want to see. His budget for computer resources is lower actually, on computer charges per software salary dollar, than what seems to be the IPTD "accepted level." For people used to using "exotic" facilities (speaking of the features, not the responsiveness), even this "average" would be

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low. Therefore Dick is very much innerested in obtaining the most computer service for his money. I enclose relevant messages:

2a

J02-1715 WATSON: Sutherlands estimate of PDP 10 cost for NSW  
Distribution: NORTON, ENGELBART Sent: 2-OCT-74 1715-PDT

2a1

Bert thinks he could offer a whole 256K machine to NSW for about 400K per year. Pieces of the machine in bulk would be proportional plus. That means the equivalent cost of a slot on a BBN run machine would be somewhere around 25K per year or 12.5K per six months. The 92.2K in the NSW budge could buy 7.5 slot equivalents at BBN versus 4.5 at 40K on Office 2. One would also expect the BBN machine to be lightly loaded after 2:00pm. The difference of 3 slots is significant increase of 66% over he 4.5. In good conscience it would be very hard if not impossible for me to ask my staff to struggle ith the lower number of slots knowing what the same amount of money would buy elsewhere. Dick

2a1a

In its current push for a business plan and an SRI-budget proposal, our Applications Group anyway will need to resolve the issues underlying the final policy we must set on service rates to ARC users, and as the Development Group's plan and budget proposal is evolved and integrated with Application's into an all-ARC plan and budget, we'll have to address the other related issues -- so, what will apparently need to be involved in resolving the NSW-project's service question are matters that anyway must be handled in the coming two weeks. It might be that we'll need to accelerate dealing with some issues to serve the commitment deadlines for NSW (and TYMSHARE??).

2b

I'm asking Dick to adopt the following approach and time scale: For the time being, assume that ARC's NSW project will contract with our Utility for its NLS services. By 18 Oct, if the arrangement doesn't seem to be converging, he would be able to take action toward other commitments. In any event, I don't want other commitments made without my foreknowledge and approval.

2c

I'm asking Jim Norton to go along with the following: I want to have a better picture painted for me of the relavent issues here. Dick and Jim will both be away next week; but I would like to have my education proceed anyway in their absence. I'd like to be free to ask for help from Bob Ratner and Robert Lieberman in relation to business plans, business analysis, and computer-systems analysis. I expect them to keep in touch with Jim Norton about what goes on, and that jim can exercise his judgments and decisions through them in this matter.

2d

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I don't expect that any decision will have to be taken before  
Jim and Dick return,

2d1

This particular matter is recognizeably important, but it can't  
be allowed to distort the whole scene, of course. For that  
reason, I'd like to clarify the primary issues with maximum  
dispatch,

2e

arpa glossary

Got your copy of the Arpa book glossary - now what do you want me to do with it? Comments, additions, or both? By when. Didn't know there was going to be a glossary - was that in the latest release by Craig (which I perused somewhat casually!)? Anyway, let me know what action you would like to have from me, Jake

1

Comments and vote on your simple graphics categories for NLS

My immediate reactions to RLB's (JJOURNAL,24120)

## Comments and vote on your simple graphics categories for NLS

Bob: Here is my vote on what kind of graphics are initially needed in a simple line drawing capability. 1

Block diagrams, etc., would most heavily be used by programmers (flow charts) and managers (PERT-type graphs). However, the problems associated with arranging such a diagram on a screen or on hardcopy as well as the problems of automatically producing such diagrams from the data (i.e., the program) would, I think, put this into a less useful category unless an extensive system is developed. 1a

For programmers who are making flowcharts just using templates, a simple capability would suffice. 1a1

The 2D plotting, etc., would get my strong support as the most useful kind of diagrams in an initial system. It most likely has the highest payoff in terms of satisfying the key people (i.e., hitting the managers - they always want bar graphs and 2d plots). 1b

The 3D set of capabilities seems the least desirable at present. Probably most costly and impacts a very different sort of group of people. The desires of users having a few facilities in this area would be more, thus causing greater pressure to give more graphics. All in all it would be a bag of worms, I think. 1c

A slightly different kind of drawing would be 2D mathematical graphs (directed graphs preferred). It is like the 2D plots but without the function requirement (i.e., it is multi-valued) and it is like the block diagrams, but with a very simple set of templates (and usually with very simple labels at the 'node' points.). 1d

This would be very desirable by me, but, alas, I think not useful enough for our general user community. 1d1

I would be glad to give more comments whenever appropriate. 1e

Robert 1f

BUG:journal system, pushing its way in.

The journal system apparently pushed me out of my initial file as indicated by 'file locking conflict', reloading the file showed the deliver of journal items. I thought this was the old way, thought you should know, RLL

1

Output Processor Bug: SNFRel

When SNFRel=On then the directive SNFShow=<=5 is interpreted  
wrongly, as SNFShow=>5 .  
I am waiting to release the format library until this is fixed.

1



NDM 3-OCT-74 17:27 24159

Problems at DDSI: Stick Fonts again,

Distribution: DYN,

Problems at DDSI: Stick Fonts again.

Stick fonts did not print in the run which included the format library samples. I have made adjustments in some of the formats and will prepare twelve new files for whenever the stick font problem gets fixed. Please let me know, Dirk, if you would like to see any changes in the formats, or additional formats.

1

Retraction: OP Bug SNFRE1

Please withdraw my OP bug report on SNFShow. Confusion due to DDSI  
problems... sorry.