Cross Reference system: instructions for use

Try it out I would like to improve the interrogate commands but know know exactly what is needed - please use it, find out what you would like to be able to do, and send me a message. Lsso, tell me about any problem.

Cross Reference system: instructions for use

The cross reference system has two products: the SYSGD file, and the cross reference data base file. It also provides a little assistance here and there to find out where things are in ssave files. The name of the subsystem is UNTRACE. 1a1

The sys-guide in simply an NLS file with a statement for each procedure in the NLS source code. The name of each statement is the same as a procedure name. These contain a link to the actual procedure source code. In the future it will contain a one-line comment about the procedure. 1a2

The SYSGD file is made via the Create Sysguide command. The resulting text file is inserted into an NLS file, and modified by a user program. The user program restores truncated names to their full length. The file is then sorted. 1a2a

The cross reference data base file is a compilcated non-text file that contains a node network that corresponds to references made in any given ssave file. The file is made directly from an ssave file, and reflects object code rather than the source code. Some ramifications of this are: 1a3

Symbols that are longer than 6 characters are truccated to 6 characters. 1a3a

Calls to low-level routines, produced by L10 to accomplish some construct, are visible. They are not visible in the sources. 1a3b

In MACRO, references inside macros are visible. 1a3c

Etc. 1a3d

Two operations exist with respect to cross reference commands: creating a cross reference file, and interrogating an existing cross reference file. 1a4

A special set of commands allows users to interrogate the cross reference file. 1a4a

The creation of the cross reference file is done

according to many parameters, e.g. where in the save file to look for references, what opcodes are legal references, etc. Hence it will probably be desriable to have several cross reference files, containing different kinds of references. 1a4b

General Features 1b

Help can be obtained at any command specification point by typing a question mark. 1b1

Backspace character with ↑A when typing strings of any kind. Use ↑W to back up over an entire string (start over). 1b2

Rubout (DEL) or ↑X (CD) can be used at any point to return to top level command recognition. 1b3

Command Accept and CR can both be used for command confirmation. File name specification requires a CR. 1b4

The three basic command modes for the UNTRACE subsystem are: 1b5

Untrace (for printing TRACE files) See (15378,) 1b5a

Interrogate (for printing cross reference files) 1b5b

Xref (for creating cross reference files, and sys-guides) 1b5c

The normal state of affairs in the cross reference usage will be that "references" are subroutine calls. But that is not necessarily the case - a reference can be any machine instruction reference. Hence, in the printouts, the term "reference" is used: They are of the general form reference FROM <symbol1>+dsp1 to TO <symbol2>+dsp2 (and may be written as TO <symbol2>+dsp2 FROM <symbol1>+dsp1). In this case, <symbol1> is the closest symbol smaller that the address represented by <symbol1>+dsp1, and likewise for <symbol2>+dsp2. This means simply that an instruction dsp1 cells past <symbol1> satisfied the criteria for a reference, and that the address of the instruction was <symbol2>+dsp2. 1b6

Interrogation Commands 1c

A cross reference file name is extracted from the user upon

entering the interrogate command mode. The default file name is <NLS>NLS.XREF - which means that the directory name must be provided if you don't want a file in <NLS>. 1c1

The file <NLS>NLS.XREF is the cross reference data base file for L10 calls and returns. 1c1a

Print (or Type) commands: 1c2

The Type commands are the same as the Print commands, except that output is always directed to the controlling teletype. 1c2a

Print X reference file (cross reference file) 1c2b

This command prints the entire file after extracting several things from the user: 1c2b1

The max level of depth to show (normally one). 1c2b1a

Whether or not to show references TO symbols 1c2b1b

Whether or not to show references FROM symbols 1c2b1c

This command is not generally used, unless the cross reference file is quite small or a hardcopy reference is desired. 1c2b2

Print References To <symbol> 1c2c

The user specifies the symbol. The program uses the current max level parameter and prints all references from any symbol TO the specified symbol. These are listed as FROM references for the specified symbol. 1c2c1

Print References FROM <symbol> 1c2d

Similar to Print References TO <symbol>, but prints all references FROM the specified symbol to any symbols. These are listed as TO references for the specified symbol. 1c2d1

Print References Both TO and FROM <symbol> 1c2e

Does the obvious thing. 1c2e1

Print Map 1c2f

This command produces a map similar to the map obtained after loading. The map corresponds to the SSAVE file from which the cross reference file was made. 1c2f1

Max level assignment 1c3

The user may specify the max level parameter. It is used by the print commands. 1c3a

Include (in printout) 1c4

Include Opcodes (No or CA) 1c4a

This is a switch that controls the printout format. If set, the opcode for each reference will be printed. 1c4a1

Include Address (No or CA) 1c4b

This is also a switch, and controls the printing of the addresses of symbols. Octal addresses for each symbol will by printed if set, otherwise only symbols will be printed. 1c4b1

Opcode filter specification 1c5

This command allows the user to specify an opcode and mask. An opcode of zero disables the filtering. A non-zero opcode causes only references which satisify the test 1c5a

opcode (top 9 bits of instr) .A filter mask = opcode filter 1c5a1

to be "visible" to the Print, Type and Search commands. 1c5b

Search for references for a reference to <symbol1> 1c6

From <symbol2> 1c6a

This results in a search of the references from <symbol2> to <symbol1>. The number of such references is printed on the controlling teletype. If that number is non-zero, the user has the option of printing the list of references on a file. 1c6a1

In range of <symbol2> 1c6b

This command is an extension of the preceeding one, and allows the user to specify how far down the reference chain he would like to look for a reference to the desired symbol. 1c6b1

Thus if routine A calls routine B, which calls routine C, etc., down to Z, the user can search for references to routine Z in the range of routine A. If the max level to search is 5, there will be no references found. If the max level is 26, one reference will be found. 1c6b2

All references are found before interacting with the user. That may be a long time, if the level is very deep. So test for shallow levels first, then go deeper as necessary. 1c6b3

The printing shows all levels of references from <symbol2> down to <symbol1>, which are part of the reference branch(s). Also, all possible routes are shown, even though parts of different routes by be the exact same reference chain. 1c6b4

Where is <symbol> 1c7

This simple command types out the program name and address for any symbol in the cross reference file. 1c7a

XREF (cross reference) commands 1d

An SSAVE file name is requested from the user when he enteres the Xref command mode. The default name is <NETSYS>NLS.SAV - be sure an include the directory name if you specify another SSSAVE file, since the default directory is <NETSYS>. 1d1

Create 1d2

X reference (cross reference) 1d2a

This command is described in the next section 1d2a1

Sys-guide 1d2b

The user provides an output file. A sequential text file is produced. It is sorted on file name, and ready for insertion into an NLS file. Symbols are

truncated to six characters, and must be restored by a special user program for that purpose. 1d2b1

Where is <symbol> 1d3

Types out the program name and address for any symbol in the SSAVE file. 1d3a

Print (or Type) Map 1d4

This produces a map similar to the one obtained when the SSAVE file was loaded. The Type command puts it out on the controlling teletype, the Print command obtains a file name from the user. 1d4a

Cross Reference data base file creation 1e

The user provides the ssave file name when he enters the XREF command submode of the UNTRACE subsystem. 1e1

The Create X reference file command is used. 1e2

The user is interrogated about several parameters: 1e3

First, a list of address bounds (symbolic or octal) over which the scan for refrences will take place. The current <arbitrary) limit is 20 bound pairs. For example: 1e3a

b11, b12 1e3a1

b21, b22 1e3a2

b31, b32 1e3a3

Next, a set of opcodes is requested. Opcodes are specified by function, or directly (symbolic or octal) with a mask (both 36 bit values). With each opcode set, a list of address bounds may be specified. Only instructions with satisfactory opcodes and addresses within one of the specified bound pairs will constitute references. Actually, a default set of bounds is requested before the opcodes are requested, so that you don't have to specify a list of bounds unless you want something unusual. 1e3b

The opcode options are: 1e3c

L10 calls (including only L10 procedure calls) 1e3c1

Calls (including PUSHJ and JSP) 1e3c2

Stores (including all instructions that store and do not have the indirect bit on) 1e3c3

JSYS (including only JSYS instructions with no indexing, no indirect bit on). 1e3c4

References (Including all instructions with indirect bit =0 and index register =0) 1e3c5

Actual opcode (allows specification of actual opcode, and mask to be applied. Note that the masking and compare operation takes place on the full instruction word) 1e3c6

What takes place during the computation is briefly this: 1e4

The ssave file is scanned from low addresses to high according to the bounds b11 to b12, b21 to b22, etc, except that the bounds list is sorted first. 1e4a

If any pages are missing, that's fine. Such occurrances are counted. 1e4b

A table of references is built during the scan. Then an index is built as every symbol (that is either referenced or references something) is looked up. 1e4c

Finally, the cross reference network is built in such a way that no symbol lookups are necessary to print references and symbols. 1e4d

Only the following information is preserved: 1e4e

The address, symbol and program name for each necessary symbol. 1e4e1

The top 9 bits of each instruction which constituted a reference. (This is the opcode, but does not include the register, index, or indirect bit, even though the opcode test may be partly based on those bits). 1e4e2

The symbol referenced, in the form or a symbol index and a displacement from that symbol. In the case of

procedure calls, this is the procedure address plus a displacement. displacements greater than four pages (3777 octal) constitute errors and are stored as displacements of 3777. 1e4e3

The entire symbol table is taken from the ssave file as well. 1e4e4

The name (including version number) of the ssave file is saved. It is included in the heading of all printouts. 1e4e5

The user then provides the output file name, and the whole thing is mapped out to the file. 1e4f

Extensive error writing is done during the computation (if requested). 1e4g

The errors you might get are as follows: 1e4g1

"page not present in ssave file" 1e4g1a

-means that one of the bound pairs b11 to b12, etc. include a "hole" in the ssave file. This is of no real consequence if the missing pages are really suppose to be missing, e.g. large arrays, no program loaded there, etc. 1e4g1a1

"can't find symbol for <address> " 1e4g1b

This is (usually) a recoverable error. It is trying to find a symbol for that address. It is not unreasonable to have one of these for each bound pair b11 to b12, etc., depending on the ssave file layout. 1e4g1b1

"reference <to or from> a symbol with dsp > mxdsp" 1e4g1c

This means that a reference address (or referenced address) does not have a symbol within MXDSP (currently = 3777). Very many of this type of error indicates that something is screwed up. Good luck. 1e4g1c1

"no ref TO symbol <symbol> " 1e4g1d

This is a warning message. It indicates that the specified symbol is never referenced,

according to the specifications for a reference. It may be that these symbols are not used at all, or simply are not referenced by the kind of reference you were looking for. 1e4g1d1

These errors are printed on a file, and summarized on the controlling teletype. 1e4g2

You may get more serious error messages on the controlling teletype (whether you request to see errors or not): 1e4g3

"symbol failure in makindex - semi-abortive return" 1e4g3a

Which means that it can't recover from a symbol lookup failure. It could be that the symbol table is messed up or not all there. The process continues and the resulting file may be useful, depending on exactly where the error occurred. This error will almost certainly cause the next type, which is: 1e4g3a1

"logic error in makxref (index or link) - semi-aboritive return" 1e4g3b

Which means that the tables produced by makindex were incomplete or messed up. 1e4g3b1

Finally, there are FATAL errors, which are criptic messages including the phrase "cannot proceed" and are usually the result of a bad ssave file, a user mistake, or a programming error. 1e4g4

If you have trouble with errors, contact DIA. 1e4g5

The whole operation takes a few minutes of CPU time, depending on the number of opcodes, the size of the ssave file area to be scanned, the number of references actually found, etc. 1e4h

Processing all L10 calls and stores into DATA for NLS takes just under 2 minutes of CPU time. 1e4h1

Considerations about the use 1f

The cross reference of all L10 calls for NLS is about

20,000 references. The hardcopy printout would be about 40,000 lines, or about 800 pages. 1f1

Online interrogation is fast. It may eventually be incoperated into NLS and usable with a split screen and all. 1f2

It is reasonable and practical to create a special cross reference file for a specific purpose. For example to find a store into a certain cell or group of cells from a set of procedures. 1f3

Cross reference file creation is very fast on small ssave files, or small parts of large files. 1f4

Cross Reference system: instructions for use

(J16275) 3-MAY-73 10:38; Title: Author(s): Andrews, Don I. /DIA;
Distribution: /NPG KEV DCW; Sub-Collections: SRI-ARC NPG; Clerk: DIA;
Origin: <ANDREWS>DOCXREF.NLS;9, 3-MAY-73 10:25 DIA ;

Whenever a control W (backspace word) is used in typing a comment, it doosn't work, and you get the message illegal string designation (this is in TNLS). Very frustrating. 1

(J16276) 3-MAY-73 10:44; Title: Author(s): Andrews, Don I. /DIA;
Distribution: /JDH; Sub-Collections: SRI-ARC; Clerk: DIA;

imload for imlacs attached to tips

i am working on just that problem at this moment. 1

KEV 3-MAY-73 05:48 16277

imload for imlacs attached to tips

(J16277) 3-MAY-73 05:48; Title: Author(s): Victor, Kenneth E. (Ken) /KEV; Distribution: /DHC; Sub-Collections: SRI-ARC; Clerk: KEV;

KIRK 3-MAY-73 12:45 16278

You can jump to name on JSYS's now in <TENEX-DOC,JSYSMANUAL,1:x>.

If you have any trouble with this please let me know. 1

KIRK 3-MAY-73 12:45 16278

You can jump to name on JSYS's now in <TENEX-DOC,JSYSMANUAL,1:x>.

(J16278) 3-MAY-73 12:45; Title: Author(s): Kelley, Kirk E. /KIRK;
Distribution: /DCW MDK LPD KEV CHI DSK HGL CFD ;
Sub-Collections: SRI-ARC; Clerk: KIRK;

WLB 3-MAY-73 17:12 16279

BUG in VIEWSPEC Handling by Device Specification Command

This may be a feature, but I think it's a bug
When you change from DNLS to TNLS using the Device Specification command, your viewspecs get reset -- both upon entering TNLS and upon returning to DNLS. I believe that they should be left unchanged going both ways. -- Walt 1

WLB 3-MAY-73 17:12 16279

BUG in VIEWSPEC Handling by Device Specification Command

(J16279) 3-MAY-73 17:12; Title: Author(s): Bass, Walt /WLB;
Distribution: /bugs ; Sub-Collections: SRI-ARC BUGS; Clerk: WLB;

April 22-28, 1973: A WEEK IN REVIEW

WEEKLY ANALYSIS REPORT:

WEEK: APR 22-28, 1973 (24 HOURS/DAY)

TOTAL SYSTEM CPU: 32.841

(ARC)

IDENT	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU
(STAFF)					
(MFA)	.003	.020	.150	.009	7:1
(DCE)	.629	26.281	.024	1.915	42:1
(BAH)	.931	17.279	.054	2.835	19:1
(SRL)	.457	16.423	.028	1.392	36:1
(JCN)	1.230	19.823	.062	3.745	16:1
(DVN)	.019	.870	.022	.058	45:1
(PR)	.150	5.246	.029	.457	34:1
(RWW)	.125	5.375	.023	.381	43:1
	-----	-----		-----	
(TOTAL)	3.544	91.317		10.792	
(PSO)					
(KFB)	.140	12.078	.012	.426	83:1
(MEJ)	1.073	38.389	.028	3.267	36:1

(KIRK)	.886	30.216	.029	2.698	34:1	6a4c
(LLL)	.388	13.713	.028	1.181	36:1	6a4d
(NDM)	.795	22.539	.035	2.421	29:1	6a4e
	-----	-----		-----		6a4f
(TOTAL)	3.282	116.935		9.993		6a4g
						6a4h
(NIC)						6a5
(EJF)	.077	4.097	.019	.234	53:1	6a5a
(MLK)	.145	9.053	.016	.442	62:1	6a5b
(MDK)	.581	13.454	.043	1.769	23:1	6a5c
	-----	-----		-----		6a5d
(TOTAL)	.803	26.604		2.445		6a5e
						6a5f
(HARDWARE)						6a6
(MEH)	.041	2.900	.014	.125	71:1	6a6a
(JR)	.007	.188	.037	.021	27:1	6a6b
	-----	-----		-----		6a6c
(TOTAL)	.048	3.088		.146		6a6d
						6a6e
(TENEX)						6a7
(DIA)	.687	18.098	.038	2.092	26:1	6a7a
(KEV)	1.727	35.749	.048	5.259	21:1	6a7b
(DCW)	.278	18.051	.015	.847	67:1	6a7c
	-----	-----		-----		6a7d

April 22-28, 1973: A WEEK IN REVIEW

(TOTAL)	2.692	74.590		8.198		6a7e
						6a7f
(NLS)						6a8
(WLB)	.337	12.102	.028	1.026	36:1	6a8a
(CFD)	.373	13.306	.028	1.136	36:1	6a8b
(JDH)	.336	23.144	.015	1.023	67:1	6a8c
(CHI)	1.275	17.824	.072	3.882	14:1	6a8d
(DSK)	.899	19.634	.046	2.737	22:1	6a8e
(HGL)	.382	10.164	.038	1.163	26:1	6a8f
(EKM)	.322	15.226	.021	.980	48:1	6a8g
(JFV)	.003	.036	.083	.009	12:1	6a8h
(JEW)	.225	8.433	.027	.685	37:1	6a8i
	-----	-----		-----		6a8j
(TOTAL)	4.152	119.869		12.641		6a8k
						6a8l

(STATS) 6a9

HIGHEST CPU: KEV 1.727 hrs LOWEST CPU: MFA JFV .003 hrs 6a9a

HIGHEST CON: MEJ 38.389 hrs LOWEST CON: MFA .020 hrs 6a9b

HIGHEST CPU/CON: MFA .150 HIGHEST CON/CPU: KFB 83:1 6a9c

6a9d

(GROUP) TOTALS 6a10

GROUP	CPU HRS	CON HRS	CPU/CON	% SYS	
					6a10a
					6a10b

(STAFF)	3.544	91.317	.039	10.792		6a10c
(PSO)	3.282	116.935	.028	9.993		6a10d
(NIC)	.803	26.604	.030	2.445		6a10e
(HARDWARE)	.048	3.088	.016	.146		6a10f
(TENEX)	2.692	74.590	.036	8.198		6a10g
(NLS)	4.152	119.869	.035	12.641		6a10h
	-----	-------	----	------		6a10i
(TOT)	14.521	432.403	AV .031	44.215		6a10j
						6a10k
(OVERHEAD)						6b
(JCP)	1.621	23.637	.069	4.936	14:1	6b1
CAT	2.111	6.179	.342	6.428	3:1	6b2
DOCUMENTATION	1.068	3.648	.293	3.252	3:1	6b3
NETINFO	.254	9.412	.027	.773	37:1	6b4
OPERATOR	.960	13.320	.072	2.923	14:1	6b5
PRINTER	.006	.032	.187	.018	5:1	6b6
SYSTEM	4.000	97.184	.041	12.180	24:1	6b7
BACKGROUND	.550	58.057	.009	1.675	111:1	6b8
GILBERT	.094	.853	.110	.286	9:1	6b9
	-----	-----		-----		6b10
(TOTAL)	10.664	212.322		32.471		6b11
						6b12
(XEROX)						6c
						6c1

April 22-28, 1973: A WEEK IN REVIEW

NAME	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU	
						6c2
						6c3
(LPD)DEUTSCH	.114	2.713	.042	.347	24:1	6c4
(JGM)MITCHELL	.248	8.759	.028	.755	36:1	6c5
(EHS)SAT-WTE	.301	15.283	.020	.917	50:1	6c6
(RES)SWEET	1.338	21.013	.064	4.074	16:1	6c7
	-----	-----		-----		6c8
(TOTAL)	2.001	47.768		6.093		6c9
						6c10

(RADC) 6d

NAME	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU	DIR	
							6d1
							6d2
							6d3
BAIR	.221	16.279	.014	.673	71:1	228	6d4
BERGSTRM	.269	10.048	.027	.819	37:1	50	6d5
BETHKE	.010	1.462	.007	.030	143:1	18	6d6
CAVANO	.014	.885	.016	.044	62:1	38	6d7
IUORNO	.006	.146	.041	.018	24:1	28	6d8
KENNEDY	0	0	0	0	0	40	6d9
LAMONICA	.142	7.459	.019	.432	53:1	57	6d10
LAWRENCE	.388	7.496	.052	1.181	19:1	142	6d11
MCNAMARA	.135	7.281	.019	.411	53:1	126	6d12
PANARA	.040	1.257	.032	.122	31:1	77	6d13
RADC	.061	4.110	.015	.186	67:1	93	6d14

RZEPKA	.002	.104	.019	.006	53:1	73	6d15
SLIWA	.040	2.294	.017	.122	59:1	38	6d16
STONE	.588	20.179	.029	1.790	34:1	229	6d17
	-----	------		------		---	6d18
(TOTAL)	1.916	79.000		5.834		1237	6d19

(PER CENT TOTAL DISK CAPACITY) 6d20
2.55%

6d21

(NETUSERS) TOP FIVE 6e

6e1

NAME	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU	
						6e2
						6e3
UCSB	.793	25.893	.031	2.415	32:1	6e4
MITRE-TIP	.566	32.174	.018	1.723	56:1	6e5
BBN-TENEX	.424	21.649	.020	1.291	50:1	6e6
NBS-TIP	.308	12.654	.024	.938	42:1	6e7
BBN-NET	.230	7.329	.031	.700	32:1	6e8
	-----	-----		-----		6e9
(TOTAL)	2.321	99.699		7.067		6e10

6e11

(NET) TOTAL	CPU HRS	CON HRS	% SYS	
				6f
				6f1
	3.723	162.915	11.336	6f2
				6f3

BAH 3-MAY-73 21:53 16280

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(J16280) 3-MAY-73 21:53; Title: Author(s): Hardeman, Beauregard A. /BAH; Distribution: /WAR ; Sub-Collections: SRI-ARC WAR; Clerk: BAH;

DEX 1.5 Will Be Up For General Use in New NLS

Input only DEX-1.5 will be up for general use when the next major new version of NLS is brought up. It is much more efficient than DEX-1 and is, more importantly, easier to use for straight text input. Documentation will soon be available. In its absence, HGL or KIRK will be happy to explain its use. 1

Adding a DELETE Function to BSYS

I propose that a DELETE function be added to BSYS. 1

Invoking this function would cause a Delete bit to be set in the Archive directory entry for the specified file. 1a

The function would be invoked by the user with an EXEC command. 1b

The interrogate function would then ignore all such flagged files. 2

No tape storage space need be reclaimed as a result of the DELETE; the user would simply have a mechanism for logically deleting (so he doesn't see them any more) archived files which have lost their usefulness. 3

Adding a DELETE Function to BSYS

(J16282) 4-MAY-73 14:08; Title: Author(s): White, James E. (Jim)
/JEW; Distribution: /dcw np sri-arc ; Sub-Collections: SRI-ARC NP;
Clerk: JEW;
Origin: <WHITE>DCWMSG.NLS;2, 4-MAY-73 14:06 JEW ;

The Network Grooves Under 1.31

Since we came up on TENEX 1.31, Network problems are drastically reduced in frequency [see (15404,) (15444,) (15464,) for discussion of Network problems under 1.29]. 1

After over a month's experience with 1.31, I know of only the following problems: 2

(1) This Wednesday the Network was down most of the day due, apparently, to a Job Zero crash (part of the Network code in 1.31 runs as a fork under Job Zero). 2a

(2) Mike Padlipsky at MIT reported that one afternoon he connected to the NIC and got nothing but BELs. I asked him to call me in real time if it happened to him again, and he hasn't. 2b

There may be a couple others; I don't recall any. 2c

The Network under 1.31 seems to be a win. 3

The Network Grooves Under 1.31

(J16283) 4-MAY-73 14:30; Title: Author(s): White, James E. (Jim) /JEW; Distribution: /sri-arc ; Sub-Collections: SRI-ARC; Clerk: JEW; Origin: <WHITE>ARCMSG.NLS;2, 4-MAY-73 14:27 JEW ;

To: Beau Hardeman, for Item (1). To: NP File and Regular Channels for Item (2). 1

Note: Item (1) has been approved and is also being requested by Jeanne North. 2

The following program and/or program command changes are requested: 3

(1) Catalog Programs, both final and proof programs: 3a

(A) Titleword Index - Please change the program so that the following items in *c1 will not be picked up and used as titleword entries: 3a1

When *c1 (and *r1) contain the identification of group notes, the name of the group should not be picked up for a titleword, such as: 3a1a

TIPUG (from "TIPUG Note xxx") 3a1a1

PRT (from "PRT Note xxx") 3a1a2

INWG (from "INWG Note xxx") 3a1a3

ASS (from "ASS Note xxx") 3a1a4

NMG (from "NMG Note xxx") 3a1a5

This suppression is now done in the programs for NWG/RFC's, CBI Notes and SUR Notes. Please add the above Group identifications to the RFC, SUR, and CBI suppressions. 3a1b

(B) Author Index, Number Index, Titleword Index, and Organization Index - Please make the following change: 3a2

When *c1 and *r1 contain the identification of a Group note (i.e., any or any combination of the following: NMN #, INWG Note #, NMG Note #, PRT Note #, TIPUG Note #, CBI Note #, ASS Note #, SUR Note #), please pick up the contents of *c1, #1, add a colon after the contents of *c1 and then add a space and the contents of *c1,#1. 3a2a

This is presently done for RFC's. 3a2b

(C) Number Listing - Please make the following change: 3a3

When *f1 is "r" (meaning that the entry documents a

report), the program now picks up the contents of *r1 (which is the issuing agency's report number) and prints this number after the name of the issuing agency and before the document date. 3a3a

Please change the program to pick up the contents of *r2 also, printing it after the contents of *r1, separate the contents of the *r1 and *r2 fields by a comma space and terminate the series as now, with a period. The *r2 field gives the report or document number assigned by a government agency, in other words the so-called "AD number", etc., which serves as the ordering number when obtaining the document from NTIS, ERIC or some other government agency. 3a3b

(2) NLS, the Execute Assimilate command, and possibly the substitute command, though I really do not care particularly about the latter. 3b

Please change the Execute Assimilate command so that it can be used with viewspec "x" to assimilate into another file only the top line of all statements being assimilated. This kind of suppression is now in the command, applicable to STRUCTURE, but not to lines; that is, substatements (lower levels below where one is) can be suppressed in an assimilation, but lines cannot. 3b1

This change to the command (or an equivalent capability) would allow the easy and quick creation of one line indexes, so to speak. In handling catalog files and manipulating the catalog and online information, this ability to create a file of top lines only (without having to retype the lines) would save a great deal of disc space and allow a saving of time in finding entries. 3b1a

(J16284) 4-MAY-73 18:14; Author(s): Jernigan, Mil E. /MEJ;
Distribution: /JBN BAH HGL CHI NP MFA DVN; Sub-Collections: SRI-ARC NP;
Clerk: MEJ;
Origin: <NIC-WORK>REQUESTS.NLS;1, 4-MAY-73 18:11 MEJ ;

MDK 4-MAY-73 11:47 16285

SITE-IDENTS

A note to Jake Feinler asking her to work jointly with Nancy Neigus in ppreparing an RFC that defines groundrules for issuing and maintaining site-idents.

MDK 4-MAY-73 11:47 16285

SITE-IDENTS

Jake ... 1

I talked with Bruce Dolan of ARPA regarding the site-ident snafu. Here is the result of that conversation: 2

Ultimately the decision as to who and how the site-idents will be issued, recorded, and made available to others will be made by consensus among the main interested parties. 3

To get that consensus soon, Bruce suggested we (the NIC) together with BBN (Nancy Neigus) write down what we mutually think are the correct ground rules: 4

> where should initial responsibility for assigning a site-ident reside, what should be the ground rules for composing a new site-ident, what should be the rules for synonyms, where should the "official" list of existing site-idents be, who can modify that list, etc. 4a

Bruce cautioned us that there are two important factors that must be considered: the desires of the site, and the constraints of the various computer systems and users. 5

> the desires of the site are paramount: if they want a name that doesn't conflict with other names, and doesn't conflict with a MINIMUM of computer and user constraints (such as not too long to type, not in conflict with Tenex conventions, etc), then they should be granted that name. 5a

I would like you to follow through on this jointly with Nancy: prepare a draft RFC covering the total plan for issuing, maintaining, and providing knowledge of site-idents. Pass a draft of this plan by a few key people, namely Alex McKenzie, Jim White, Ed Schelonka, Bruce Dolan; then issue it as an RFC to key groups such as FTP, NLG and wait a reasonable time for a consensus before having it become official policy. 6

Thanks for your patience. ... Mike 7

16285 Distribution

Watson, Richard W. , White, James E. (Jim) , Feinler, Elizabeth J. (Jake) , North, Jeanne B. , Deutsch, L. Peter , Irby, Charles H. ,

SITE-IDENTS

(J16285) 4-MAY-73 11:47; Title: Author(s): Kudlick, Michael D. /MDK;
Distribution: /rww jew jake jbn lpd chi ; Sub-Collections:
SRI-ARC; Clerk: MDK;
Origin: <KUDLICK>JAKE.NLS;2, 4-MAY-73 11:31 MDK ;

MDK 4-MAY-73 17:33 16286

User Issues

cc: jew rww

MDK 4-MAY-73 17:33 16286

User Issues

Dave ...
re your note on "user issues" (mjournal,16256,1:w):
I have general complaints and suggestions and I'm willing to discuss these as well as those of other persons.
If your meeting is scheduled in connection with Bob Thomas' meeting at BBN on 21-May-73, then I would VERY MUCH PREFER it be on Sunday 20-May. Reason: heavy things happening here, and I will have been gone a week (including trip to MITRE for East Coast NLS course).
Please accept my apologies, Dave, for not responding sooner.
Thanks for including me.
... Mike Kudlick 1

16286 Distribution
Crocker, David H. , White, James E. (Jim) , Watson, Richard W. ,

User Issues

(J16286) 4-MAY-73 17:33; Title: Author(s): Kudlick, Michael D. /MDK; Distribution: /dhc jew rww ; Sub-Collections: SRI-ARC; Clerk: MDK;

MDK 4-MAY-73 17:40 16287

Proposals

Re our proposal discussions:
My file (Kudlick, IPT,1:wy) will have the latest version of the NIC proposal at all times. It currently contains a summary of our 3-May-73 meeting. You are welcome to read it. But I prefer to journalize only the final proposal. 1

Proposals

(J16287) 4-MAY-73 17:40; Title: Author(s): Kudlick, Michael D. /MDK; Distribution: /jbn jew jake rww ; Sub-Collections: SRI-ARC; Clerk: MDK;

New Employee at NIC

Fellow ARC-ers-- NIC has a new member by the name of Judy Cooke. She will be working Monday, Wednesday, and Friday (alternating days with Carol). Please feel free to come in and introduce yourself to her. 1

New Employee at NIC

(J16288) 4-MAY-73 14:04; Title: Author(s): Keeney, Marcia Lynn /MLK; Distribution: /SRI-ARC; Sub-Collections: SRI-ARC; Clerk: MLK;

response to 16083 (TIPUG#11)

?

1

16289 Distribution
Walden, David C. ,

MRL 4-MAY-73 07:39 16289

response to 16083 (TIPUG#11)

(J16289) 4-MAY-73 07:39; Title: Author(s): Leavitt, M. R. /MRL;
Distribution: /DCW3; Sub-Collections: NIC; Clerk: MRL;

MRL 4-MAY-73 07:53 16291

reponse to nic 16083, tipug 11

Per your request for an active mailbox, I am using mitre-tip, my ident is simply mrl, and our group (in the ident system) is caci. If you need more info, let me know. 1

16291 Distribution
Walden, David C. ,

MRL 4-MAY-73 07:53 16291

reponse to nic 16083, tipug 11

(J16291) 4-MAY-73 07:53; Title: Author(s): Leavitt, M. R. /MRL;
Distribution: /DCW3; Sub-Collections: NIC; Clerk: MRL;

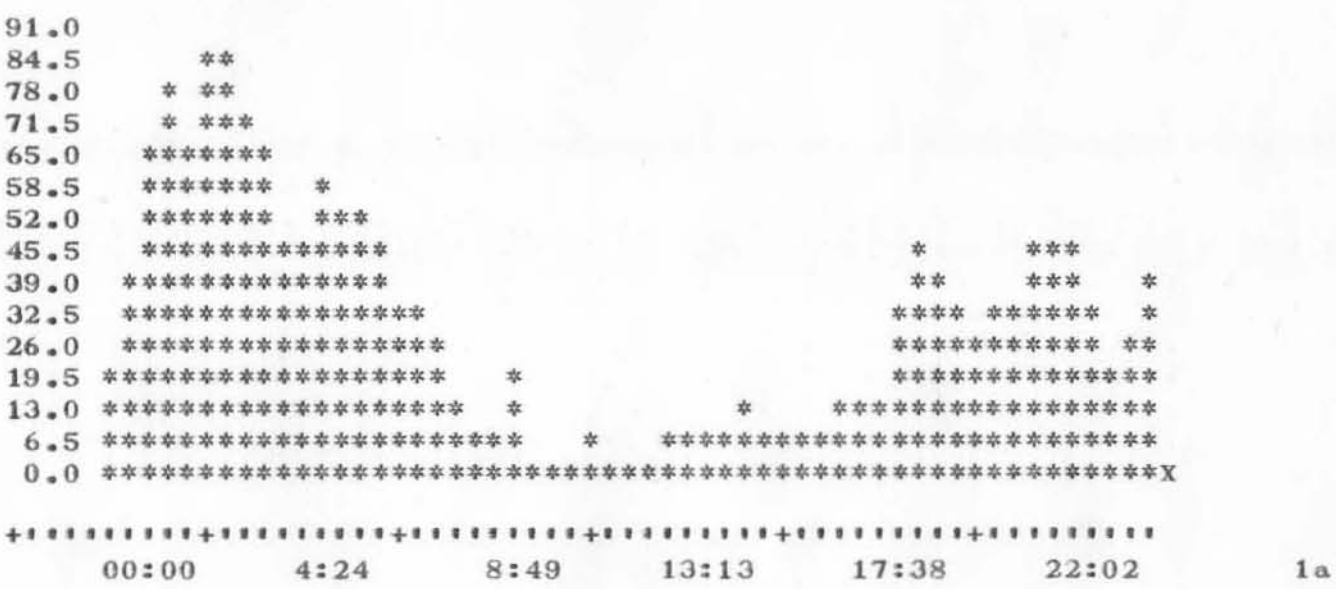
SRL 4-MAY-73 09:01 16292

Superwatch graphs for week of 4/23/73

If this looks O.K. to you, let me know and I'll send it to a larger distribution at ARC.

Superwatch graphs for week of 4/23/73

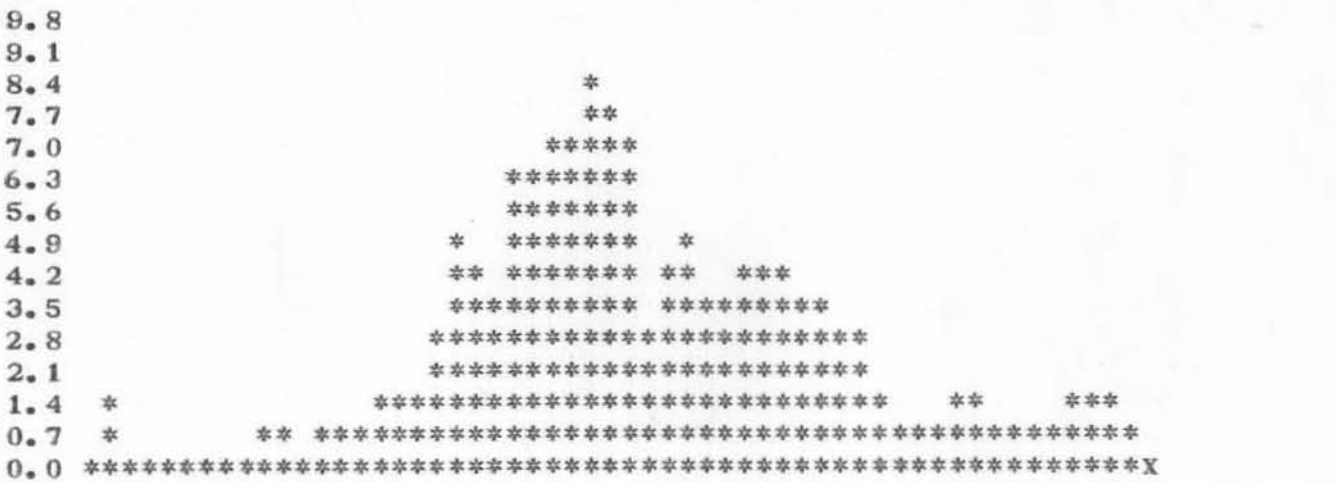
TIME PLOT OF AVERAGE IDLE TIME FOR THE WEEK OF 4/23/73
x axis labeled in units of hr:min, xunit = 1587 sec. 1



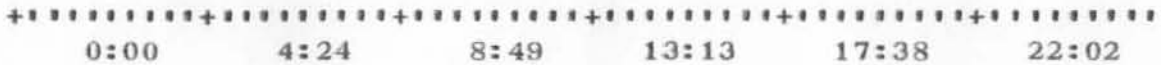
1a

2

TIME PLOT OF AVERAGE NUMBER OF GO JOBS FOR THE WEEK OF 4/23/73
x axis labeled in units of hr:min, xunit = 1587 sec. 3



Superwatch graphs for week of 4/23/73

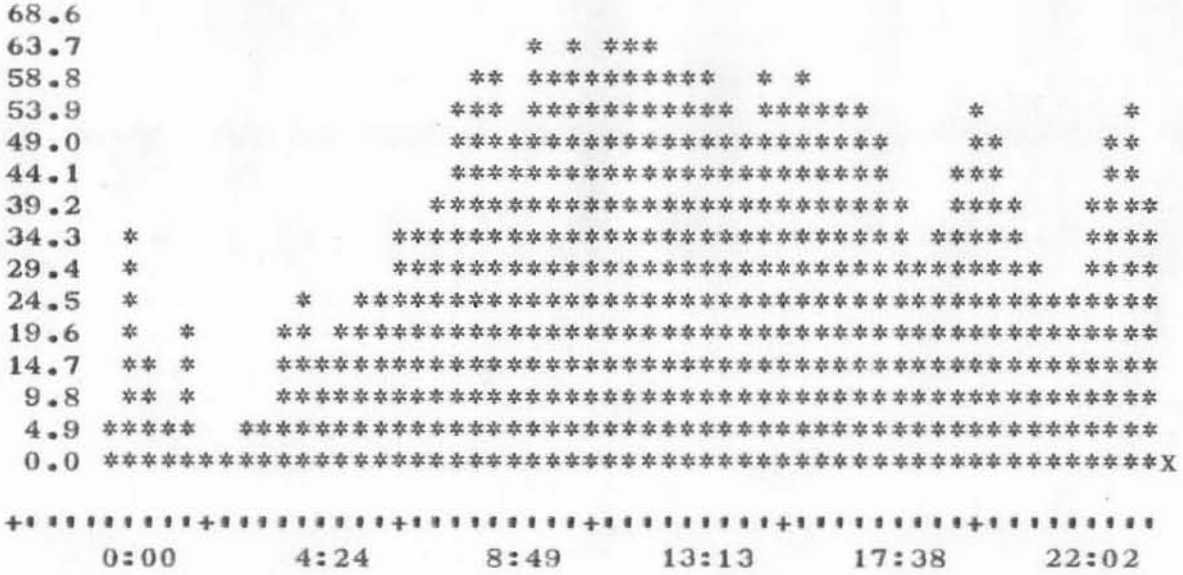


3a

3b

Superwatch graphs for week of 4/23/73

TIME PLOT OF AVERAGE PER CENT OF SYSTEM USED FOR WEEK OF 4/23/73
x axis labeled in units of hr:min, xunit = 1587 sec. 4

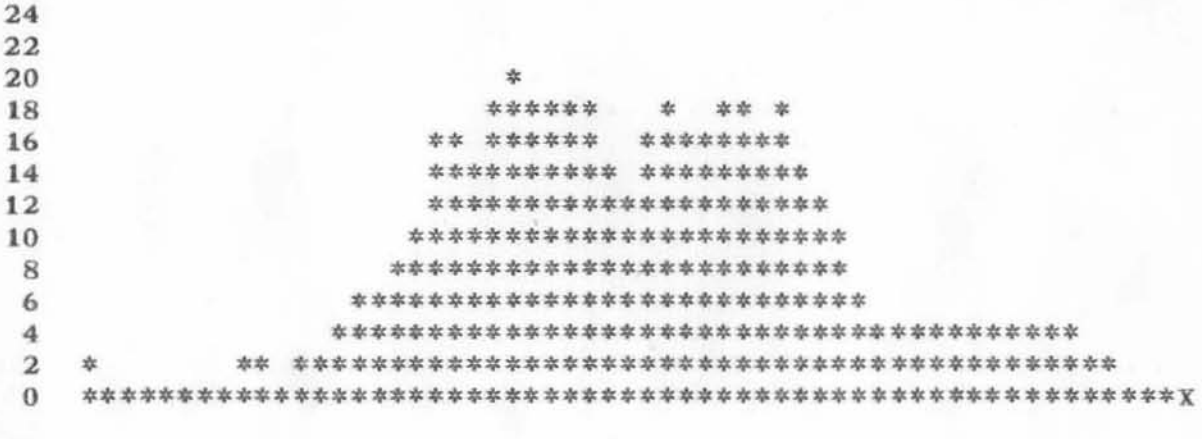


4a

4b

4c

TIME PLOT OF AVERAGE NUMBER OF USERS FOR THE WEEK OF 4/23/73
x axis labeled in units of hr:min, xunit = 1587 sec. 5



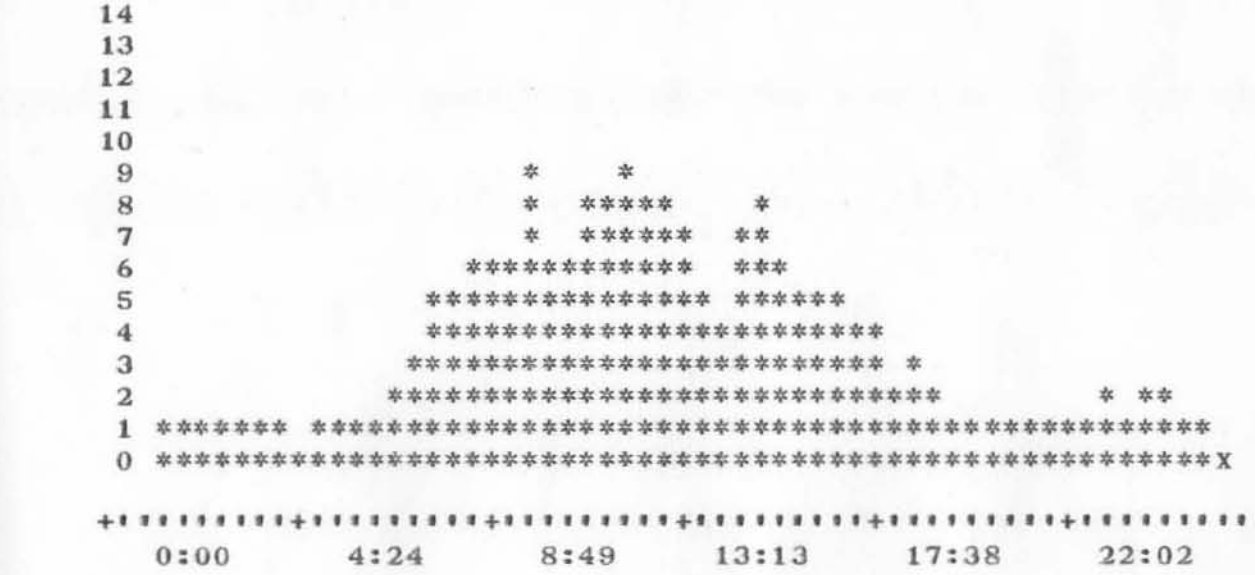
Superwatch graphs for week of 4/23/73

0:00 4:24 8:49 13:13 17:38 22:02

5a

Superwatch graphs for week of 4/23/73

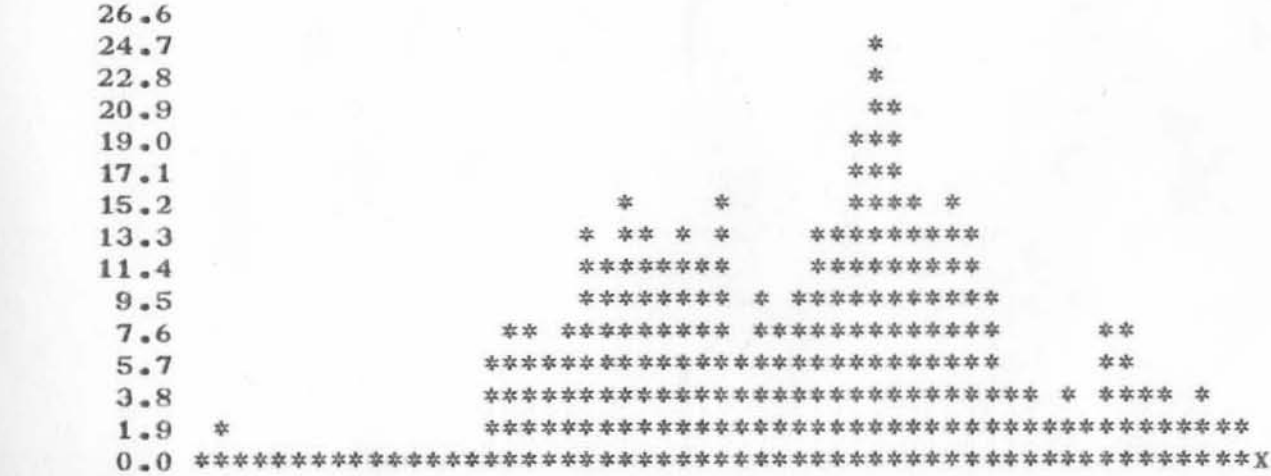
TIME PLOT OF AVERAGE NUMBER OF NETWORK USERS FOR THE WEEK OF 4/23/73
x axis labeled in units of hr:min, xunit = 1587 sec. 6



6a

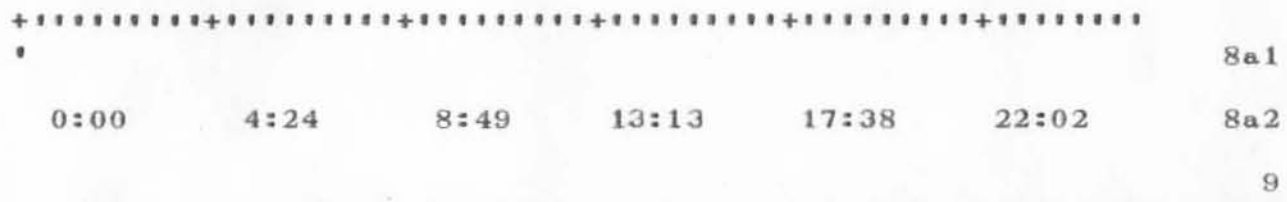
7

TIME PLOT OF AVERAGE PERCENT OF SYSTEM USED IN DNLS FOR WEEK OF 4/23/73
x axis labeled in units of hr:min, xunit = 1587 sec. 8



8a

Superwatch graphs for week of 4/23/73



Superwatch graphs for week of 4/23/73

(J16292) 4-MAY-73 09:01; Title: Author(s): Lee, Susan R. /SRL;
Distribution: /pr ; Sub-Collections: SRI-ARC; Clerk: SRL;
Origin: <LEE>IDLE.NLS;4, 4-MAY-73 08:52 SRL ;

SOME PERSONAL PHILOSOPHY ABOUT WORK

1

2

"Work is not a curse, it is the prerogative of intelligence, the only means to manhood, and the measure of civilization. Savages do not work."
[Calvin Coolidge] 2a

"All work, even cotton-spinning, is noble; work is alone noble."
[Thomas Carlisle] 2b

"The true right to a country -- as to anything else -- springs not from political or court authority, but from work."
[David Ben-Gurion] 2c

"Workingmen we all are so far as we have the desire to make ourselves useful to human society in any way whatever."
[Ferdinand Lassalle] 2d

"No race can prosper till it learns that there is as much dignity in tilling a field as in writing a poem."
[Booker T. Washington]

2e

This group (ARC) was created to be a research group. It is researching how man communicates and how to increase and make more efficient that communication through use of interactive, timesharing computers and networks of such computers. The purpose of the whole thing -- the "soul" of the "group-body" -- is the increased and facilitated communication. This is a very worthy work, one that merits the best interest and effort of the entire staff and associates. 3

In the hurry and press of daily life and the jockeying for pecking-order that groups always seem to be karmically working through, this essential and main purpose is very easy to forget. Attention becomes so centered on the scramble to establish pecking-order that the personal line position for pecking becomes the major reason for existence. 4

The employer (management, or whatever) hires an employee because he thinks that the potential employee has the skills, background, motivation and ability to do the job and because he is willing to accept the salary that the employer's budget dictates. 5

The employee accepts the job and continues to work -- why? 6

If his motivation for working is (1) to get sufficient money to buy the necessities (and hopefully a few luxuries), and (2) for some imagined status or social position, then those are the motives he will seek on the job. His interests will not be to perform the job, but rather to use the job to get money and status. His interest and effort will continue to be expended in the direction they were pointed when he took the job: for personal benefit. 7

Now there is absolutely nothing wrong -- in fact everything right -- in a person wanting to be adequately recompensed for his labor. I'm all for it. And I think any reasonable person would be. 8

There is also every reason why an employee should attempt to advance and develop in his work. This is highly admirable. All will agree with this. 9

However, there are some basic assumptions in the employer-employee, job-worker relationships that sometimes get lost in the scramble. 10

One of these is the fact that the reason the job was created in the first place and the reason money was allocated to pay for the labor is that there is a job to be done that was considered to be worth doing by the people who are putting up the money. What an employer is attempting to buy with his salary and facilities money is the correct, economical, and efficient completion of the job he wants done. He is not in any way attempting or even interested in buying a person, or his time, or his social status, or his private interests, or anything at all about that person. He is attempting to get a job done that he cannot do himself -- and that is all. And that is all that it is necessary for him to be buying in an open and honest market. 10a

Of course, there are many peripheral things in present day employment environment that somewhat obscure this basic need and its filling: a job creation and the getting it done. Customs such as "employment benefits", on-the-job relationships, and all that jazz often assume some curious glow of oneupmanship and "I won this round, let's fight for the next one" ideology. This is foggy thinking. These are merely part of the salary of the employee and should be properly considered so -- the employee is paid, partially in money, and partially in whatever benefits he gets or can acquire through his ingenuity. 10b

From the other viewpoint, the employee also has capital to use: his time, his knowledge and skills, his experience and ability, and -- here lies the point of most of the employee-employer relationship problems -- the employee also has a very valuable but intangible capital asset that he can use both for his benefit and his potential employer's benefit: his ability to be interested in the job instead of himself, and his ability to apply a serendipitous ability to do the job through properly applying his personal motivation. 10c

Usually, the employer must choose from among several somewhat similar applicants to fill his job slot. The one employee-asset which the experienced employer values above any other and which he knows can make the difference between a very large plus and either a minus or a smaller plus on his job is this intangible asset the employee can bring to the job -- interest in the job and motivation to get the job done, rather than self-interest and status-allied motivation. This is what the employer really is trying to buy with his salary and benefits money. If he doesn't get it from the employee, he is not getting his money's worth, he is getting cheated. 10d

When the employee applies for the job, by his application he implies that he will furnish that job-oriented interest and motivation. If he takes the job and does not give it, he is not living up to his agreement. If he feels that the job is such that he cannot give those intangible qualities that are the most valuable thing he can offer, then he should not have taken the job, but should have looked for one to which he could dedicate himself. 10e

Looking at the overall picture, most jobs (work of the world) are in varying degrees pointed toward either the serving of the present society or the furthering (in whatever degree) of the evolution of civilization as a whole. (Those who will rise up in vociferous protest at this statement should sit back quietly and consider carefully the job they had in the back of their minds when the impulse to protest came, and consider why they used that particular job as a symbol of present day civilization.) 10f

Any honest work, no matter in what strata of society, is effort expended toward the evolution of society and should be considered worthy of best effort. Understanding of one's best skills and abilities allows one to look for employment according to the best use and personal satisfaction in that use of his best qualities. Therefore, an employee who does not contribute to the job his dedicated interest and thoughtful abilities is cheating his employer 8 hours a day, and cheating himself 24 hours a day. The employer can usually recover some of the damage because he has other employees. The employee cannot recover the damage because he has no substitute for the 24 hours he is living. 10g

Since furtherance of the job and its efficient achievement is seen to be the prime goal, then it follows naturally that whatever each employee can do to efficiently achieve that goal -- no matter whether the job is small or large, admired or inconsequential in appearance -- is equally worthy, both of the doing and of applying one's best effort, cheerfulness, and goodwill to the doing. 11

It also follows that no one job is really higher in status than any other job, whether it is the job of the architect who designed a building or the job of the janitor who sweeps its floor. Thinking otherwise is, again, foggy thinking. 12

Of course this destroys one of the most time consuming and energy wasting efforts usually underway in any group: establishment of pecking-order and attempts to achieve some mythical personal status. But those are not really pertinent to getting the job done, anyway. And isn't getting the job done what we really are here for? 13

DHC 5-MAY-73 13:28 16296

Pre-meeting Meeting

As described in (16256,1), I would like to have a small, very informal meeting on 20-May-73 (Sunday before BBN meeting) beginning about 10 am and going into the afternoon.

Hopefully, at BBN. Will you attend? --Dave

(p.s., we'll work out exact location, etc. as soon as possible. 1

DLS 5-MAY-73 13:00 16297

List of topics for JLM to cover during visit to ARC

Add to or subtract from this list as you see fit--RADC troops should do this before Tuesday, MAY 8th.

List of topics for JLM to cover during visit to ARC

Some topics to cover during your visit to the ARC: 1

DIRECTORIES 1a

We need a directory for Frank Tomaini. He is the last man in the chain of command from the worker level to the Division office to be trained on the system. We would lke to start the training now, but would like to start with sndmsg and feel that if he could start receiving messages immediately that this woud act as a reinforcement to the learning process. 1a1

We would like directories for everyone in the section-even if they only have 25 pages apiece. These are needed some months prior to the Utility, so that training etc can be accomplished. 1a2

Is the problem with directries related to: 1a3

fear of excessive simultaneous users 1a3a

or excessive system loading 1a3a1

or too much total system use? 1a3a2

upper limit for directories is being reached? 1a3b

file space is used up? 1a3c

TRAINING 1b

General knowledge and proficiency tests-- 1b1

We need tests to determine what the users don't know about the system so we can spend our time more effecively in training exercises and we need tests to deterimine how proficient the user is in applying what he does know. We also need some over all measure of how much time (trainer's, trainee's and computer's) is required to bring a user up to a particular level of knowledge/proficiency. 1b1a

Explore the possibility for a collaborative effort between JHB pusher, Borden, MFA, TFL, DVN? 1b1a1

Another training round-- 1b2

DVN and JCN have talked about another training round and

are willing to undertake this when we want. There is merit in having them come here, since they might get undivided attention from trainees and management more so than internal trainers. I would prefer to have the above items taken care of first if at all possible, ie there may not be a need for them to provide additional training if we only knew where the users are at now. 1b2a

Computer Based Instruction--CBI/CAI 1b3

Sylvia Mayer and company--I don't think, from what I have read about their work so far that any CBI acitivity would be of immediate benifit to us in training the rest of our section or the other section, ie the timing is not right(soon enough). It would undoubtedly be of use to future NLS users, however. Sylvia has asked for--quote from document transmittal slip, 13 APR-- 1b3a

"This is my wish list for expansion of this effort with more FY-74 funds: 1b3a1

1. 25K added to 70K planned (95K total for BBN) 1b3a1a

2. 50K for a second effort for an in-depth analysis of AHI applications, followed by development of training content for a NET-SCHOLAR data base to support these tasks. 1b3a1b

3. 10(?)K for an AHI terminal at ESD to support 1&2 above, and to use in communication with RADC/ISI relative to Project 2801." 1b3a1c

CHEAP DNLS TERMINALS 1c

It would be nice if we could have the terminal designed, built and evaluated by next Fall. By that time we might be in a position to scratch up some money to buy a few, but I don't see how we can provide additional development support during that time period. 1c1

Could JCN see his way clear to hire another guy (if this is what it akes) under the Utility contract to be dedicated to developing a cheap DNLS terminal? I guess he couldn't charge this guy's time to that contract cince its not supposed to have a development flavor, but maybe he could juggle the books?? We could use less than our share (1.5 MY) of support from the utility, if this would help the terminal development. 1c1a

List of topics for JLM to cover during visit to ARC

I had an extensive talk with Dick Metsker last Friday, 5 MAY. He indicated that such an undertaking was indeed within his charter and of interest to him, particularly since we had a quite well defined job. He does not at this time have any money and is (like us) trying to hit-up Roger Panara-5550- for funds to implement some of his ideas in FY-74. He might have some in-house talent which could be put on this job in FY-74. My feeling was however, that this would not mean a piece of hardware, but maybe a plan/design, which DIA (Don Andrews) has already started. His interest lies more in the multi-console area where one MINI supports N displays. He has a similiar need within a couple of his projects. 1c2

My personal feeling is that the stand-alone approach should be the first one we tackle, since it involves less development of software (both within the mini and within NLS). In addition there is apt to be fewer problems in maintaining the item in the field. If the mini went down for some software or hardware reason, you would loose X terminals, where with the stand-alone you would only lose one. 1c2a

The best I can see right now is to wait until FY-74 and see if 5581 and/or 5550 doesn't come up with some loose funds. I would be willing to start paperwork now say for 50K with a couple of delivered stand-alone terminals as the end product. Encourage SRI/ARC to continue with design and work with Superbee or whatever in the interm as a part of the overall ARPA effort. 1c3

They spent $X hunderd thousand building TNLS on the premis that not every one could afford expensive displays. Why not spend a few K to significantly lower the cost of the display? It seems technology has progressed to the point now where it is entirely possible to build a DNLS display for under $4K, or less than twice the cost of a thermal teleprinter. If this is so, then it may very well turn out that users CANNOT AFFORD TO USE A TELEPRINTER, when the total cost of terminals, CPU and users' time is calculated. 1c3a

CALCULATOR/FORMS GENERATOR 1d

Try to get assurance that the forms generator package will not be neglected under our current contract. I don't know how long it will take, but would not like to see the interface to BASIC consume all the manpower. Informally I

have told them that the printer will not be here until Aug at the earliest. I'M not sure that they need to wait until then to start, since it is conceiveable that the TYCOM units could be used for printing many of the forms. They will be delivered in late June/early July and have a 15 inch carriage, which will allow printing on the wider forms. It won't have any fancy split platen or horizontal or vertical tabbing, but it has never really been determined that these are necessary. It was only speculated that these were desireable to simplify the software. Incidently, we are having some trouble getting these options delivered from I/O Devices. At this point i have faith that everything will be worked out. 1d1

UTILITY 1e

We have no further news about the procurement from ARPA. I will call Col John S Perry Monday, to see if he was successfull in getting the memo asking RADC to handle their procurement through Larry Roberts..there are obvious advantages to both parties for going this route. 1e1

SEAS 1f

What do NLS and/or TENEX programmers feel are the advantages of NLS in accomplishing their particular brand of knowledge work? 1f1

Would these advantages be likely to be applicable to PL-1/COBOL/BASIC/JOVIAL programmers here at RADC, if our facility (operating under the MULTICS exec) were a host on the ARPANET? That is, would there be any particular advantage to writing programms for the above compilers in NLS and then running them on the RADC host? 1f2

If I have asked the wrong question, note this and bring home the answer anyway--I suspect from what little I have read about SEAS that it is a lot more (at least in concept) than simply writing code in a flexible text editor and running the program from the editor--(I think one can do that under MULTICS??). 1f2a

INTERFACING WITH SPECIAL PURPOSE AUGMENTATION SYSTEMS 1g

MIS/DM systems 1g1

At RADC 1g1a

List of topics for JLM to cover during visit to ARC

DLS 5-MAY-73 13:00 16297

List of topics for JLM to cover during visit to ARC

Do you give a damn??	1h3a
Can you find your way back to LA???	1h3a1
DO YOU REALLY CARE	1h3a1a

JAKE 5-MAY-73 16:21 16298

User Needs

Dave,

Apologies for not following through on our conversation of a few weeks ago regarding user needs for the Resource Notebook and for the ARPAnet in general. I saw your journal messages 16014 to Mike Kudlick and 16162 to Jean Iseli, and with regard to the latter would like to clarify that I do have a very real interest in the whole area of user needs and am really glad to see that you are pushing for some activity along these lines.

I discussed the matter vis a vis the Resource Notebook last week with Mike, and he has given me the go ahead to get something moving. Therefore, I was wondering if it would be convenient for you to get together with me soon to exchange views as to what our approach should be and how the NIC can contribute. (I have also mentioned the idea previously to Nancy Neigus and Susan Poh, since they have been kind enough to exchange data with me from time to time and have also expressed an interest.)

Perhaps a few of us could get together informally and discuss various alternatives, then come up with some guidelines for more formal action and a larger group. Does this sound agreeable to you?

Looking forward to hearing from you.

Sincerely, JAKE FEINLER (ARI-ARC)

JAKE 5-MAY-73 16:35 16299

MITRE Handbok

Mike,

I understand from Susan Poh that MITRE is planning to issue a ONLINE ad offline Network Handbook in the near future and that the NIC is going to produce it for them. I was not aware of this - were you? If so, can you fill me in on the details so that I can look into whether there are areas in which we should cooperate. Also, may I have back the notes that JEW made regarding the regional-coordinators scheme for further cogitation on his comments. Thanks JAKE

P.S. Did you get the sndmsg I sent you Sat. Doug linked to me and said he was having difficulty so I switched to the journal.

J.

1

Siteidents

Suggested method for assigning siteidents

TITLE: Siteidents
COMMENT: Suggested method for assigning siteidents
AUTHOR(S):JAKE
DISTRIBUTION:np mdk jew chi jbn
SUBCOLLECTION:
CLERK:JAKE

1

BACKGROUND: 2

Most sites do not seem to care particularly what naming convention is used as long as their site can be easily recognized by others. In the past siteidents have usually been chosen by the sites themselves, and have not followed a consistent naming pattern. Several naming conventions are now in use: some siteidents are single words such as BELVOIR or ABERDEEN; some have two hyphenated acronyms such as SRI-ARC or UCLA-CCN; some are named first for the site and then for the type of computer such as HARV-10 or LL-67; and still others are named to show what type of a network site they are such as AMES-TIP. 3

I would like to suggest that the following convention be considered for assigning siteidents: 4

A siteident would consist of two parts - the first part being an alphabetic acronym of up to six letters (but preferably three or four) chosen by the site itself, followed by a hyphen and a second numeric part which is the same as the host address. 4a

ex.: SRI-2 or HARV-137 4a1

The advantages of this system would be the following: 5

-Everything needed to address a site would be included in the siteident; therefore, the need for two lists - one for host addresses and one for siteidents would be avoided. 5a

-Siteidents would follow a consistent and unique naming pattern (which they do not now follow), and each site would still be able to choose its own descriptive acronym. 5b

If needed the initial 'T' or 'U' could precede the host address, thus signifying whether a site was a User or a Tip - all others being Servers. 6

ex.: MITRE-T145 or ARPA-T156 6a

Siteidents

A problem for serious consideration would be whether to make the transition from one naming convention to another gradually or abruptly. Perhaps the whole idea might be put to some sort of Network vote. 7

JAKE 6-MAY-73 16:36 16301

Query bug

As of 4:25 6-May-73 the entry to query language through the EXEC (@nic CR) does not work on either the display simulating a teletype or on the TI, and the following error message was received:

```
  Illeg inst 104000000020 at 151 - Jsys error:
    error message not found for error 0
```

1

JCN 5-MAY-73 21:44 16302

Note to Col. John Perry, ARPA re: JCN PR Visit

John: I plan to be at IPT 5/10 about 9:00 with Paul Rech. We would like to get together with as many of Larry's people as he can (and wants) to pull together to discuss what we are about to get into as NLS comes into IPT. I'll call sometime this week..perhaps from Rome, NY to see how things ae shaping up. If any questions arise befoe that, here's my schedule this week: 1

JCN Schedule for week of 4/29 - 5/5 2

SUNDAY		2a
MONDAY	Leave for RADC 9:30 plane	2b
TUESDAY	RADC to Wash pm	2c
WEDNESDAY	NBS, Tom Pyke NSRDC Robert Lieberman	2d
THURSDAY	ARPA-IPT 9:00am on	2e
FRIDAY	ARPA-IPT and Tom O'Sullivan and NMRO	2f
SATURDAY	Return for home	2g

KIRK 4-MAY-73 19:41 16303

Proposal for Augmenting the NIC Station Agent Office

cc: DVN MLK NDM LLL

KIRK 4-MAY-73 19:41 16303

Proposal for Augmenting the NIC Station Agent Office

Mike and Jeanne -- Marcia Keeney is currently writing out each transmittal letter and NIC requests for the Log in longhand. If you really want this information to be online and to Augment the NIC Station Agent Office, it would be trivial for Dean to write a user program that would query Marcia (or anyone) for the identical information that she currently writes out in longhand. The information would be printed out in the form for the letter, and at the same time the desired information could be put into an index. 1

Very little more if any, possibly less, of what is currently written would need to be typed. 1a

Since she is a good typist, it should take less of her time not to mention the savings of an additional typist and speedier turn around time from the time she writes/types the information to when she gets the hardcopy letter. (from currently about 24 hours [if she finds no errors when proofreading] to essentially instantaneous). 1b

There would be fewer intermediate translations from the request to the final product, 1c

She is already familiar with what it feels like to enter information this way from her work with the ident system. 1d

She needs to have her own terminal handy at all times anyway. 1e

She essentialy does have her own TI and is logged in most of the time because of ident work she has to do (as was Susan after Barbera left). I do not use my office any more because it is unreasonable to force her to restrict her use of a terminal to Linda's TI down in the ARC office and only at certain times of the day. The person who handles the IDENT file really DOES need her own TI. 1e1

She already receives a lot of requests online through the journal and sndmessage, eventually a system should be worked out to use what is already online. 1f

I say this would be trivial because Dean has already written a user program for business letters (LETTER) that queries the user for information and then gives them the final copy. He keeps asking me if I want one for transmittal letters. Also, he has written a program that automatically inserts the mailing address for any person who has an ident (ADDRESS). 2

It would really be a large step in the direction of augmenting

the NIC Station Agent and PSO (and therefore the whole ARC-NIC office management system) and I think it should at least be tried out. I would be willing to work with Dean on specifying what we need and testing it to make sure it does everything we want and has no bugs before giving it to the Station Agent. 3

KIRK 5-MAY-73 19:52 16304

A problem with userprogram ADDTEXT

Dean--I was using ADDTEXT to add a space to the beginning of everystatement in a plex. It worked fine for viewspec x. But when I specified the plex in the next level down, it also capitalized all of the statements except the first, in addition to adding the character. I also had viewspecs l and B on. 1

VGC 4-MAY-73 18:41 16305

ADDITIONAL INWG MEMBER

MARCIA:

PLEASE ADD FRANK KUO OF HAWAII TO THE INWG MAILING LIST. HE IS ALREADY KNOWN TO THE NIC, SO HIS ADDRESS AND OTHER PARTICULARS ARE AVAILABLE TO YOU VIA THE NIC PARTICIPANTS NOTEBOOK. HE SHOULD RECEIVE ALL PREVIOUS RELEVANT INWG NOTES, BUT DOES NOT NEED A PROTOCOL NOTEBOOK. SEE FILE <SU-AI>INWGREL FOR CURRENT LIST OF RELEVANT INWG NOTES. THANKS VERY MUCH.

VINT CERF 1

AAM 7-MAY-73 10:44 16307

Peggy,

I tried to call you last Thursday and again today; perhaps this will be faster. We would like to reprint your COMPCON 73 paper. In order to do so we need permission from the publisher, and in order to get that we need written permission from you. Would you be willing to write me a letter granting permission? If we get the paper printed would you like some copies?

Regards,

Alex McKenzie 1

AAM 7-MAY-73 13:48 16308

Agent/Liaison for Tymshare

To whom it may concern:
I recently received a letter from Tymshare regarding their forthcoming connection to the Network, in which a Liaison and Station Agent was named. Although I realize that the NIC may know more about what's happening at Tymshare than I do, I am passing on the information I received anyhow. Tymshare requests that a single individual be listed as BOTH Liaison and Station Agent. His name and address are:

Michael L. Marrah
TYMSHARE, INC.
10261 Bubb Road
Cupertino, California 95014
Phone: 408/257-6550 ext 424

As usual, I would appreciate a positive acknowledgement that someone has processed this information.

Regards,
Alex McKenzie

1

AAM 7-MAY-73 13:57 16309

EXECUTE IDENTIFICATION is hiding

I can't get the Identification System. When I type "ei" I get Execute Insert. Has the name been changed, and if so to what? 1

CHI 7-MAY-73 12:07 16310

Tree Meta References

Ron, following are some referrences to Tree-Meta reports and a sample compiler.

Tree-Meta Reports: (Journal, 14045, 1) and (Journal, 14046, 1)
IMLAC Machine-Oriented-Language (IMOL): (Imlac, Imol,)
An IMOL program: (Imlac, Imnls,). 1

DHC 7-MAY-73 11:53 16311

Appologia, errata, gracias

I just used NLS with the new feedback, etc. changes. GREAT.

Thank you. Thank you. Thank you. Thank you.

(Also, I had not realized what they were going to be, when I read the Preview document (15312,), so please forgive the NP/BUGS note regarrding feedback, which I sent last week or the week before..) -- Dave.

1

IWC 7-MAY-73 12:07 16312

Draft Chapter on ARPA from Network Management Survey

The following is a draft of a chapter of a survey of network management which I am preparing for the National Science Foundation. I am sending you a copy of it via the network, without a transmittal letter, with the request that you review it and return me your INFORMAL comments and constructive criticism. Four other networks will be surveryed in this report; all chapters will follow the format given in the table of contents below. THANK YOU FOR YOUR COOPERATION AND ASSISTANCE 1

Draft Chapter on ARPA from Network Management Survey

Ira W. Cotton
National Bureau of Standards
Washington, D. C. 20234

1a

Draft Chapter on ARPA from Network Management Survey

Table of Contents 2

ARPA Network 3

I. Introduction 3a

The ARPA Network is characteristic of large decentralized networks of autonomous computer systems. Its successful operation has been widely publicized in the professional literature and trade press, and has demonstrated the technical feasibility of packet-switching for large networks. 3a1

II. Network Identification and General Description 3b

A. Sponsoring Organization 3b1

Advanced Projects Research Agency (Department of Defense) 3b1a

B. Purpose/mission of Network 3b2

The ARPA Network was begun as a research effort to investigate multiple computer resource sharing and demonstrate the feasibility of packet switching technology. 3b2a

The network currently operates in support of many ARPA-sponsored research programs by providing access to resources not available locally. 3b2b

C. Status and Topology 3b3

The network has been operational for approximately two years. Figure 1 illustrates the topology of the network as of January 1973. The network currently includes over 30 sites with over 40 independent computer systems connected. 3b3a

Reliability of the various network components varies widely. Currently the communications subnet of IMPs and circuits have extremely high reliability, with only occasional outages for particular IMPs or circuits. Since all nodes are doubly connected, the outage of a single circuit does not disturb network operation. The service sites are generally less reliable, although the statistics vary widely from site to site. 3b3b

D. Technology Summary 3b4

The ARPA Network may be characterized as a distributed store-and-forward network of heterogeneous computer systems (hosts). Hosts are connected to the communications subnet by means of a software interface called the Network Control

Program (NCP) and a hardware interface which may have the characteristics of either a channel or a communications line. Each host is connected to a switching center in the subnet called an Interface Message Processor (IMP) which contains an augmented Honeywell 516 or 316 computer; up to four independent hosts may be connected to the same IMP. Each IMP is connected to two or more neighbouring IMPs by means of dedicated 50kb comunications lines. Host to host messages are passed from the sending host to its IMP, where they are broken into packets and relayed to their destination by the subnetwork of IMPs and communications lines. The routing is adaptive; i.e., the route of any given packet is not established in advance and in general the several packets of a message will follow different routes. The destination IMP will reassemble the message and deliver it to the proper host. 3b4a

Protocols in the network are constructed according to a layered approach. The lowest level protocol is a binary synchronous communications protocol governing traffic exchange between IMPs. The so-called "first level" protocol governs the logical exchange of information between host and IMP. The "second level" protocol governs the logical exchange of information between Network Control Programs in communicating hosts. The "third level" of protocol refers to any communications occuring between processes in the host machines. Such third level protocols include the Initial Connection Protocol (ICP), data transfer protocol, file transfer protocol, remote job entry protocol, graphics protocol, and others. 3b4b

A special third level protocol called TELNET defines a network virtual terminal and permits all terminals on the network to provide a similar interface to processes in a separate host computer system. A special IMP which is augmented by the addition of memory and a multiline controller (a specially designed component containing central logic and line interface units) can provide direct network access to terminals without going through a separate host computer system by providing the TELNET function itself. Such an IMP is called a Terminal IMP, or TIP. 3b4c

III. Network Organization 3c

A. Structure and Extent 3c1

Figure 2 illustrates the present organizational structure for the network. 3c1a

The Advanced Projects Research Agency (ARPA) of the Department of Defense initially conceived and funded the network, and presently directs its operation. The conception of the network may in large part be attributed to one individual in this agency, Dr. Lawrence G. Roberts , Director, Information Processing Techniques. ARPA is not a large agency, serving primarily as a granting agency, and only several people spend their full time on network activities. 3c1b

ARPA is currently in the process of turning over the day to day operation of the communications network to the USAF Range Measurements Laboratory (RML) at Patrick AFB in Florida. RML will serve as the procurement agent for IMPs and maintenance, and will serve as the focal liaison point for DECCO and the common carriers, BBN, NAC, and prospective new users. 3c1c

Bolt Beranek and Newman (BBN) of Cambridge, Mass., is the primary ARPA contractor in the development and operation of the network. BBN designed and constructed the IMPs and TIPs which comprise the subnet, wrote the software for these processors, and participated in the specification of the network protocols. BBN currently oversees all network modifications, dealing directly with the Bell System for the wideband circuits, and with Honeywell Information Systems for the procurement of H-516 and H-316 processors for inclusion in the IMPs and TIPs. BBN also operates a Network Control Center (NCC) which monitors the operation of the network on a round-the-clock basis and which aids in the diagnosis of failures and initiates and coordinates maintenance efforts. 3c1d

Honeywell Information Systems is an OEM supplier of basic H-316 and H-516 processors, from which BBN fabricates the IMPs and TIPs. Honeywell field engineers also assist in the installation of these devices, and is responsible for maintenance. 3c1e

Network Analysis Corporation (NAC), Glen Cove, N. Y., serves as an ARPA contractor for analytical studies to determine the optimum topology of the network. 3c1f

The Network Measurement Center (NMC) is an ARPA-supported research group at the University of California (Los Angeles) which investigates the performance of the network. 3c1g

The Network Information Center (NIC) at Stanford Research

Institute provides documentation services for the network community under ARPA sponsorship. SRI is currently planning to turn over the operation of the NIC to some other group (currently indicated to be Tymshare) on a contractural basis. 3c1h

Approximately 18 hosts may be classified as research sites. These sites perform research in a number of areas under ARPA contracts and utilize the network in support of their research. 3c1i

Five sites are classified as service sites: UCLA (360/91), SRI (NIC), UCSB (360/75), BBN (PDP-10) and MIT (MULTICS). Some of these sites offer services to the network community on a fee basis; others are subsidized by ARPA. 3c1j

The remaining sites are users, although intersite arrangements are often made for the sharing of resources. 3c1k

The "network facilitators" are an informal committee of experienced users who proselytize and attempt to solve network problems for users. 3c1l

B. Functions Performed 3c2

1. Planning 3c2a

Network growth is controlled by the sponsoring agency, ARPA. There does not appear to be any fixed or published policy for determining what sites are to be added. 3c2a1

When a new site is selected, however, Network Analysis Corporation determines for ARPA the new topology for the subnet. The network topology is not optimized each time a node is added, since that might entail too costly and disruptive alterations of existing circuits, but the new node is added in as cost-effective a means as possible. Occasionally, more extensive changes are made to the network topology as needs warrant. The planning function is thus centralized and supported by appropriate analysis. 3c2a2

All hardware procurement for the network is controlled by ARPA; the individual sites are not involved. ARPA places orders (through RML) for IMPs and TIPs with BBN. Communications circuits are ordered by ARPA from the Defense Commercial Communications Office (DECCO) which deals with the various common carriers. As explained

below, in practice BBN coordinates circuit installation with the carriers. 3c2a3

2. Installation 3c2b

Each site which is added to the network is responsible for fabricating the interface to the IMP or TIP and for coding a network control program. Specifications for each are available from Bolt Beranek and Newman. The host organization is also responsible for site preparation (floor space, power, air conditioning, etc.) for the IMP, which will reside at the host's own location. 3c2b1

Bolt Beranek and Newman serves to coordinate IMP installation through the Network Control Center. The normal installation team consists of a BBN representative, the person from the local Honeywell office who will maintain the machine, possibly an additional person from the main Honeywell office, and telephone company personnel. 3c2b2

3. Operations 3c2c

The local host organization is responsible for maintenance of its host processor, NCP and IMP interface. The local Honeywell office will maintain the IMP itself. AT&T long lines division is responsible for maintenance of the modems and communications circuits. 3c2c1

For diagnostic and control purposes, BBN operates a special host system in Cambridge, Mass., which is called the Network Control Center. The NCC regularly receives status reports from all the IMPs in the network regarding the operational status of their communication circuits and their neighbouring IMPs. Special programmable debugging and fault isolation procedures (such as looping lines back into the same IMP) may be initiated remotely from the NCC. Fault isolation may or may not require the assistance of local host personnel. 3c2c2

The maintenance function, which may involve several organizations including the Bell System, Honeywell, BBN and the local host, sounds complicated, but actually isn't. The Network Control Center is very effective in diagnosing failure and coordinating maintenance among the various groups involved. 3c2c3

The division of responsibility for software is similar to

that for hardware. All IMP software is controlled by BBN and is currently loaded via the network itself. Host organizations are forbidden to modify the software in their IMPs. 3c2c4

Functional protocols are specified by committees of host, ARPA and contractor personnel. At the lower levels these are fairly well agreed upon and debugged, and hosts agree to abide by them. At the higher levels, the protocols are still evolving, and subsets of hosts often experiment with variants among themselves. 3c2c5

At the present time, all of the lower level protocols are sufficiently well defined and debugged as to be of little or no concern to the average user. The higher level protocols, or more precisely, the lack of generally accepted and debugged higher level protocols (for example, remote job entry) have and continue to be a major hindrance to increased network utilization. More formal direction from ARPA and/or the reestablishment of the network working group (which formulated the lower levels of protocol and then disbanded) to meet on a regular basis might help. 3c2c6

4. User Services 3c2d

Users at one site seeking to utilize resources at another site are required to be familiar with the characteristics (log-on procedures, operating system commands, program conventions, etc.) of that site. Documentation is, in general, provided by the serving site according to its own conventions. Several organizations do exist, however, to help users access remote resources. 3c2d1

The Network Facilitators Group is an informal committee of experienced personel at various sites around the country who organized to promote network utilization. They advertise themselves at their local site as a focal point for network assistance, and communicate among themselves in order to help solve user problems and establish personal contacts. 3c2d1a

The Network Information Center is operated by Stanford Research Institute under contract to ARPA for the purpose of disseminating documentation and network "information" on a timely basis. The NIC provides an on-line text editing system, an on-line journal

system, and distributes documentation from the various sites. 3c2d1b

The user support function is probably the least well-provided function in the ARPA network. The quality of documentation and the general availability of assistance from sites varies tremendously from site to site. The network facilitators help at selected user sites, but because of the informality of their organization and because they are not located at all sites they have not proven to be a general solution. The NIC has not been really effective in distributing all the documentation needed to run at a particular site, let alone enforcing any documentation standards. 3c2d2

C. Interfaces (relationships with other organizations) 3c3

The question of the ARPA network's future status has yet to be settled. The network is a closed community, available only to governmental agencies and their contractors, but the network has been connected for demonstration purposes to other (commercial) networks (e.g., TYMNET). The network is actively serving as a marketplace for the sale of computer time to the network community. 3c3a

ARPA has indicated on several occasions that it does not intend to operate the network indefinitely. Several proposals have been submitted to operate the network commercially, but non have received approval. It remains to be seen what the future of the network will be. 3c3b

In another vein, the technology developed for the network has already received commercial attention. Several companies have filed applications with the Federal Communications Commission to set up an operate similar networks as common carriers (in some cases, using basic communications circuits provided by other common carriers in a so-called "value-added" configuration). 3c3c

IV. Financial and Legal Concerns 3d

A. Capitalization 3d1

The network was funded by ARPA and so required no capitalization. ARPA continues to subsidize the subnet communications circuits. Each of the IMPs and TIPs was either paid for by ARPA or the participating host organization. In general, some of the early sites were ARPA

contractors, and so had their IMPs provided, while most of the newer sites are users who are paying for their own. 3d1a

B. Accounting 3d2

Participation in the network requires access to the communications subnet and access to individual hosts on the network. IMPs and TIPs are available for a fixed fee from ARPA, which obtains them from BBN. Monthly maintenance charges must be paid after the first year of operation. Communications charges are assessed by ARPA according to usage: a base fee plus a variable fee for traffic above a given minimum. In fact, most network participants have been supported by ARPA in one way or another, and communications costs continue to be subsidized. 3d2a

Accounting for resources at the host sites is done by each of the hosts concerned. Each user who desires to utilize remote resources must open an account at the appropriate site. The friendliness of sites to external users varies considerably, as do billing rates. Billing procedures vary widely (some sites have been known to close an account when it ran out of funds without notifying the user) and require using sites to deal with many vendors. The overall situation is less than satisfactory. 3d2b

C. Tariffs 3d3

The wideband communications circuits used in the subnet are leased by ARPA through the Defense Department at less than commercial rates. The communications charges assessed to users, even in the absence of subsidies, thus do not represent what "real world" charges would be. 3d3a

D. Regulation 3d4

No commercial users or non-research commercial servers are currently permitted on the network. 3d4a

E. Security 3d5

The communications subnet will insure that messages are delivered to the proper host. The non-deterministic routing of the individual packets of a message could be viewed as providing some degree of security to the subnet. At that point it is the responsibility of the host to insure delivery to the proper user. 3d5a

File security is the responsibility of the individual hosts. Log-on procedures, keyword access and the like are among the procedures employed by the various hosts as protective mechanisms. 3d5b

In general, the ARPA community does not seem very concerned with user security. Passwords are easily obtained, and it is easy to logon as someone else and inspect (and even alter) his files. There is no checking on the origin of messages to insure that they agree with the identification given in a logon sequence. 3d5c

V. Conclusions 3e

A. Summary of Problems 3e1

Start-up Requirements - Fabrication of the IMP interface and coding of the Network Control Program have been major obstacles to new host joining the network. BBN has fabricated some interfaces, but prefers not to do so. This problem is expected to continue, as the character of sites joining the network changes from research-oriented to user. However, a mitigating factor may be the inventory of interfaces and NCPs which have already been constructed. 3e1a

Cost - The question of cost is growing in importance as the network operation is examined by potential commercial suppliers and as the full costs become known. Published documentation on costs have thus far dealt mainly with the communications subnet. Even here, the costs may be distorted, because the government obtains circuits at a discount. Also, the cost of network access (an IMP or TIP) remains high (though lower cost replacements are currently under development). However, the most significant concern is that the cost of the subnet may not be the major network cost. Recent studies have shown that the overhead associated with the NCP may be substantially larger than was previously believed. Additional cost studies are indicated, as well as a reevaluation of the current protocol strategy. 3e1b

Reliability - In contrast to the now high reliability of the subnet, the host sites, at which the real work is done, vary widely in reliability. Nothing can more surely stifle network success than uncertainty over whether a resource will be available or not when it is needed. 3e1c

Heterogeneity - Except for the TELNET system, no commonality of operation has been achieved between hosts of different

type. Executive level commands are all different, text editors are different, log-on procedures are different, etc. This is a problem which networks have only exacerbated by making additional systems available to potential users. 3e1d

User Services - The need for readable, accurate, complete and available documentation cannot be stressed too much. Of equal importance, however, is the occasional need for hand-holding. On-line tutorials may provide some relief, but personal assistance by knowledgable and friendly personnel will never be completely replaced by documentation. The current level of these services on the ARPA network is not acceptable. 3e1e

Protocols - Lack of particular protocols such as graphics and remote job entry has cut off potential usage in some cases. 3e1f

B. Lessons Learned 3e2

In fairness, it must be recognized that the ARPA network began as an experiment in networking among research-oriented sites. It has achieved its objective of demonstrating the feasibility of the packet-switching approach. Many of the problems which have been identified have arisen as the network matured and the complexion of its participants changed from research-oriented to usage-oriented. 3e2a

In general, the network has functioned best where there has been formal responsibility and organization, for example, the Network Control Center. The less directed efforts have been correspondingly less successful, for example, the higher level protocol committees. 3e2b

One of the clearest areas requiring additional work is that of standardizing the usage of all the systems, possibly by means of some intermediary translator. Perhaps a standard "network control language" is required to facilitate usage of all the different systems involved. 3e2c

Annexes 3f

A. Bibliography 3f1

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B. Special Vocabulary 3f2

IMP - Interface Message Processor - A specially modified Honeywell 316 or 516 processor which serves as the communications computer in the network. 3f2a

TIP - Terminal IMP - An IMP which is augmented by additional memory and a multiline controller. The TIP contains a network control program and a TELNET program within it to permit terminals to access the network directly through it. 3f2b

Multiline Controller - A specially designed multiplexor-like device which supports the access of up to 64 terminals of varying type into a TIP. 3f2c

Message - A logical unit of data exchange between processes. 3f2d

Packet - Physical segments of a message which are the transmission units in the subnet. 3f2e

Subnet - The array of IMPs, TIPs and communication circuits which deliver messages from one host to another. 3f2f

Resource Notebook - Progress rept.

This memo is in reply to MDK's request for progress on the Resource Notebook as of 5-2-73. 1

(QUERY-LANGUAGE) 1a

Before JFV left we had brought up a new version of query, debugged the language and checked it for obvious errors. The new version entailed a major reorganization of the data base including removing a number of level choices that could not be avoided in the old version, breaking the large file into separate files for each site, rewriting and reorganizing all of the header and instructional material, etc. The online version of the Resource Notebook had been in a state of complete disarray following ICCC and up until the time the new version of query came up. This was due to a number of problems including bugs; incompleted editing; bad files, etc. 1a1

At present, the online data base is about 3/4 of the way debugged. LLL has fixed many of the errors and I am in the process of fixing those that are better untangled by the person who did the original writing. I should complete all of this editing and changing within the next week (by May 11). 1a2

HGL has been assigned to continue the programming needed for query. Several suggestions wlll be discussed with him in the near future; meanwhile, he is available to repair bugs now. 1a3

(SERVER-SITES) 1b

The following SERVER sites have been sent out in DRAFT copy:

AMES-67	BBN-TENEX	BBN-TENEXB	CASE-10	CMU-10A
CMU-10B	HARV-10	LL-TX2	MIT-AI	MIT-DMCG
MIT-ML	MIT-MULTICS	SDC-ADEPT	SRI-AI	SRI-ARC
SU-AI	UCLA-CCN	UCLA-NMC	UCSB-MOD75	USC-ISI
UTAH-10				

1b1

UCSB-CC and LL-67 are yet to go out (Probably within two weeks depending on report production, etc.). The Xerox sites, CCA MIT-ML, and a couple of others that are questionable servers have not yet been written up either because they never responded or are new. Total number of servers not accounted for is probably less than five. 1b2

Twelve draft sites were sent to Liaison with specific requests for additional information for a final version. Eleven more have not yet gone out but are ready to go. Six sites have returned final (although still incomplete) information to date.

Harv-10 and Xerox have requested questionnaires so that they can get their sites up to date. 1b3

I have not been able to enter the final information online as yet but this task is high on my priority list. 1b4

(USE-AND-TIP-SITES) 1c

No user or tip sites have been sent out in hardcopy and, to date, none are in the online version of the Resource Notebook. Work on these was put back in order to concentrate on the server sites. This seemed reasonable originally but the situation has changed somewhat due to user and TIP sites becoming very active members of the Network. 1c1

LLL has assembled the following information for Users and Tips: Name, address, function statement, and personnel (as many as we can identify here). This much information will be entered online within the next two weeks (or sooner if possible). These sites will then be contacted and requested to send us a short interest statement. That along with other minor bits of information should complete the write-ups for users and tips, therefore this phase should not be as time consuming as obtaining the information for servers. 1c2

(PROGRAMS-TABLE) 1d

A compendium of all programs available on the network that I am aware of at this time have been collected into a file and organized in a useable fashion. This needs more work before it is ready for the public. When I have gathered and verified as much as I can find, I will investigate a variety of approaches to attempt to get sites to supply the missing infomation. (It is a lot of detail and not a trivial undertaking for some of the sites.) 1d1

In organizing this file, MDK and myself have evolved an interesting technique for organization that is applicable to other listings in the Resource Notebook and query and meets some of the indexing needs. 1d2

(COMPUTERS-TABLE) 1e

The computers table has been completely rearranged in a manner similar to the programs table, but has not been put online and debugged yet. 1e1

(DOCUMENTATION) 1f

A great deal of information is needed to have the documentation sections really in good shape. I have collected much more information snce the ICCC version and will have LLL work on this next. I don't feel this has to be absolutely complete, but should be correct. We will keep building this part. 1f1

Sites are beginning to be more cooperative on this score due to concerted efforts of Jeanne, Mil, and myself to keep after them. 1f2

(HARDCOPY-PRODUCTION) 1g

Getting documents produced through the SRI Report Production department is a hair-raising feat. They rarely meet deadlines and make horrible snafus like printing all the dividers wrong, punching the holes slightly off, forgetting to collate some of the material, etc. DVN and I will talk to Felix Natis about this. I have already talked to Steve Barry. 1g1

Gfetting a site 'out-the-door' after I have finished with it and have given 'camera-ready' copy to Marsha is generally a matter of one month and sometimes longer. I intend to improve on this. 1g2

(COM) 1h

NDM and DVN and myself are continuing to send site-writeups to COM. When we get a format we like we will attempt to have one site printed and reproduced there keeping track of all production problems. When we feel production is satisfactory on one site we will try several (probably users and tips) and, if all goes well (and that is a big if at the moment), we will plan to do a final version through DDSI. (However, due to problems it may not be the next final version.). 1h1

(USER-ASSISTANCE) 1i

Nancy Neigus, Susan Poh, and Dave Crocker have been contacted about being a steering committee for gathering information for the Resource Notebook. The exact plan for handling this has not been implemented as yet. I have plans to have something set up by early June. 1i1

KFB 7-MAY-73 11:07 16314

**WEEKLY REPORT - WEEK ENDING: 3/10

HJOURNAL="SRI-ARC 8 MAY 73 5:35AM 12421";

**WEEKLY REPORT - WEEK ENDING: 3/10

VISITORS OF NOTE 1

John Naughton, Director, Advanced Market Development; Bimal Mahanti, Market Development Consultant; Mal Nechis, Business Plans Consultant of IBM, Armonk, New York; Nathan Edwards, Research Staff, Research Division; Anthony Snachirico, Manager, Exploratory Planning, Advanced Systems Development Division of IBM, Yorktown Heights, New York; general discussions and demonstrations, R. Watson 3/8 1a

VISITORS EXPECTED 2

NEW EMPLOYEES 3

Marcia Keeney, Station Agent 3a

TRIPS PLANNED 4

J. White, M. Kudlick 3/15-17 4a

FTP Meeting, Bolt Beranek & Newman Inc., Cambridge, Massachusetts 4a1

J. Norton 3/13-15 4b

Technical discussions with client, ARPA, Washington, D.C. 4b1

TRIPS TAKEN 5

**WEEKLY REPORT - WEEK ENDING: 3/31

HJOURNAL="SRI-ARC 8 MAY 73 5:36AM 12421";

**WEEKLY REPORT - WEEK ENDING: 3/31

KFB 7-MAY-73 11:11 16316

**WEEKLY REPORT - WEEK ENDING: 4/14

HJOURNAL="SRI-ARC 8 MAY 73 5:37AM 12421";

**WEEKLY REPORT - WEEK ENDING: 4/14

VISITORS OF NOTE 1

John Ehrman and Bruce Hunt, Stanford Computation Center, SLAC Facility; demonstrations of text editing in DNLS, E. Michael and D. van Nouhuys 4/6 1a

VISITORS EXPECTED 2

NEW EMPLOYEES 3

TRIPS PLANNED 4

TRIPS TAKEN 5

M. Kudlick, J. Vallee, J. White 4/6 5a

University of California at Santa Barbara Computer Center to discuss running catalog work at UCSB via the Net. 5a1

ARC WEEKLY REPORT - WEEK ENDING: 4/14

(J16316) 7-MAY-73 11:11; Title: Author(s): Kay F. Byrd/KFB;
Sub-Collections: SRI-ARC; Clerk: KFB;
Origin: <BYRD>WEEKLYREPORT4/14.NLS;2, 17-APR-73 10:43 KFB ;

Imnls-Dnls bug...
When I change viewspecs to m, the ALL ALL message at the top of
the screen changes to ALL AL (i.e. it loses the second L) 1

Dave ... Yes, will attend; but hope you change your mind about 10AM starting time. Would you consider 2PM or thereabouts? ... Mike Kudlick.

1

Packet Radio Group

Mr. Kirstein,
The coordinator of the Packet Radio Group, Robert Kahn, regrets that membership in the Packet Radio Group is limited at this time and that he is unable to put you on the distribution list. The effort is still in the early stages of development and the only notes are intended to be informal personal memoranda not for distribution. He does hope to be able to provide a formal distribution later in the year. If you have any further questions, do feel free to write to Robert Kahn at the ARPA office. Thank you very much for your interest.
Marcia Keeney 1

Ident Question

You are listed in the ident file as KP but as I recall you wanted your ident changed to KTP. Is this correct? Shall I change it? Let me know. --Marcia Keeney. 1

RWW 7-MAY-73 08:41 16321

Reply to Jake on Site Idents

Jake, For the record I disagree wth your proposal on site idents. There is an RFC describing the rules adopted a year and a half ago for site naming. NIC is supposedly responsible for enforcing these. If other conventions are in use we have dropped the ball. My objection to your convention is that it is not mnemonic enough. 1

WLB 7-MAY-73 15:51 16322

Summary of Dialog on Journal Headers

Dick and Charles,
This document contains copies of all dialog on the Journal Header issue through 7 May. I believe everyone has had ample opportyunity to contribute to this dialog and we should get together soon to make a decision on what needs to be done. -- Walt

Summary of Dialog on Journal Headers

WLB 19-APR-73 16:15 16023 Request for Feedback on Journal Headers
(MJOURNAL, 16023, 1:w) 1

Once upon a time, it was decided that documents submitted to the Journal would have a special header (XXX 13-APR-73 00:00 12345) attached to them by the HJournal directive, and that this directive would be interpreted in such a way that the Journal Header could not subsequently be changed or turned off by user-inserted directives in the file. I never cared for this restriction, but as long as the Output Processor was used only for the printer it never presented much of a problem. Now that we have the power of Output Device COM at our fingertips, this is no longer quite as satisfactory. In this memo I'll try to indicate what the conflicts are so that we can begin dialog with the idea of finding a set of conventions that are acceptable to everyone. 1a

The basic conflict here is between the following two considerations: 1b

(1) A document's author/editor should have complete control over the final appearance of the published document. 1b1

(2) Every document published through the Journal should be marked in a conspicuous way so as to identify it as a Journal item with the Journal number, author ident(s), and date of submission in a uniform format and location. 1b2

Obviously, one or both of these considerations has to be dropped or modified. When I was cleaning up the Output Processor for Output to COM last November, I decided (unilaterally) that it was more important for authors to have aesthetic control over their documents than it was for the Journal Header to be sacrosanct, so I quietly changed the Output Processor to treat the Journal Header exactly like any of the other four possible headers -- if an author wants to explicitly specify a Journal Header, his specificaton will now override the Journal default. This caused no grief until recently when Dean started making use of what he thought was still the convention -- i.e., that user-specified Journal Headers would be ignored after Journalization -- only to find that the Output Processor didn't work that way any more. Rather than changing things back the way they were, with the possibility of upsetting somebody else, I am starting this dialog to seek agreement on some convention or the other that we will be willing to live with for the next few years. 1c

There are several obvious conventions which could be followed: 1d

Summary of Dialog on Journal Headers

(1) Leave things the way they are now -- the Journal specifies a default header which can be overridden by the user. 1d1

Advantages: 1d1a

Gives user complete aesthetic control. 1d1a1

Disadvantages: 1d1b

No guarantee that info now in Journal Header will appear anywhere in document. 1d1b1

No way for user to get Journal Number into document without pre-assignment or to get date/time of Journalization by any means. 1d1b2

(2) Change back to the original convention -- Journal Headers cannot be modified or eliminated by user directives. 1d2

Advantages: 1d2a

Guarantees that info in Journal Header will appear. 1d2a1

Disadvantages: 1d2b

Gives user no aesthetic control over Journal Header. 1d2b1

(3) Change back, but allow user some control over the format of the Journal header -- full author name / ident, spell out / abbreviate month, use spaces for hyphens in date, etc. 1d3

Advantages: 1d3a

Guarantees that info in Journal Header will appear and gives user some aesthetic control. 1d3a1

Disadvantages: 1d3b

Aesthetic control is parameterized rather than absolute. 1d3b1

(4) Keep current convention and also provide directives for printing date/time of Journalizaition, author's name or ident, and Journal Number. 1d4

Advantages: 1d4a

Gives user complete aesthetic control as well as access to all information now in Journal Header. 1d4a1

Disadvantages: 1d4b

Difficult to guarantee that standard information is printed. 1d4b1

I'm not particularly attached to any of these four alternatives, although I have a preference for #4, and I would seriously like to get some feedback from anyone who has anything to say on this subject. 1e

Thanks -- Walt 1f

WLB 7-MAY-73 15:51 16322

Summary of Dialog on Journal Headers

RWW 20-APR-73 08:25 16038 Reply to WLB on Journal Header 2

Message: Walt, with respect to the Journal Header question, I think we want to be able to quarantee that Journal items are printed with the appropriate information; therefore I favor alternative 3 in your discussion. If there is a really strong reason why someone must have it really different he can always make a copy and set the directives as he pleases. 2a

Summary of Dialog on Journal Headers

JBN 20-APR-73 08:28 16031 Resubmitted Reply to WLB re Journal
(MJOURNAL,16031,1:w) Headers 3

This is a reJournalized item, because I suspect that accidentally having g viewspec rather than h truncated the end of the item as previously submitted. 3a

I feel that even WLB's possibility 4 doesn't quite answer the needs of knowledge workers. The Journalization of a document should allow the document to appear exactly as the user prepared it if he gave any directives at all. The Journalizer should not have to override the Journal, as Walt too quietly provided for. The Journal formatting should be a default for documents with no directives. A Journalized document should be the same document as it was before Journalizing, with the upper margin adding the information about Journalization, and the right margin, outside the text as prepared, giving the statement numbers. This would be possible by the Journal recognizing a slightly larger page for its own recording purposes. 3b

I said essentially the same in (15440,) and for emphasis I quote it here: 3c

Allow the journalizing of items exactly as prepared, with the addition only of a notation giving the date of journalization and the initials of the journalizer, as a superheader. Added headers and statement indications should be marginal, with the Journal system assuming the burden of allowing for the widening or lengthening of pages to permit its additions. 3d

WLB 7-MAY-73 15:51 16322

Summary of Dialog on Journal Headers

DVN 20-APR-73 09:50 16029 For Freedom of the Press...Replly to 16023 4

Message: In gneral I agree that the author ought to be able to control what goes out over his name atleast my ammending defaults. In particular I like alternative 4 best. 4a

Summary of Dialog on Journal Headers

NDM 23-APR-73 20:23 16113 Re: (16023,) Journal Header treatment
(MJOURNAL, 16113, 1:w) 5

An additional consideration in designing the treatment of journal headers: one should be able to set up a document that before journalization looks very much like the journal file will look (for proofing). To do so, I was including a HJournal directive, expecting it to be overridden by the HJournal directive inserted at journalization. This could be accomplished by any of the last three alternatives in (16023,). Alternative four would work well if the directives produced a reasonable default if the journal information were not known: 5a

the author could be taken as the last to change the file, 5a1

the date should be the current date, 5a2

the number could be something like "xxxxx" or whatever, just so the format resembled the final copy. 5a3

I have found that, in what little publishing I have done, I have not used journal headers in anticipation of back-to-back printing. Perhaps journal header position should be specifiable. 5b

When publishing on COM, it may be wise to publish before journalization, then use DELDIR to delete all print directives in the journalized version. Theoretically, if more copies are desired, we can just call DDSI and ask them to reprint a past film. Print directives are annoying for on-line viewing, and there may be no call for them in once-published files. If one doesn't trust DDSI's microfilm archival system, the publishing version could be archived here. 5c

Summary of Dialog on Journal Headers

DCE 28-APR-73 10:03 16233 On Journal Headers, response to
(MJOURNAL, 16233, 1:w) (16231,) 6

REgarding the JHEADER, showing author, publication date, and Journal number: I favor it's being in a standard place (with the Jnumber being right justified to same as SNF and Footoer RM Page NUmber -- these location referencing numbers should always be in the same place,a nd I feel that they shoud line up as a stylistic way of reinforcing their common characteristic of being part of that referencing data. (I like putting "Page" befor the right-justfied page number in thefooter, but any other way to set that integer apart from a possibily duplicated first-level statement number is o.k.). 6a

I think having all of these reference data in a standard position on the page is an important feature. If we want some aesthetic variation available to the person who submits the JOurnal item (in modifying these reference data, I'd favor: 6a1

Giving him some directives that say what form the JHEADER authorname or publish-date items might be printed (from some pre-defined alternatives; also letting him choose from some alernatives regarding the idenfitying of right-justified page numbers -- but not let him move the Jhedader or page number. 6a1a

Then, if he really wanted different style, let him copy the JOurnal file into his own directory and modify to suit himself. 6a1b

On the problem of printout directives being in the way of on-line studying: 6b

There has long been an alternative (in the NP pushdown stack) for consideration as to specifying outputting formats -- besides embedding directives in the file at the point where they are to take effaffect: 6b1

Have formatting directions be independent, as a branch in another file. One could use the same set of directives as in our current system, and for each location in the text tile where a directive or a set of directives (from one to n) was needed, these directives in the specification branch would be associated with a link that defines the place in the target file where they were to become effective. 6b1a

THis waits for two small developments that have (in my

mind, at least) been near the top of our push-down stack for quite a few years: 6b1b

Extending the syntax and link-handling machinery to enable a link to specify any information entity in an NLS file, so that in particular it could specify the exact between-character point at which a directive (or set of them) was to take effect. [There are a number of other application expectations also waiting for this link-specification extension.] 6b1b1

Having the back-link capability in NLS; which here would enable the sequence-generator statement-outputting machinery to send to the display or to the output processor a statement that is modified in some desired way according to the links that cite it (or that cite some internal entity). 6b1b2

In displaying the NLS file that is thus having its output format specified, the directives could optionally be chosen (via VSPEC) to be indicated in several ways: like embedded where their links indicate, or shown in a betwen-statement area with arrows showing the exact interstitial target point, or merely with some little annunciator type visual signals indicating that there are directives (of prhaps a specified type) aimed at this statement. 6b1b2a

In outputting, this back-link machinerey could obviate the need for the detailed search for embedded directives -- handing the directive information across to the Output Processor at the right point in a special way so as to differentiate it from the printout file's literal text. 6b1b2b

ANother alternative can easily stem from another expected feature (from the NP Stack): There are a number of types of information often embedded in text that we would like to have explicitly tagged so that their unique handling in certain processes could be facilitated. Besides the printout directives, we'd like for instance to have every link be unequivocably and explicitly known about. (We want processes that can unambiguously locate every link in a file, for instance). Comments in source code, too -- and if we keep thinkin about it we'd consider all proper nouns, or all variales of a given type, or etc. 6b2

I assume that the next stage of NLS file structure design

will allow us to implement the desired bookeeping in several ways; but for the printout directive issue we need merely say that when such provisions are established, the directives could be installable, viewable, editable, communicated to the output processor, etc., in ways to keep them from interfering with NLS studying when we wished, while still being safely embedded within the file. 6b2a

About keeping printout-file versions around: I assume that there is an analytic way of evaluating the payoff for keeping print-formatted versions of a JOurnal file around, for a given period; and I assume that it would payoff to keep it for some period. 6b3

I would like to see this pursued one of these days, depending upon the nature of the changes required in NLS command processes, and in the people procedures for the Journal-support operational staff -- and for the on-line file space thus required. It would ease the conscious of many of us in doing individualized printouts if we knew that we weren't paying for the OUtput Processor every time -- and I really do like to see most Jounal items in the full-format form via the Output PRocesor. 6b3a

There is another potential value to be obtained by keeping the print-format copy of Journal files (or at least some sort of "print map" of which full print copy could be one kind): 6b3b

Dialogue via Journal will be very useful for people who, at their terminal, have hard copy to refer to when they want to cite some previous item. Also, if they want to copy hunks of other-file material and merge them into a document they are developing. For some years, it will be very effective (to my mind) for some of these people to be working from micro-fiche records, and I believe that many of them will work from micro-fiche readers that are on line and whose frame positioning will be computer controlled. I believe that they also will be able to point with a device that will tell the computer the frame coordinates of a select action. 6b3b1

IT will add greatly to the support they can get from the computer if it can map back from these "printout-page frame coordinates" to the contents, and to a map that allows both-way correlation: the computrer should be able to find the source-file point corresponding to the projected-frame entity thus "bugged", and it should

corresponsingly (as for instance if it then follows a link) be able to find out out which fiche and frame (and perhaps what coordinates on the frame) frame holds the cited entity, so that it can find and position the appropriate fiche to give the user the "jumped-to" view (and even possibly bive him some indication, perhaps via controlled cross-hair positioning, as to where the cited entity is on the projected frame). 6b3b2

I think of this fiche-usage as very real in the "probable" future, and therefore the necessary associated features in file handling and NLS processes are also "expected" in my mind. Therefore, for other types of issues, such as being discussed here about Journal printout practices, I tend to favor solution aaproaches that anticipate and indeed help along these expected future states of things. 6b3b3

WLB 7-MAY-73 15:51 16322

Summary of Dialog on Journal Headers

CHI 30-APR-73 Reply to WLB on Journal Header 7

Message: I prefer your alternative #3 (controlled, parameterized changes). 7a

CHI 7-MAY-73 22:23 16323

Execute Identification

Alex, Use Goto Identification Submode. We have phased out access to this facility through Execute. Sorry for the inconvenience. -- Charles 1

DCE 7-MAY-73 21:11 16324

Re. JCN visit arrangement to NBS 9 May 73

Jim: CHecked with Tom Pyke this morning (noon, his time). They'll be glad to see you. Set up for Wed morning, 9 May. He mentioned that they were just now in some review process within NBS regarding the general text-handling operations they have, and how bout compterizing them; among the possibilities being NLS -- so from that point of viw your visit is timely. 1

He suggested 0930 your arrival there. Not too obvious how to get there, even after a few visits. You could call ahead Wed morning, or contact them during office hours Tues -- (301) 921-2601 gets anyone in the group (Tom Pyke, Shiley Watkins, George Lindamood, Ira Cotton, etc.). Tom's home phone is (703) 525-5917; he'll be home Tues evening, and wouldn't mind a bit (his words) if you call hime there to talk over how to get there or etc. 2

DVN 8-MAY-73 08:22 16326

A Source for Locator Glossary

I am submitting a journal item for the first time in the new NLS. The echoning has changed. You should check the charts agansreality.

DVN 8-MAY-73 08:22 16326

A Source for Locator Glossary

A draft description of Network Management, (Ijournal,16312,) contians a useful glossary of net terms. 1

NJN 8-MAY-73 08:59 16327

RJS Socket

I don't remember if I answered your note to me about the RJS socket. In any case, I have duly noted that it is ARPANET Standard and will be listed correctly thenext time I release the list. I apologize for the error. --Nancy 1

CFD 8-MAY-73 09:25 16328

NMDT Status Report -- May 7, 1973

This brief report summarizes the status of recent work by the NMDT.
Your comments and suggestions are encouraged.

NMDT status report -- May 7, 1973 1

Several NMDT meeting reports have been held in recent weeks for which there have been no reports issued. This report is an attempt to mark where we're at today and summarize the progress of the last few weeks. Three principal areas of discussion consumed most of the NMDT meeting time; these are summarized separately below: 1a

Command Language recognition and feedback 1a1

General consensus was finally reached that it would be impossible to adopt any single recognition or feedback mechanism which would accomodate all NLS users. A mechanism for optionally specifying the type of command recognition and feedback that is to be provided to the users should be built into the command interpretter for the system. The recognition property must be a global property of a command subsystem, and it might not be too much of a restriction to require the user to use only a single recognition method for all subsystems. 1a1a

User Programming Capability 1a2

The principal difficulty in modelling the user programming capability for NLS is the decision of what level of capability is most appropriate. Our experience with the L10 user programming capability is that it does not satisfy the needs of non-programmers. 1a2a

One basic decision which was reached only after considerable debate and argument was that the user programming facility must be kept as simple as possible to use, and the user should not have to learn a programming language per se in order to be able to use it. It seems more appropriate to use the syntactic base of the command language for the user programming facility rather than draw upon MPS for syntactic notions. 1a2b

This decision has extensive implications for the capabilities of the programming facility: 1a2b1

The user programming facility will not handle large software development efforts. MPS programming facilities are designed to augment the production of large scale software efforts and the MPS facilities will always be availiable to the sophisticated programmer-type NLS users. 1a2b1a

Some users may reach the limits of the capabilities of the user programming facility and thus may be forced to learn MPS in order to successfully augment their use of NLS. 1a2b1b

The actual syntax of the user programming language has not been resolved and requires considerable attention. It is easy for software designers and programmers to design another programming language; it is considerable more difficult to develop a programming facility which integrates well with the command language. 1a2c

MPS data facilities 1a3

Jim Mitchell has released a new version of MPSDATA, intended to be a final draft of the data structures for MPS. This draft contains significant changes in the reference notation concepts, arrays and their generalized application to strings, pointers and their de-referencing, and several other areas. A few problems still exist with the document in the areas of left hand side pointer de-referencing and forward referencing to undeclared procedures, but the continuing discussions seem to be beneficial because they simplify and consolidate the basic notions of the MPS language. 1a3a

Some highlights of the new proposed MPS data structues are listed below: 1a3b

1) The parenthesis characters are used only for expression grouping and evaluation. Square brackets are used to indicate a selection operation (record/array selection, procedure/port call, macro call). 1a3b1

2) The appearance of a non-subscripted variable which is a procedure name or macro name implies evaluation of the procedure/macro with no actual arguments. Empty subscripts are no longer required to designate procedure/macro evaluation with no actual arguments. 1a3b2

3) Pointers are not automatically de-referenced when they appear as elements of an expression. The statement ptr ← object; is equivalent to ptr ← @object; . 1a3b3

4) Sequences appear to have no utility as distinct primative object types in the language and are therefore elided. The effect of sequences can be obtained from arrays and array descriptors. 1a3b4

5) The concepts of arrays have been extended to include character strings, implying that the pattern matching and compare/selection mechanisms which are developed for character strings may have utility for other types of arrays as well. 1a3b5

a) The notion of a string cursor has been extended to be an index mode object for an array. The selection and positioning operations developed for string "cursors" will have application to arrays in general. 1a3b5a

6) An alternative syntactic form for the declaration statement was recommended. This form utilizes the occurrence of an identifier enclosed in parenthesis to mean "DECLARE" <identifier>. 1a3b6

7) The uniform reference concepts have been included in the description of the data structures for MPS. 1a3b7

Significant consolidation of thinking has taken place among the NMDT members and participants in recent NMDT meetings. We should be held accountable for our concurrence, and we solicit your arguments and criticisms. A good deal of additional work is required to prepare a firm proposal for the user programming capability, and it looks like this area might benefit most from collaborative dialogue. 1b