WEN 21-FEB-73 15:58 14601

msg

this is a msg 1

msg

(J14601) 21-FEB-73 15:58; Title: Author(s): Naylor, William E. /WEN; Distribution: /WEN; Sub-Collections: NIC; Clerk: WEN;

this is a msg. 1

(J14602) 21-FEB-73 16:05; Title: Author(s): Naylor, William E. /WEN; Distribution: /WEN; Sub-Collections: NIC; Clerk: WEN;

WLB 21-FEB-73 12:21 14603

Initiating the Exchange of Pre-Compiled User Programs

Congradulations to Chuck for implementing the Goto Programs Get Rel File command. If you haven't used it and would like to give it a try, my Journal Transmissions reformatter is available as <BASS>F.REL for your entertainment. If you decide to use it, be sure your initials file is updated first, as the program replaces the notifications statements in your file (rather than just doing SENDs to the display) -- and you can't get back the old forms without unlocking your file. Have fun -- Walt 1

14603 Distribution

Van Nouhuys, Dirk H. , Victor, Kenneth E. (Ken) , Wallace, Donald C. (Smokey) , Watson, Richard W. , Andrews, Don I. , Hoffman, Carol B. , Lee, Susan R. , Michael, Elizabeth K. , Dornbush, Charles F. , ARC, Guest O. , Feinler, Elizabeth J. (Jake) , Handbook, Augmentation Research , Kelley, Kirk E. , Meyer, N. Dean , Byrd, Kay F. , Prather, Ralph , White, James E. (Jim) , Vallee, Jacques F. , Kaye, Diane S. , Rech, Paul , Kudlick, Michael D. , Ferguson, Ferg R. , Lane, Linda L. , Auerbach, Marilyn F. , Bass, Walt , Engelbart, Douglas C. , Hardeman, Beauregard A. , Hardy, Martin E. , Hopper, J. D. , Irby, Charles H. , Jernigan, Mil E. , Lehtman, Harvey G. , North, Jeanne B. , Norton, James C. , Paxton, William H. , Peters, Jeffrey C. , Ratliff, Jake , Van De Riet, Edwin K.

WLB 21-FEB-73 12:21 14603

Initiating the Exchange of Pre-Compiled User Programs

(J14603) 21-FEB-73 12:21; Title: Author(s): Bass, Walt /WLB;
Distribution: /sri-arc ; Sub-Collections: SRI-ARC; Clerk: WLB;

WEN 22-FEB-73 9:04 14604

nwmadd

Please add the following to the network measurement note distribution list:

Jack Ray
P.O. Drawer D
Cocoa Beach, Fla. 32931

Buz Owen
Seismic Array Analysis Corporation
P. O. Box 334
Alexandria, Va. 22814

1

nwmadd

(J14604) 22-FEB-73 9:04; Title: Author(s): Naylor, William E. /WEN;
Distribution: /JBN; Sub-Collections: NIC; Clerk: WEN;

AAM 22-FEB-73 10:59 14705

more on TELNET meeting from Alex

Dear Jon,
I got a call from Wayne Hathaway yesterday. Seems that the yearly SHARE meeting is taking place from March 5 thru March 9. Wayne suggested that this would be a bad time fore himself, Winett, Steve Wolfe,.... to get to a TELNET meeting. I told him I had checked with Braden before scheduling, and would therefore not reschedule unless I got objections from more than one site. Wayne said he would call at least Braden and Winett, and tell them to call me if they cared, otherwise he didn't care either. Any thoughts as to what to do if there are more objections? Looks to me like Friday the second or MUCH later?

Assuming meeting stays on March 5, how would you like to take care of me (car, room, etc.) from sometime like Saturday night or Sunday noon through Tuesday noon or Wednesday morning (I want to be prepared for the meeting taking an extra day)?
Regards, Alex

1

AAM 22-FEB-73 10:59 14705

more on TELNET meeting from Alex

(J14705) 22-FEB-73 10:59; Title: Author(s): McKenzie, Alex A. /AAM;
Distribution: /JBP; Sub-Collections: NIC; Clerk: AAM;

AAM 22-FEB-73 11:24 14706

Dear Dave,

If the purpose of a users group is to put pressure on servers to provide something,perhaps it's a good idea; however I then begin to side more with Peter Deutsch in believing that the whole question of whether "research" sites OUGHT to be asked to provide general services. I don't think that such sites are really staffed to even deal appropriately with complaints, much less implement changes. With regard to CCN, Braden always seems willing to perform implementations if sufficient money is involved; why should anyone get to say he should do things for free? Similarly, if TENEX or Lincoln Labs is willing only to provide service to people who are willing to use subsystems as they are, what sort of valid complaint can anyone make (I exclude ARPA or whoever is actually paying the bills)???

It DOES seem reasonable that any system being designed specifically for the network should take user needs into account (how recently have "users" talked to CCA about the "Datacomputer"?), but the only such existing systems that I know of are the TIP and the ANTS. The TIP group, at least, tries to be responsive, altough I don't know if this is perceptible to an outside observer

In short, anything that gets done has to be paid for by someone. It also has to be DONE by someone, and high-quality manpower is in short supply everywhere. I don't see how forming a "lobby" addresses these issues unless

1) the lobby has money, or

2) it lobbies ARPA rather than the servers.

Otherwise, I think the "users" are likely to drive each server into a tight shell (or off the network) rather than getting what they really want.

I'll try dealing with the secretary/text editor issue some other time, perhaps when I next see you.

Regards, Alex

1

(J14706) 22-FEB-73 11:24; Title: Author(s): McKenzie, Alex A. /AAM; Distribution: /DHC JI; Sub-Collections: NIC; Clerk: AAM;

BAH 22-FEB-73 12:08 14707

FEB 11-17, 1973, A Week In Review

FEB 11-17, 1973, A Week In Review

WEEKLY ANALYSIS REPORT: 1

2
(ARC) 2a

2a1
WEEK: FEB 11-17 1973 (24 HOURS/DAY) 2a2

2a3

IDENT	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU	2a4
						2a5
(DIA)	.136	5.830	.023	.4	43:1	2a6
(MFA)	.439	8.846	.050	1.3	20:1	2a7
(WLB)	.466	17.248	.027	1.4	37:1	2a8
(KFB)	.093	9.802	.009	.3	111:1	2a9
(CFD)	2.180	45.585	.048	6.6	20:1	2a10
(DCE)	.933	38.237	.024	2.8	42:1	2a11
(JAKE)	.046	4.168	.011	.1	91:1	2a12
(WRF)	1.074	24.003	.045	3.3	22:1	2a13
(BAH)	.470	10.415	.045	1.4	22:1	2a14
(MEH)	1.010	17.409	.058	3.1	17:1	2a15
(JDH)	.441	12.793	.034	1.3	29:1	2a16
(CHI)	2.296	27.464	.084	.480	12:1	2a17
(MEJ)	.480	22.463	.021	1.5	48:1	2a18
(DSK)	.921	18.699	.049	2.8	20:1	2a19
(KIRK)	1.522	41.527	.037	4.6	27:1	2a20
(MDK)	.526	10.738	.049	1.6	20:1	2a21

(LLL)	.138	10.826	.013	.4	77:1	2a22
(SRL)	.102	3.822	.027	.3	37:1	2a23
(HGL)	.810	15.613	.052	2.5	19:1	2a24
(NDM)	.135	3.909	.035	.4	28:1	2a25
(EKM)	.446	15.017	.030	1.4	33:1	2a26
(JBN)	.195	11.377	.017	.6	59:1	2a27
(JCN)	1.339	26.713	.050	4.1	20:1	2a28
(JCP)	1.100	29.484	.037	3.3	27:1	2a29
(JR)	-	-	-	-	-	2a30
(PR)	.121	4.574	.026	.4	38:1	2a31
(JFV)	.036	.577	.062	.1	16:1	2a32
(EKV)	.002	.786	.003	0	333:1	2a33
(DVN)	.462	16.824	.027	1.4	37:1	2a34
(KEV)	.511	12.270	.042	1.6	24:1	2a35
(DCW)	.804	10.308	.078	2.4	13:1	2a36
(RWW)	.109	2.337	.047	.3	21:1	2a37
(JEW)	.323	7.347	.044	1.0	23:1	2a38
			-----	-----		2a39
(TOTAL)				59.7%		2a40
(AVERAGE)			.038			2a41

2a42

HIGHEST CPU: CHI 2.296 hrs LOWEST CPU: EKV .002 hrs 2a43

HIGHEST CON: CFD 45.585 hrs LOWEST CON: JFV .577 hrs 2a44

FEB 11-17, 1973, A Week In Review

HIGHEST CPU/CON: CHI .084 HIGHEST CON/CPU: EKV
333:1 2a45

2a46

(RADC) 2b

2b1

WEEK: FEB 11-17 1973 (24 HOURS/DAY) 2b2

2b3

NAME DIR	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU	
(JHB)BAIR 147	.258	20.438	.013	.8	77:1	2b5 2b6
(WPB)BETHKE 22	.033	2.343	.1	.1	71:1	2b7
(JPC)CAVANO 46	-	-	-	-	-	2b8
(RFI)IUORNO 18	.023	2.257	.010	.1	100:1	2b9
(FSL)LAMONICA 21	.044	7.169	.006	.1	167:1	2b10
(TFL)LAWRENCE 87	.130	6.667	.019	.4	53:1	2b11
(JLM)MCNAMARA 123	.024	1.647	.015	.1	67:1	2b12
(RBP)PANARA 78	.036	2.399	.015	.1	67:1	2b13
(MDP)PETELL 20	-	-	-	-	-	2b14
(RADC)RADC 72	.116	12.631	.009	.4	111:1	2b15

(WER)RZEPKA	-	-	-	-	-	
47						2b16
(FPS)SLIWA	.021	1.724	.012	.1	83:1	
29						2b17
(JRS)STELLATO	.057	2.761	.021	.2	48:1	
34						2b18
(DLS)STONE	.142	7.173	.020	.4	50:1	
145						2b19
	-----	-----		-----		
---						2b20
(TOTAL)	.884	67.205		2.8		
889						2b21

(PER CENT TOTAL DISK CAPACITY)
1.8% 2b22

2b23
(XEROX) 2c

2c1
WEEK: FEB 11-17 1973 (24 HOURS/DAY) 2c2

NAME	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU	
						2c3 2c4
(DDC)COWAN	.113	3.610	.031	.3	32:1	2c5 2c6
(LPD)DEUTSCH	.261	6.534	.040	.8	25:1	2c7
(CMG)GESCHKE	-	-	-	-	-	2c8
(EMM)MC-CRGHT	-	-	-	-	-	2c9
(RMM)METCALFE	-	-	-	-	-	2c10
(JGM)MITCHELL	.321	6.511	.049	1.0	20:1	2c11
(WHP)PAXTON	.009	.082	.110	0	9:1	2c12

(EHS)SAT-WTE	.581	12.208	.048	1.8	21:1	2c13
(RES)SWEET	.999	23.647	.042	3.0	24:1	2c14
	-----	-----		-----		2c15
(TOTAL)	2.284	52.592		6.9		2c16

2c17

(NETUSERS) TOP FIVE 2d

2d1

WEEK: FEB 11-17 1973 (24 HOURS/DAY) 2d2

2d3

NAME	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU	2d4
						2d5
MITRE-TIP	.872	31.490	.028	2.6	36:1	2d6
COLES	.391	17.306	.023	1.2	43:1	2d7
UCLA-NMC	.344	16.585	.021	1.0	48:1	2d8
GUEST	.316	12.780	.025	1.0	40:1	2d9
UCSB	.240	7.796	.031	.7	32:1	2d10
	-----	-----		-----		2d11
(TOTAL)	2.163	85.957		6.5		2d12

14707 Distribution

Van Nouhuys, Dirk H. , Victor, Kenneth E. (Ken) , Wallace, Donald C. (Smokey) , Watson, Richard W. , Andrews, Don I. , Stone, Duane L. , Lawrence, Thomas F. , Bair, James H. , Deutsch, L. Peter , Mitchell, James G. ,
Hoffman, Carol B. , Lee, Susan R. , Michael, Elizabeth K. , Dornbush, Charles F. , ARC, Guest O. , Feinler, Elizabeth J. (Jake) , Handbook, Augmentation Research , Kelley, Kirk E. , Meyer, N. Dean , Byrd, Kay F. , Prather, Ralph , White, James E. (Jim) , Vallee, Jacques F. , Kaye, Diane S. , Rech, Paul , Kudlick, Michael D. , Ferguson, Ferg R. , Lane, Linda L. , Auerbach, Marilyn F. , Bass, Walt , Engelbart, Douglas C. , Hardeman, Beauregard A. , Hardy, Martin E. , Hopper, J. D. , Irby, Charles H. , Jernigan, Mil E. , Lehtman, Harvey G. , North, Jeanne B. , Norton, James C. , Paxton, William H. , Peters, Jeffrey C. , Ratliff, Jake , Van De Riet, Edwin K.

BAH 22-FEB-73 12:08 14707

FEB 11-17, 1973, A Week In Review

(J14707) 22-FEB-73 12:08; Title: Author(s): Hardeman, Beauregard A. /BAH ; Distribution: /SRI-ARC DLS TFL JHB LPD JGM ;
Sub-Collections: SRI-ARC RADC ; Clerk: BAH ;

DVN 22-FEB-73 20:11 14708

My Time: Distribution and Redistribution to fit in more DPCS

In January JCN, RWW, and I met and they suggested that I find more time to organize the DPCS better, particularly COM (journal,14164,0133,). 1

I pointed out that my time was full; something would have to give. 1a

They suggested I work out a way for something to give; I have only had time to do that this week. 1b

The following table shows a thoughtful guess about the present allocation of my time as opposed to. 1c

Present Distribution: 2

Training		38%	2a
TNLS Course	11%		2a1
Answering questions from the network	6%		2a2
Answering local questons	10%		2a3
Working with Video Tape		5%	2a4
Continuing NLS Seminars	6%		2a5
Administration		19%	2b
Dealing with SRI	6%		2b1
PSO Co-ordination	8%		2b2
Planning my own time	5%		2b3
DPCS		8%	2c
Other Publications		8%	2d
RADC		10%	2e
Other Meetings		7%	2f
Overhead (mostly screwing around with the system)		10%	2g

Where I think I can squeeze: 3

I propose putting MFA in charge of the TNLS course work. 3a

My Time: Distribution and Redistribution to fit in more DPCS

By "in charge" I mean caring for the course outline(journal,13856), the charts, the overall planning and scheduling, and being "the main teacher". 3a1

I expect to be available to be a member of the teaching team. 3a2

I think this change will free 6% of my time. 3a3

I propose to make a serious effort to shift answering questions from the NET away from me. 3b

Marilyn would get most of this work, too. 3b1

I think I can save 5% there. 3b2

Item 2a3 (answering local questions) seems irreducible without my turning into a grump. 3c

Re 2a4, I can stop working on video tape. 3d

Harvey, Kirk and Marilyn have worked on video taping. It is my feeling that if I dropt it nothing would happen until some new start was made. 3d1

A training tape on sending a journal message is almost finished; I would like to complete it. 3d2

Cutting video taping gets me 5% 3d3

I propose to drop continuing NLS seminars (link,). That gets me 6% 3e

Since I am still working on an overall training plan I would like to put a new item into training called training coordination (which is now really overhead among the above items) which takes 5%. 3f

Thus I squeeze 17% out of training. 3f1

The items under administration seem irreducible. 3g

Item 2d, Other Publications, includes various writing jobs, like the handout and the understanding between Marilyn and I to help one another by editing, etc. 3h

I hate to reduce it, let's say we could squeeze 3% out of it. 3h1

My Time: Distribution and Redistribution to fit in more DPCS

The last 3 items seem to me irreducible. 3i

Let me comment that 10% for 2g, overhead, seems to me too low for somebody trying to survive in NLS. 3i1

That frees 28% for DPCS. 3j

If we want to get more, something like training as a general subject, administration or RADC will have to give. 3k

DVN 22-FEB-73 20:11 14708

My Time: Distribution and Redistribution to fit in more DPCS

(J14708) 22-FEB-73 20:11; Title: Author(s): Van Nouhuys, Dirk H. /DVN; Distribution: /rww jcn mfa wlb hgl (note branch 3d) kirk (note branch 3d) ; Sub-Collections: SRI-ARC; Clerk: DVN;
Origin: <VANNOUHUYS>DVNTIME.NLS;2, 22-FEB-73 20:05 DVN ;

TNLS Classes, Notes on Post Mortem of February 13

Mike, Marilyn, and I met on the 13th to discuss the previous week's TNLS class. 1

I remember best the thoughts that I had worked out before I went to the meeting: 2

The class was unusually even in competence, there were no hotshots and no dummies. 2a

It was a pretty good class overall. 2b

For that reason and because it ran longer (3 full days for most of the people) they went away better able to return home and begin functioning in TNLS than any previous class. 2c

The greater length of the class arose from three sources. 2d

We explained each command in greater length with particular attention to why that command exists as it does in the larger context of NLS. 2d1

We covered more material, the complete outline (13856,,). 2d2

On a few occasions we had people do exercises in unison which is rather slow because of random errors. 2d3

We discussed the length of the class what it bought and what it cost. 3

They learned more, but was it worth it to tie up 3 busy people and limit service to other people for 3 days? 3a

In particular we considered the question of whether the purpose of the class was to instruct all students as thoroughly as possible or to "net the big fish", that is, to give an introduction to TNLS that would allow people who, because of their own situation, are likely to become importaat users to go home and become proficient on their own. 3b

Mike urged that we are obliged to do a good job for anyone who is sent to the class and urged the importance of full explanation of commands if NLS is to make sense. 4

We also considered the problem that occurs when one of us is lecturing and another is present in the room and the listener feels that the lecturer is about to miss some important point. 5

The listener has the choice of: 5a

keeping silent and risking that an important point will be missed, or 5a1

interrupting the speaker who may who may be skillfully building up to the point in question. 5a2

We confessed to one another how we had all suffered both from interruption and from keeping silent. 5b

We agreed that, as we expected to work together in the future, we would have the problem less as we learned to trust one another. 5c

More thorough acquaintance of the flip charts will help. 5c1

We turned our attention to the class coming up starting the 26th with Sutherland, Linkletter, etc. 6

We agreed that we would give them some chance for hands on experience with DNLS on the 3rd day. 6a

We agreed we would switch around subjects that we would teach. 6b

We agreed we would look at the outline (13886,), consider what changes we should make to adjust to this group, and meet again on Monday. 6c

But Monday is a holiday so I suppose we will meet on Tuesday. 6c1

TNLS Classes, Notes on Post Mortem of February 13

(J14709) 22-FEB-73 9:51; Title: Author(s): Van Nouhuys, Dirk H.
/DVN; Distribution: /mfa rww jcn mdk ; Sub-Collections: SRI-ARC;
Clerk: DVN;
Origin: <VANNOUHUYS>FEBTNLS.NLS;5, 16-FEB-73 8:54 KPB ;

DEX: Plans and Progress Report

INTRODUCTION 1

In response to RWW's journal documents (14430,) and (14164,), this message is a short progress report on DEX-II and possible further developments. The DEX-II design document was (9241,); the user system design has not changed substantially. 1a

STATUS OF DEX-I 2

DEX-I has been in use for close to a year with varying degrees of success. 2a

Primary users have been PSO people who have used the system for text input. 2a1

The fact that others have not made use of the system is a type of failure. One reason is the limited instruction set available in DEX-I, a condition to be remedied with DEX-II which permits a wide variety of commands on both new and existing files. 2a1a

There have been very few bugs in the system though it does not provide what the primary users desire. 2a1b

PR has discovered in his measurements a large overhead in DEX-I. This is because several things in addition to simple NLS statement input and creation are done; thus, the comparison made with TNLS is not completely valid. Currently, an output processor print file is created and an output file is performed. 2a2

At Doug's suggestion, I have changed DEX-I in the experimental system to make the printer file creation optional. I have also changed the Output file to an update which should also increase the efficiency. 2a2a

DEX-II is likely to be less effiecient than DEX-I for simple text input because of the problems involved in parsing with the greater variety of commands. DEX-II contributes to our resource efficiency if we take into consideration the ability to run jobs at a less busy time of day. I hope we can arrange some sort of queueing mechanism (much like that for the printer) to process DEX-II sequential files. 2a2b

The text input facility described above wil be much more efficient than the current DEX-I and DEX-II. 2a2c

DEX 1.5 Proposal (for text input) 2b

For PSO purposes purposes, a simpler text-input only system would be advantageous. Discussion of such a system has taken place and it is anticipated that such a system (which has the advantage of not requiring the specification of LNs) can be implemented rapidly using procedures from DEX itself. Among features would be: 2b1

Present DEX text backup. 2b1a

Statements delimited by more than one EOL (as suggested by Kirk) with the escape character to permit their inclusion in the text. 2b1b

No commands (such as output device printer.) A file will be created with a default name (which cannot be changed) as in DEX-I. 2b1c

Use of u's and d's followed by a space to indicate level changes. (Default is successor.) 2b1d

No capability of inserting in any order or interpolating. 2b1e

It will be faster than DEX-I because of simpler parsing, no printer text file created. 2b1f

STATUS OF DEX-II 3

I have been working off and on on DEX-II since the end of November. 3a

Not having convinced myself of the value of the project and discovering that there were always other pressing bugs to fix and features which could be implemented in comparatively short times, I managed to push DEX-II off for close to a year. 3a1

When I began the implementation, I was pleased to discover that the basic flow (the higher level procedures) of DEX-I could be used. I also discovered some bugs in parts of DEX-I which no one had discovered. 3b

Error handling, a problem in any off-line system, is , I feel, dealt with very well using a set of signals. 3c

Plowing ahead, I discovered rocks in the field in the part of

the system which translates DEX-II LNs into stids. Ambiguities had to be resolved in the definition of nodes which had been moved or copied and then interpolated on. Some of these ambiguities have been extremely difficult and have been solved concepptually, but have not been coded. The complexity is disappointing, for it means the system will be very expensive for simple text input and difficult to explain to most users. 3d

For simple text input, I would recommend the system described above. In creating a DEX-II course, I would strongly recommend avoiding the mistakes made in presenting the rest of NLS to new users: more complex features of the system should be held back from novices. 3d1

After discussing some of the problems involved in the DEX implementation with DCE, we have decided to bring up as rapidly as possible a truncated version of the system and to add features later. The truncated version will have all of the commands specified in (9241,). It will not have some of the addressing options which permit the accessing of LNs which have been moved/copied and permit some of the more complex interpolations on such nodes. Such an omission will, I feel, affect only more sophisticated users. 3e

We will thus gain some experience with most of the eventual feature of DEX-II and be able to evaluate its value (or lack of value). 3e1

So, you may well ask, when will it be up? I hesitate to say for obvious (and admittedly embarrassing) reasons. I hope to get something working by 5 March, though this may slide a bit. 3f

This will be the truncated DEX-II. DEX-1.5, the text input system, should come shortly after it (or maybe even before.) 3f1

HGL 22-FEB-73 15:32 14710

DEX: Plans and Progress Report

(J14710) 22-FEB-73 15:32; Title: Author(s): Lehtman, Harvey G. /HGL;
Distribution: /rww jcn chi wlb kirk dce dvn ; Sub-Collections:
SRI-ARC; Clerk: HGL;
Origin: <LEHTMAN>TASK.NLS;2, 22-FEB-73 12:45 HGL ;

History, Needs, Possibilities, of Catalogs at ARC JBN 23 FEB 73
--Part 1 NIC Catalogs

This is the first part of an opus discussing the Catalogs of all types at ARC. The NIC document catalog has received the greatest attention, in input, program and production effort. Other work modules to be looked at in following parts are the NIC Journal Catalog, the ARC catalog which has evolved from the XDOC catalog, and an attempt to summarize a whole philosophy of catalog building and use in our environment. 1

SCHEDULE 2

The NIC Current Catalog, with a listing of paragraphs for each item, and one-line indexes by author, number and titleword has been issued at intervals. 2a

Catalog parts	Dated	Distributed	Pages	
NIC 5144	28-OCT-70	NOV-70	6	2a1a
NIC 5715,-6,-7,-8	27-JAN-71	27-JAN-71	67	2a1b
NIC 5800,-1,-2,-3,-4,-5	23-MAR-71	11-MAY-71	224	2a1c
NIC 7029,-31,-32,-33	1-JUN-71	25-JUN-71	97	2a1d
NIC 7720,-1,-2.-3,-4	1-OCT-71	3-DEC-71	172	2a1e
NIC 9101,-2,-3,-4,-5	1-FEB-72	APR-72	255	2a1f
NIC 11600,-1,-2,-3,-4	1-AUG-72	16-OCT-72	361	2a1g
NIC 13457-13465	1-DEC-72	FEB 73	430	2a1h

NEED--Reliable set of programs, to allow to be run successfully in one off-prime-time period. (WLB, BAH) 2a2

NEED--Regular monthly production, based on reliable programs. (BAH or other, MEJ, BER, JBN, SRL) 2a3

NEED--Close followup on all efforts. (JBN or other) 2a4

FORMAT 3

The pages for Listings and Indexes were designed to make thumbing a hardcopy easy, by throwing the entry point to the right margin. This feature has no advantage for printing on both sides of the paper. 3a

POSSIBILITY--Design for reversible format so that index entry point is at outer edge of printed page. The format of the rest of the entry could remain the same. 3a1

After the third issue, the format was expanded in length and width to allow reduction to approximately 78%. This format was designed especially for the printed catalog, but was next best to a two-column format, which was not feasible at the time. It is readable online, but is not optimum for this purpose. 3b

NEED--Hidden directives needed, if same file is to be used for both online and offline, and this is reportedly not feasible. 3b1

Offline format for Author Index, present and to continue: 3c

TENEX, A Paged Time Sharing System for the PDP-10 (Preliminary Draft) 4

BBN-LISP TENEX Reference Manual 5

Online format for Author Index, present: 5a

TENEX, A Paged Time Sharing System for the PDP-10 (Preliminary Draft
Aug 71 9622 Bobrow 6

BBN-LISP TENEX Reference Manual
Jul 71 8515 Bobrow 7

Online format for Author Index, proposed: 7a

Blum Macromodular Computer Systems 6861
20 Jun 67 8

Bobrow TENEX, A Paged Time Sharing System for the PDP-10 (Preliminary Draft) 9622
Aug 71 9

Onlne format for Number Index, proposed: 9a

11111 Title title title title title title title title Author, Init
Continuation of title continuation of title 20 Dec 72 10

10a

NEED--Program change: An online version should be created, with wraparound only within a field, the width of the whole to fit the display screen. 10a1

NEED--The version created by the present program, formatted for COM printout, should be created, printed, and archived. 10a2

NEED--A paragraph of explanation, even though it repeats some of the introduction, could be added to draw attention to features. (JBN) 10a3

POSSIBILITY--Any way that (cont), inserted at top of page when applicable heading is continued from previous page, could be added as last minute Output Processor directive, rather than as part of production program as now, which now becomes unusable if any statements are deleted in editing. 10a4

Offline and online format for Keyword Index: 10b

NEED--Present fixed-field format for indexes is not satisfactory for keywords because they occur in long lengths. Format should show entry, e.g. a string of words, on one line, with rest of citation subordinate and indented. Additional entries under same keyword should suppress the keyword in the offline file; in the online file the keyword should be retained.. 10b1

Offline and online format for RFC, SUR, etc. Indexes 10c

NEED--Online version should not wrap around. (WLB or BAH) 10c1

NEED--Entries should sort with latest first. (WLB or BAH) 10c2

Contract Number Index Formats 10d

Document coding includes any contract numbers found. A contract number index will be of increasing value. 10d1

NEED-- Program to sort by contract number, using the proposed format for keyword and organization index. 10d1a

Organization Index Formats 10e

An index to our documents by organization is an important need. None of our present formats is satisfactory for this, because of the varying lengths of the names to be indexed. WLB tried a one-line index format which was online for sometime and which indicates the problems in using an existing program and data base. 10e1

NEED--Program to format the items, something like this: 10e1a

Stanford Research Institute. Artificial Intelligence Group 11

Research and Applications -- Artificial Intelligence (Final Report). Bertram Raphael. November 1970. 169p. 11a

Research on Intelligent Question-Answering Systems (Final Report). Bertram Raphael. Rpt. AFCRL-68-0266. May 1968. 13p. 11b

CONTENT OF CATALOG 12

Interface with Journal 12a

As at present, Journal items should be included in the NIC Catalog by manual selection, with independent citation preparation, just as offline documents are treated. 12a1

NEED--A separate publication, an Index to Network Dialogue, should be issued, to include citations prepared by programs applied to the Journal. A prototype of this publication has been run by BAH on the NIC entries up to January 19. BAH is trying as of February 22 to run an uptodate file which we can issue. The need then will be to get this publication on a regular schedule. (JBN with BAH) 12a1a

Author Index 12b

Added items by same author with same form of name 12b1

Added items by same author with different form of name 12b2

First name or initial is not printed, altho it is used to differentiate before sorting. 12b2a

NEED--Write explanatory introduction, until program change. (JBN) 12b2a1

NEED--Program change: Print first name or initial, suppressing when same as last printed entry. (WLB or BAH) 12b2a2

Number Index 12c

Present number index in offline format is satisfactory. Online needs work as above. 12c1

Number Listing 12d

Present number listing content is satisfactory. 12d1

Titleword Index 12e

POSSIBILITY--Need for an expanded stoplist of terms not to be accepted? 12e1

Keyword Index 12f

Present input would process into a very uneven, inadequate index. 12f1

NEED--A thesaurus is needed; rough input to start formulation of one can now be generated from the contents of *y2 and *y3. Manual or kludgey machine files of terms used will be constructed to form the basis of decisions on an authority list of terms to be used by ARC abstractors in *y3. (JBN and MEJ) 12f1a

RFC, SUR, etc. Indexes 12g

These indexes are online, by manual construction. (MEJ). 12g1

NEED--Program modification to RFC index program to sort from latest back, for offline format, and an online format program. 12g1a

Contract Number Index 12h

Document coding includes any contract numbers found. A contract number index will be of increasing value. 12h1

NEED-- Program to sort by contract number, using the proposed format for keyword and organization index. 12h1a

Organization Index 12i

An index to our documents by organization is an important need. None of our present formats is satisfactory for this, because of the varying lengths of the names to be indexed. WLB tried a one-line index format which was online for sometime and which indicates the problems in using an existing program and data base. 12i1

NEED--Program to format the items 12i1a

NEED--Effort to standardize the conventions for organization name form. Without a standard authority giving names and rules for forming new ones, an index by organization name is not only sloppy but actually misleading in that a number of items will be missed if two nonconsecutive names are used for the same organization and the items are split between them. No existing name authority is satisfactory for our use. (This is a fact, not an NIH posture.) A great deal of effort by an experienced

document handler will be necessary to produce this authority list. 12i1b

JBN 22-FEB-73 14:14 14711

History, Needs, Possibilities, of Catalogs at ARC JBN 23 FEB 73
--Part 1 NIC Catalogs

(J14711) 22-FEB-73 14:14; Title: Author(s): North, Jeanne B. /JBN;
Distribution: /sri-arc nicsta ; Sub-Collections: SRI-ARC NICSTA;
Clerk: JBN;
Origin: <NORTH>CATALOGPLANS.NLS;12, 22-FEB-73 14:04 JBN ;

JEW 22-FEB-73 12:31 14712

OLS User's Manual Update Request

I received a copy of 'News & Notes' from the Comcen this morning. I don't know how I happened to get on the distribution list after nearly a year of absence, but I'm happy to get it. It's interesting to see what you guys are up to these days. 1

I noticed the announcement of an update to the OLS User's Manual. If you could manage to get a copy of that to me, I would be grateful. 1a

Are you guys sending anyone to the FTP meeting at BBN next month? 2

Jim 2a

JEW 22-FEB-73 12:31 14712

OLS User's Manual Update Request

(J14712) 22-FEB-73 12:31; Title: Author(s): White, James E. (Jim) /JEW; Distribution: /rms ; Sub-Collections: SRI-ARC; Clerk: JEW; Origin: <WHITE>NANDN.NLS;2, 22-FEB-73 12:28 JEW ;

JEW 22-FEB-73 13:26 14713

Exceed Capacity

'Exceed Capacity' is a misleading diagnostic that NLS generates under a number of circumstances. 1

If FREQUENTLY means that the maximum length of a string variable has been exceeded and that the procedure which encountered the error provided no code to handle it. 1a

If NEVER reflects a user error, ALWAYS a bug in the system. 1b

If you know of a command sequence which repeatedly produces this error, please let me know. Otherwise, hardcopy of the session in which the problem arose would be useful. 2

Sorry I can't be more help. --Jim 3

JEW 22-FEB-73 13:26 14713

Exceed Capacity

(J14713) 22-FEB-73 13:26; Title: Author(s): White, James E. (Jim) /JEW; Distribution: /jbp ji ; Sub-Collections: SRI-ARC; Clerk: JEW; Origin: <WHITE>NANDN.NLS;4, 22-FEB-73 13:24 JEW ;

JEW 22-FEB-73 17:12 14714

Disk Allocation Increased

Jean-- I increased <MITRE-TIP>'s dsk allocation from 300 to 350 pages. Hope that takes care of you. --Jim 1

JEW 22-FEB-73 17:12 14714

Disk Allocation Increased

(J14714) 22-FEB-73 17:12; Title: Author(s): White, James E. (Jim) /JEW; Distribution: /ji ; Sub-Collections: SRI-ARC; Clerk: JEW;

KEV 21-FEB-73 21:37 14715

user program library

now that we have go to program get rel file we should establish a new directory for maintaining a library of user programs in rel format and the appropriate documentation. 1

user program library

(J14715) 21-FEB-73 21:37; Title: Author(s): Victor, Kenneth E. (Ken) /KEV; Distribution: /SRI-ARC NP; Sub-Collections: SRI-ARC NP; Clerk: KEV;

RWW 22-FEB-73 12:16 14717

NP SID Renumbering Command

INLS users are now using SID's extensively and liking them. There is a need for an easy way to get them renumbered sequentially after some editing has been done. Users now go to considerable lengths to do this, by creatng new files, replacing orgin statements, copying plex as a stadad sequence. There ought to be a simple command resequence SID's to accomplish this purpose. 1

RWW 22-FEB-73 12:16 14717

NP SID Renumbering Command

(J14717) 22-FEB-73 12:16; Title: Author(s): Watson, Richard W. /RWW ; Distribution: /chi np dce mdk dsk hgl ; Sub-Collections: SRI-ARC NP; Clerk: MDK;

Telephone Answering Service: Scheme for Revitalizing

The telephone answering service, set up some months ago at a cost of $240 per month, is not working well. 1

The reason is that we haven't been supplying up to date system status information to the answering service operators. 2

To make it easier for the Operations staff to provide information to the answering service, and to make it easier for the answering service to respond to user calls, NIC has prepared a simple guide to be used. 3

This guide exists in (IJOURNAL, 14592, 1:w) 4

If there are any questions about the guide or about the procedures desired, please contact MDK or JBN. 5

In order to serve our Network users more effectively, NIC would like this guide and the procedure it entails implemented as soon as possible. 6

If this can't be done by March 1, 1973, please let the NIC know. 7

MDK 22-FEB-73 16:08 14718

Telephone Answering Service: Scheme for Revitalizing

(J14718) 22-FEB-73 16:08; Title: Author(s): Kudlick, Michael D. /MDK ; Distribution: /rww jbn jcn (cc: rww,jbn) ; Sub-Collections: SRI-ARC; Clerk: MDK;
Origin: <KUDLICK>ANSWER.NLS;4, 22-FEB-73 16:04 MDK ;

MDK 22-FEB-73 16:16 14719

Partial Copies: A Tutorial for Novices

Was but no longer is (Kudlick, Partials, 1:w).

Partial Copies: A Tutorial for Novices

Partial Copies 1

This note is organized as follows: 2

Introduction
Basic Concepts
Basic Operations in NLS
Basic Operations in Tenex
Looking at Someone Else's File
Warnings 2a

Introduction 3

The concept of "partial copies" stems from two recurring problems that exist when handling files in time-sharing systems: 3a

1) system crashes 3a1

2) multi-user access to a given file 3a2

In the past, users could lose all the work they had done on a file, together with the original file itself, when a system crashed while they were logged in and working on the file. 3b

The partial copy mechanism is an attempt to minimize the occurrence of thsse disasters. 3b1

It does this by storing the modifications that are made to a file in a SEPARATE file (a "partial" copy of the original file) until the user wishes to incorporate these modifications into the original file he'd been working on. 3b2

Also, the classical "deadlock" problem which prevents one person from reading a file while another person is making modifications to that file has generated many solutions, some of them not attractive to timesharing systems. 3c

The partial copy mechanism makes it possible for many people to read a file at the same time that one person is working on that file. 3c1

The only limitation is that the "reader" cannot see what changes the "modifier" is currently making. 3c2

Basic Concepts 4

The "partial copy" is A TEMPORARY FILE used by NLS to store

all the modifications made to a file since the last time it was updated. 4a

Partial copies have the following attributes: 4a1

There is at most one partial copy per version of a user file. 4a1a

It is automatically created by NLS when the first modification is made to a file following an update. 4a1b

It is a "behind the scenes" file, useful for the two purposes described above in the introduction section, but not to be manipulated as ordinary NLS files are (i.e., not to be loaded, not to be updated, ordinarily not to be copied or deleted or renamed, etc.) 4a1c

It exists for a specific "version" of a file, and it exists from the time that the first modification to that version is made until that version is updated. (This means that the partial copy is not automatically deleted when you log out.) 4a1d

The partial copy IS automatically deleted by NLS when an update is performed. 4a1e

The mechanism of partial copies is an NLS mechanism, not a Tenex mechanism. 4b

With one exception, Tenex (the operating system on the PDP-10 computer that NLS currently resides in) does not know about partial copies. 4b1

The exception is the Archive system, which archives and retrieves a version of a file AND its partial copy. 4b1a

Otherwise, Tenex treats partial copies as separate files. Much care must be taken when doing the standard Tenex file operations such as COPY, RENAME, DELETE, EXPUNGE. 4b1b

NLS knows all about partial copies. 4b2

The mechanisms for dealing with partial copies in NLS are essentially automatic, that is they are invoked automatically by the system whenever you modify a file. 4b2a

In addition, there are two special commands in NLS to

deal directly with partial copies, the "execute reset" command, and the "execute unlock" command. These are discussed below. 4b2b

In Tenex, a partial copy is distinguished by its filename. A partial copy has almost the same filename, has a different extension, and has exactly the same version number as the file that it is the partial copy of. 4c

For example, if you have a file whose Tenex name is 4c1

<user>file.nls;1 4c1a

then the Tenex name of the PARTIAL COPY of this file would be 4c2

<user>(user)file.pc;1 4c2a

THE IMPORTANT POINT is that the partial copy belongs to the file with EXACTLY the same version number. 4d

As can be seen, the filenames differ only by a concatenated prefix which consists of the directory name enclosed in parentheses, 4d1

Basic Operations in NLS 5

Introduction 5a

Whenever you insert, delete or otherwise change the text or structure within a file, a partial copy is automatically created (or the existing partial copy is automatically modified) by NLS to indicate what changes and modifications have been made. 5a1

This section discusses the basic operations that one can use to cause all changes to become part of the file, to delete all changes since the last update, to delete all text in the file without deleting the file, or to create a file that has no text in it. 5a2

Summary of Operations 5b

uf update file
of output file
eu execute unlock file
er execute reset

n null file
lf load file 5b1

Explanation of Operations 5c

update file 5c1

This command takes all the modifications that have been made to the file, i.e., all the modifications that exist in the partial copy of the file, and adds them to the file itself. It then automatically deletes the partial copy. 5c1a

output file 5c2

This operates exactly the same as update does with respect to partial copies. It has the additional aspect of physically reorganizing the file data to make more economical use of disk space. 5c2a

execute unlock file 5c3

This ERASES ALL THE MODIFICATIONS that have been made to the file SINCE THE LAST UPDATE took place. 5c3a

NOTE ... The partial copy is deleted automatically by this operation. 5c3a1

execute reset 5c4

This DELETES ALL THE INFORMATION IN THE FILE. To do this, it creates a partial copy (or modifies an existing partial copy) to indicate that ALL the information in the file except that in the origin statement is to be deleted. 5c4a

null file 5c5

This CREATES A NEW FILE which has NO INFORMATION in it. When information is added to the file, a partial copy is created and will exist until an update is performed. 5c5a

load file 5c6

This operation opens a file and makes it available for reading (typing or displaying the contents) and, usually, writing (modifying the contents). 5c6a

Partial copies affect this operation as follows (the discussion applies equally to accessing files via NLS "links"): 5c6b

If a partial copy exists, then it too is opened by the system at the time the "load file" command is given. 5c6b1

If a partial copy had existed but was deleted for some valid or invalid reason by the user, then the system will type the error message "PC OPEN FAIL". 5c6b2

This means that it expected to find a partial copy and didn't. The remedy here is to output the file to a new version. 5c6b2a

If the file you are opening belongs to a directory different from your own, and if the owner of that directory was in the process of making modifications to that file, then the system WILL NOT OPEN THE PARTIAL COPY, but will only open the file itself. 5c6b3

In this case the system warns you of this by typing the message "FILE LOCKED BY X", where "X" is the owner of the file. 5c6b3a

This lets you see the last state of the file before the current round of modifications were begun, but does not let you see the current modifications. 5c6b3b

You will not be able to see the current modifications until the owner updates the file. 5c6b3c

Basic Operations in Tenex 6

The principal operations in Tenex that are applicable are COPY and DELETE. 6a

These may be used on partial copies just as they may be used on ordinary NLS files. 6b

The catch is, however, that they must be used separately on the ordinary files and on the partial copies. 6c

For example, if you delete a file, you won't automatically cause its partial copy to be deleted. That must be done separately. 6c1

And if you copy a file, you won't automatically get its partial copy copied either; that too must be done separately. 6c2

The warning, therefore, is not to expect Tenex to do anything with respect to partial copies that you actually have to do in NLS. 6d

Looking at Someone Else's File 7

If you load a file that exists in a directory other than the one you are logged into, then you may get the message "file locked by x". 7a

This means that Mr. X is working on the file, and has changes outstanding that have not been incorporated into his file via the "update" or "output" file commands. 7a1

What you will see, therefore, is only the information that existed at the time of his last update or output file. All changes made since then will be invisible to you, until he updates. 7a2

Warnings 8

DON'T try to load a partial copy in NLS. It is strictly a "behind the scenes" file, and isn't to be operated on explicitly. 8a

DON'T do the "execute unlock" command unless you're certain that you know what modifications have been made since the last update. The "execute unlock" erases ALL the modifications made since the last update. 8b

DON'T wait too long between updates. It will make your life easier if you update at least once per work session at the terminal. If your work session is long, or if you are making lots of modifications to a file, update more often than once per session. 8c

MDK 22-FEB-73 16:16 14719

Partial Copies: A Tutorial for Novices

(J14719) 22-FEB-73 16:16; Title: Author(s): Kudlick, Michael D. /MDK; Distribution: /mdk ; Sub-Collections: SRI-ARC; Clerk: MDK; Origin: <KUDLICK>PARTIALS.NLS;8, 16-FEB-73 16:31 MDK ;

MFA 22-FEB-73 16:37 14720

BUGS in UPDATE and OUTPUT FILE COMMANDS IN TNLS

There are several apparent problems with the output file and update file commands. I find them difficult to explain neatly; the number of options and combinations that do and don't work can best be evidenced by your seeing for yourself. I'm about to release the TNLS cue card and desperately need to pin down a "safe" albeit limited syntax for both these commands. 1

The syntax I'll have to go with for the Update command looks like: 1a

'update ['file] [SP FILENAME] CA 1a1

That space really hurts - its necessary because if you don't use it and you've already typed 'f for "File" and your filename begins with 'f, the system simple-mindedly reechoes the word "File" - why oh why??? 1a2

similarly if it begins with 'n - it again echoes "new version" if you're already typed "n" for new version - I haven't looked, but I'd make book on it doing the same thing for 'o (old version) - yucchh 1a2a

Then there's output file - not nearly do hairy as its cousin - but right now there's simply no way that you can use this command and not specify a filename - terrible. Why can't it default to the next version of the same filename?? Please get back to me about this command ASAP. 1b

MFA 22-FEB-73 16:37 14720

BUGS in UPDATE and OUTPUT FILE COMMANDS IN TNLS.

(J14720) 22-FEB-73 16:37; Title: Author(s): Auerbach, Marilyn F. /MFA; Distribution: /BUGS ; Sub-Collections: SRI-ARC BUGS; Clerk: MFA;

MFA 22-FEB-73 16:47 14721

Meeting date changed for DIRT, (re -- 14595,)

The User Interface design meeting has been changed Thursday, March 1 at 2 PM instead of Tuesday - I forgot about the TNLS class that we'll be running next week. 1

MFA 22-FEB-73 16:47 14721

Meeting date changed for DIRT, (re -- 14595,)

(J14721) 22-FEB-73 16:47; Title: Author(s): Auerbach, Marilyn F. /MFA ; Distribution: /DIRT ; Sub-Collections: SRI-ARC DIRT; Clerk: MFA ;

Type checking in MPS

Type checking 1

I have been bothered that MPS was not going to provide something like the SIMULA67 class concatenation facility. 1a

An example : 1a1

```
PriorityQueue = RECORD(                                  1a1a

   (left,right) :  POINTER PriorityQueue,                1a1a1

   dist : INTEGER,                                       1a1a2

   key : REAL);                                          1a1a3
```

Anyone wanting to use priority queues can declare a record which is a PriorityQueue concatenated with whatever data they wish to store. For example, 1a1b

```
SysQueue = PriorityQueue RECORD ( job : INTEGER );       1a1c
```

Functions to manipulate priority queues will work on any record which begins with a PriorityQueue. For instance the function which adds an entry must be able to take a SysQueue as input and return a new SysQueue as result. 1a1d

MPS doesn't allow this since the input/output record types for the function must be explicitly stated with the function -- and the PriorityQueue functions don't know about SysQueues. 1a1e

A possible solution to this would be to generalize the way in which type checking can be done. 1b

Consider what happens now at bind time. Let p be a routine called from q. Routine q expects to pass records of type I to p and get back records of type O. Type checking involves comparison of the mode descriptors for I and O with the declared input and output records for p. My proposal is to make it possible for the user step in at this point to determine whether I and O are alright. 1c

For example, if p is the PriorityQueue function, then at bind time, a user supplied function will check that I starts with a PriorityQueue. If it does and I = O then everthing is OK. Otherwise the function can signal a binding fault. 1d

The main drawback of this is the possibility of bugs in type

checking functions. Hopefully these functions will be very simple -- even automatically generated in many cases such as class concatenation -- and debugging them won't be a serious problem. le

14722 Distribution

Mitchell, James G. , Deutsch, L. Peter , Irby, Charles H. , Dornbush, Charles F. , Satterthwaite, Ed H. ,

WHP 22-FEB-73 15:23 14722

Type checking in MPS

(J14722) 22-FEB-73 15:23; Title: Author(s): Paxton, William H. /WHP; Distribution: /JGM LPD CHI CFD EHS; Sub-Collections: SRI-ARC; Clerk: WHP;

WLB 22-FEB-73 17:24 14723

Let's Make Jump File Link and Jump File Return Easier to Use

There is an inconsistency in the state that you are in after doing a Jump File Link / Jump File Return: after JFL to get JFR you must type "fr" -- if you type just "r" you end up in Jump Return; after JFR to get JFR you must type JUST "r" -- if you type "fr" you incredibly end up in Jump Return. This inconsistency strikes me as being slightly crazy, not to mention confusing. -- Walt 1

WLB 22-FEB-73 17:24 14723

Let's Make Jump File Link and Jump File Return Easier to Use

(J14723) 22-FEB-73 17:24; Title: Author(s): Bass, Walt /WLB;
Distribution: /bugs ; Sub-Collections: SRI-ARC BUGS; Clerk: WLB;

DCE RWW JCN 1-MAR-73 14:07 14724

The Augmented Knowledge Workshop

preprint of paper to be given at the National Computer Conference in June 1973

The Augmented Knowledge Workshop

CONCEPT OF THE KNOWLEDGE WORKSHOP 1

This paper discusses the theme of augmenting a knowledge workshop. The first part of the paper describes the concept and framework of the knowledge workshop. The second part describes aspects of a prototype knowledge workshop being developed within this framework. 1a

The importance and implications of the idea of knowledge work have been described by Drucker [3, 4]. Considering knowledge to be the systematic organization of information and concepts, he defines the knowledge worker as the person who creates and applies knowledge to productive ends, in contrast to an "intellectual" for whom information and concepts may only have importance because they interest him, or to the manual worker who applies manual skills or brawn. In those two books Drucker brings out many significant facts and considerations highly relevant to the theme here, one among them (paraphrased below) being the accelerating rate at which knowledge and knowledge work are coming to dominate the working activity of our society: 1b

> In 1900 the majority and largest single group of Americans obtained their livelihood from the farm. By 1940 the largest single group was industrial workers, especially semiskilled machine operators. By 1960, the largest single group was professional, managerial, and technical -- that is, knowledge workers. By 1975-80 this group will embrace the majority of Americans. The productivity of knowledge has already become the key to national productivity, competitive strength, and economic achievement, according to Drucker. It is knowledge, not land, raw materials, or capital, that has become the central factor in production. 1b1

In his provocative discussions, Drucker makes extensive use of such terms as "knowledge organizations," "knowledge technologies," and "knowledge societies." It seemed a highly appropriate extension for us to coin "knowledge workshop" for re-naming the area of our special interest: the place in which knowledge workers do their work. Knowledge workshops have existed for centuries, but our special concern is their systematic improvement, toward increased effectiveness of this new breed of craftsmen. 1c

Workshop improvement involves systematic change not only in the tools that help handle and transform the materials, but in the customs, conventions, skills, procedures, working methods, organizational roles, training, etc. by which the workers and

their organizations harness their tools, their skills, and their knowledge. 1d

Over the past ten years, the explicit focus in the Augmentation Research Center (ARC) has been upon the effects and possibilities of new knowledge workshop tools based on the technology of computer timesharing and modern communications [18 - 41]. Since we consider automating many human operations, what we are after could perhaps be termed "workshop automation." But the very great importance of aspects other than the new tools (i.e., conventions, methods, roles) makes us prefer the "augmentation" term that hopefully can remain "whole-scope." We want to keep tools in proper perspective within the total system that augments native human capacities toward effective action [1 - 3, 10, 16, 18, 24]. 1e

Development of more effective knowledge workshop technology will require talents and experience from many backgrounds: computer hardware and software, psychology, management science, information science, and operations research, to name a few. These must come together within the framework of a new discipline, focused on the systematic study of knowledge work and its workshop environments. 1f

TWO WAYS IN WHICH AUGMENTED KNOWLEDGE WORKSHOPS ARE EVOLVING 2

INTRODUCTION 2a

First, one can see a definite evolution of new workshop architecture in the trends of computer application systems. An "augmented workshop domain" will probably emerge because many special-purpose application systems are evolving by adding useful features outside their immediate special application area. As a result, many will tend to overlap in their general knowledge work supporting features. 2a1

Second, research and development is being directed toward augmenting a "Core" Knowledge Workshop domain. This application system development is aimed expressly at supporting basic functions of knowledge work. An important characteristic of such systems is to interface usefully with specialized systems. This paper is oriented toward this second approach. 2a2

NATURAL EVOLUTION BY SCATTERED NUCLEI EXPANDING TOWARD A COMMON "KNOWLEDGE WORKSHOP" DOMAIN 2b

Anderson and Coover [15] point out that a decade or more of

application-system evolution is bringing about the beginning of relatively rational user-oriented languages for the control interfaces of advanced applications software systems. What is interesting to note is that the functions provided by the "interface control" for the more advanced systems are coming to include editors and generalized file-management facilities, to make easier the preparation, execution, and management of the special-purpose tools of such systems. 2b1

It seems probable that special application-oriented systems (languages) will evolve steadily toward helping the user with such associated work as formulating models, documenting them, specifying the different trial runs, keeping track of intermediate results, annotating them and linking them back to the users' model(s), etc. When the results are produced by what were initially the core application programs (e.g., the statistical programs), he will want ways to integrate them into his working notes, illustrating, labeling, captioning, explaining and interpreting them. Eventually these notes will be shaped into memoranda and formal publications, to undergo dialogue and detailed study with and by others [15]. 2b2

Once a significant user-oriented system becomes established, with a steady growth of user clientele, there will be natural forces steadily increasing the effectiveness of the system services and steadily decreasing the cost per unit of service. And it will also be natural that the functional domain of an application system will steadily grow outward: "as long as the information must be in computer form anyway for an adjacent, computerized process, let's consider applying computer aid to Activity X also." 2b3

> Because the boundary of the Application System has grown out to be "next to" Activity X, it has become relatively easy to consider extending the computerized-information domain a bit so that a new application process can support Activity X. After all, the equipment is already there, the users who perform Activity X are already oriented to use integrated computer aid, and generally the computer facilitation of Activity X will prove to have a beneficial affect on the productivity of the rest of the applications system. 2b3a

This domain-spreading characteristic is less dependent upon the substantive work area a particular application

system supports than it is upon the health and vitality of its development and application (the authors of [15] have important things to say on these issues); however, it appears that continuing growth is bound to occur in many special application domains, inevitably bringing about overlap in common application "sub-domains" (as seen from the center of any of these nuclei). These special subdomains include formulating, studying, keeping track of ideas, carrying on dialogue, publishing, negotiating, planning, coordinating, learning, coaching, looking up in the yellow pages to find someone who can do a special service, etc. 2b4

CONSIDERING THE CORE KNOWLEDGE WORKSHOP AS A SYSTEM DOMAIN IN ITS OWN RIGHT 2c

A second approach to the evolution of a knowledge workshop is to recognize from the beginning the amount and importance of human activity constantly involved in the "core" domain of knowledge work -- activity within which more specialized functions are embedded. 2c1

If you asked a particular knowledge worker (e.g., scientist, engineer, manager, or marketing specialist) what were the foundations of his livelihood, he would probably point to particular skills such as those involved in designing an electric circuit, forecasting a market based on various data, or managing work flow in a project. If you asked him what tools he needed to improve his effectiveness he would point to requirements for aids in designing circuits, analyzing his data, or scheduling the flow of work. 2c2

But, a record of how this person used his time, even if his work was highly specialized, would show that specialized work such as mentioned above, while vital to his effectiveness, probably occupied a small fraction of his time and effort. 2c2a

The bulk of his time, for example, would probably be occupied by more general knowledge work: writing a planning or design document; carrying on dialogue with others in writing, in person, or on the telephone; studying documents; filing ideas or other material; formulating problem-solving approaches; coordinating work with others; and reporting results. 2c2b

There would seem to be a promise of considerable payoff in

establishing a healthy, applications oriented systems development activity within this common, "core" domain, meeting the special-application systems "coming the other way" and providing them with well-designed services at a natural system-to-system interface. 2c3

It will be much more efficient to develop this domain explicitly, by people oriented toward it, and hopefully with resources shared in a coordinated fashion. The alternative of semi-random growth promises problems such as: 2c4

1) Repetitive solutions for the same functional problems, each within the skewed perspective of a particular special-applications area for which these problems are peripheral issues, 2c4a

2) Incompatibility between different application software systems in terms of their inputs and outputs, 2c4b

3) Languages and other control conventions inconsistent or based on different principles from one system to another, creating unnecessary learning barriers or other discouragements to cross usage. 2c4c

In summary, the two trends in the evolution of knowledge workshops described above are each valuable and are complementary. Experience and specific tools and techniques can and will be transferred between them. 2c5

There is a very extensive range of "core" workshop functions, common to a wide variety of knowledge work, and they factor into many levels and dimensions. In the sections to follow, we describe our developments, activities, and commitments from the expectation that there soon will be increased activity in this core knowledge workshop domain, and that it will be evolving "outward" to meet the other application systems "heading inward." 2c6

BASIC ASSUMPTIONS ABOUT AUGMENTED KNOWLEDGE WORKSHOPS 3

EMBEDDED IN A COMPUTER NETWORK 3a

The computer-based "tools" of a knowledge workshop will be provided in the environment of a computer network such as the ARPANET [7, 8, 14]. For instance, the core functions will consist of a network of cooperating processors performing special functions such as editing, publishing,

communication of documents and messages, data management, and so forth. Less commonly used but important functions might exist on a single machine. The total computer assisted workshop will be based on many geographically separate systems. 3a1

Once there is a "digital-packet transportation system," it becomes possible for the individual user to reach out through his interfacing processor(s) to access other people and other services scattered throughout a "community," and the "labor marketplace" where he transacts his knowledge work literally will not have to be affected by geographical location [27]. 3a2

Specialty application systems will exist in the way that specialty shops and services now do -- and for the same reasons. When it is easy to transport the material and negotiate the service transactions, one group of people will find that specialization can improve their cost/effectiveness, and that there is a large enough market within reach to support them. And in the network-coupled computer-resource marketplace, the specialty shops will grow; -- e.g., application systems specially tailored for particular types of analyses, or for checking through text for spelling errors, or for doing the text-graphic document typography in a special area of technical portrayal, and so on. There will be brokers, wholesalers, middle men, and retailers. 3a3

COORDINATED SET OF USER INTERFACE PRINCIPLES 3b

There will be a common set of principles, over the many application areas, shaping user interface features such as the language, control conventions, and methods for obtaining help and computer-aided training. 3b1

This characteristic has two main implications. One, it means that while each domain within the core workshop area or within a specialized application system may have a vocabulary unique to its area, this vocabulary will be used within language and control structures common throughout the workshop system. A user will learn to use additional functions by increasing vocabulary, not by having to learn separate "foreign" languages. Two, when in trouble, he will invoke help or tutorial functions in a standard way. 3b2

GRADES OF USER PROFICIENCY 3c

Even a once-in-a-while user with a minimum of learning will want to be able to get at least a few straightforward things done. In fact, even an expert user in one domain will be a novice in others that he uses infrequently. Attention to novice-oriented features is required. 3c1

But users also want and deserve the reward of increased proficiency and capability from improvements in their skills and knowledge, and in their conceptual orientation to the problem domain and to their workshop's system of tools, methods, conventions, etc. "Advanced vocabularies" in every special domain will be important and unavoidable. 3c2

A corollary feature is that workers in the rapidly evolving augmented workshops should continuously be involved with testing and training in order that their skills and knowledge may harness available tools and methodology most effectively. 3c3

EASE OF COMMUNICATION BETWEEN, AND ADDITION OF, WORKSHOP DOMAINS 3d

One cannot predict ahead of time which domains or application systems within the workshop will want to communicate in various sequences with which others, or what operations will be needed in the future. Thus, results must be easily communicated from one set of operations to another, and it should be easy to add or interface new domains to the workshop. 3d1

USER PROGRAMMING CAPABILITY 3e

There will never be enough professional programmers and system developers to develop or interface all the tools that users may need for their work. Therefore, it must be possible, with various levels of ease, for users to add or interface new tools, and extend the language to meet their needs. They should be able to do this in a variety of programming languages with which they may have training, or in the basic user-level language of the workshop itself. 3e1

AVAILABILITY OF PEOPLE SUPPORT SERVICES 3f

An augmented workshop will have more support services available than those provided by computer tools. There will be many people support services as well: besides clerical support, there will be extensive and highly specialized professional services, e.g. document design

and typography, data base design and administration, training, cataloging, retrieval formulation, etc. In fact, the marketplace for human services will become much more diverse and active [27]. 3f1

COST DECREASING, CAPABILITIES INCREASING 3g

The power and range of available capabilities will increase and costs will decrease. Modular software designs, where only the software tools needed at any given moment are linked into a person's run-time computer space, will cut system overhead for parts of the system not in use. Modularity in hardware will provide local configurations of terminals and miniprocessors tailored for economically fitting needs. It is obvious that cost of raw hardware components is plummeting; and the assumed large market for knowledge workshop support systems implies further help in bringing prices down. 3g1

The argument given earlier for the steady expansion of vital application systems to other domains remains valid for explaining why the capabilities of the workshop will increase. Further, increasing experience with the workshop will lead to improvements, as will the general trend in technology evolution. 3g2

RANGE OF WORKSTATIONS AND SYMBOL REPRESENTATIONS 3h

The range of workstations available to the user will increase in scope and capability. These workstations will support text with large, open-ended character sets, pictures, voice, mathematical notation, tables, numbers and other forms of knowledge representation. Even small portable hand-held consoles will be available [13]. 3h1

CAREFUL DEVELOPMENT OF METHODOLOGY 3i

As much care and attention will be given to the development, analysis, and evaluation of procedures and methodology for use of computer and people support services as to the development of the technological support services. 3i1

CHANGED ROLES AND ORGANIZATIONAL STRUCTURE 3j

The widespread availability of workshop services will create the need for new organizational structures and roles. 3j1

SELECTED DESCRIPTION OF AUGMENTED WORKSHOP CAPABILITIES 4

INTRODUCTION 4a

Within the framework described above, ARC is developing a prototype workshop system. Our system does not meet all the requirements outlined previously, but it does have a powerful set of core capabilities and experience that leads us to believe that such goals can be achieved. 4a1

Within ARC we do as much work as possible using the range of online capabilities offered. We serve not only as researchers, but also as the subjects for the analysis and evaluation of the augmentation system that we have been developing. 4a2

Consequently, an important aspect of the augmentation work done within ARC is that the techniques being explored are implemented, studied, and evaluated with the advantage of intensive everyday usage. We call this research and development strategy "bootstrapping." 4a3

In our experience, complex man-machine systems can evolve only in a pragmatic mode, within real-work environments where there is an appropriate commitment to conscious, controlled, exploratory evolution within the general framework outlined earlier. The plans and commitments described later are a consistent extention of this pragmatic bootstrapping strategy. 4a4

To give the reader more of a flavor of some of the many dimensions and levels of the ARC workshop, four example areas are discussed below in more detail, following a quick description of our physical environment. 4a5

The first area consists of mechanisms for studying and browsing through NLS files as an example of one functional dimension that has been explored in some depth. 4a6

The second area consists of mechanisms for collaboration support -- a subsystem domain important to many application areas. 4a7

The third and fourth areas, support for software engineers and the ARPANET Network Information Center (NIC), show example application domains based on functions in our workshop. 4a8

GENERAL PHYSICAL ENVIRONMENT 4b

Our computer-based tools run on a Digital Equipment Corporation PDP-10 computer, operating with the Bolt, Beranek, and Newman TENEX timesharing system [9]. The computer is connected via an Interface Message Processor (IMP) to the ARPANET [7, 8]. There is a good deal of interaction with Network researchers, and with Network technology, since we operate the ARPA Network Information Center (see below) [39]. 4b1

There is a range of terminals: twelve old, but serviceable, display consoles of our own design [26], an IMLAC display, a dozen or so 30 ch/sec portable upper/lower case typewriter terminals, five magnetic tape-cassette storage units that can be used either online or offline, and a 96-character line printer. There are 125 million characters of online disk storage. 4b2

The display consoles are equipped with a typewriter-like keyboard, a five-finger keyset for one-handed character input, and a "mouse" -- a device for controlling the position of a cursor (or pointer) on the display screen and for input of certain control commands. Test results on the mouse as a screen-selection device have been reported in [25], and good photographs and descriptions of the physical systems have appeared in [20, 21]. 4b2a

The core workshop software system and language, called NLS, provides many basic tools, of which a number will be mentioned below. It is our "core-workshop application system." 4b3

During the initial years of workshop development, application and analysis, the basic knowledge-work functions have centered around the composition, modification, and study of structured textual material [26]. Some of the capabilities in this area are described in detail in [26] and are graphically shown in a movie available on loan -- [41]. 4b4

The structured-text manipulation has been developed extensively because of its high payoff in the area of applications-system development to which we have applied our augmented workshop. We have delayed addition of graphic-manipulation capabilities because there were important areas associated with the text domain needing

exploration and because of limitations in the display system and hardcopy printout. 4b4a

To build the picture of what our Core Knowledge Workshop is like, we first give several in-depth examples, and then list in the section on workshop utility service some "workshop subsystems" that we consider to be of considerable importance to general knowledge work. 4b5

STUDYING ONLINE DOCUMENTS 4c

INTRODUCTION 4c1

The functions to be described form a set of controls for easily moving one around in an information space and allowing one to adjust the scope, format, and content of the information seen [26, 41]. 4c1a

Given the addition of graphical, numerical, and vocal information, which are planned for addition to the workshop, one can visualize many additions to the concepts below. Even for strictly textual material there are yet many useful ideas to be explored. 4c1b

VIEW SPECIFICATIONS 4c2

One may want an overview of a document in a table-of-contents like form on the screen. To facilitate this and other needs, NLS text files are hierarchically structured in a tree form with subordinate material at lower levels in the hierarchy [26]. 4c2a

The basic conceptual unit in NLS, at each node of the hierarchical file, is called a "statement" and is usually a paragraph, sentence, equation, or other unit that one wants to manipulate as a whole. 4c2a1

A statement can contain many characters -- presently, up to 2000. Therefore, a statement can contain many lines of text. Two of the "view-specification" parameters -- depth in the hierarchy, and lines per statement -- can be controlled during study of a document to give various overviews of it. View specifications are given with highly abbreviated control codes, because they are used very frequently and their quick specification and execution make a great deal of difference in the

facility with which one studies the material and keeps track of where he is. 4c2a2

Examples of other view specifications are those that control spacing between statements, and indentation for levels in the hierarchy, and determine whether the identifications associated with statements are to be displayed, which branch(es) in the tree are to be displayed, whether special filters are to be invoked to show only statements meeting specified content requirements or whether statements are to be transformed according to special rules programmed by the user. 4c2b

MOVING IN INFORMATION SPACE 4c3

A related viewing problem is designating the particular location (node in a file hierarchy) to be at the top of the screen. The computer then creates a display of the information from that point according to the view specifications currently in effect. 4c3a

The system contains a variety of appropriate commands to do this; they are called jump commands because they have the effect of "jumping" or moving one from place to place in the network of files available as a user's information space [26,33 - 39]. 4c3b

One can point at a particular statement on the screen and command the system to move on to various positions relative to the selected one, such as up or down in the hierarchical structure, to the next or preceding statement at the same hierarchical level, to the first or last statement at a given level, etc. 4c3b1

One can tell the system to move to a specifically named point or go to the next occurrence of a statement with a specific content. 4c3b2

Each time a jump or move is made, the option is offered of including any of the abbreviated view specifications -- a very general, single operation is "jump to that location and display with this view." 4c3b3

As one moves about in a file one may want to quickly and easily return to a previous view of the file. This is accomplished by saving a piece of the path as one traverses through the file and the specific view at each

point, and then allowing return movement to the most recent points saved. 4c3c

Another important feature in studying or browsing in a document is being able to quickly move to other documents cited. 4c3d

There is a convention (called a "link") for citing documents that allows the user to specify a particular file, statement within the file and view specification for initial display when arriving in the cited file. 4c3d1

A single, quickly executed command (Jump to Link) allows one to point at such a citation, or anywhere in the statement preceding the citation, and the system will go to the specific file and statement cited and show the associated material with the specified view parameters. This allows systems of interlinked documents and highly specific citations to be created. 4c3d2

A piece of the path through the chain of documents is saved so that one can return easily a limited distance back along his "trail," to previously referenced documents. Such a concept was originally suggested by Bush [1] in a fertile paper that has influenced our thinking in many ways. 4c3e

MULTIPLE WINDOWS 4c4

Another very useful feature is the ability to "split" the viewing screen horizontally and/or vertically in up to eight rectangular display windows of arbitrary size. Generally two to four windows are all that are used. Each window can contain a different view of the same or different locations, within the same or different files [39]. 4c4a

COLLABORATIVE DIALOGUE AND TELECONFERENCING 4d

INTRODUCTION 4d1

The approach to collaboration support taken at ARC to date has two main thrusts: 4d1a

1) Support for real-time dialogue (teleconferencing) for two or more people at two terminals who want to

see and work on a common set of material. The collaborating parties may be further augmented with a voice telephone connection as well. 4d1a1

2) Support for written, recorded dialogue, distributed over time. 4d1a2

These two thrusts give a range of capabilities for support of dialogue distributed over time and space. 4d1b

TELECONFERENCING SUPPORT 4d2

Consider two people or groups of people who are geographically separated and who want to collaborate on a document, study a computer program, learn to use a new aspect of a system, or perform planning tasks, etc. 4d2a

The workshop supports this type of collaboration by allowing them to link their terminals so that each sees the same information and either can control the system. This function is available for both display and typewriter terminal users over the ARPANET. 4d2b

The technique is particularly effective between displays because of the high speed of information output and the flexibility of being able to split the screen into several windows, allowing more than one document or view of a document to be displayed for discussion. 4d2c

When a telephone link is also established for voice communication between the participants, the technique comes as close as any we know to eliminating the need for collaborating persons or small groups to be physically together for sophisticated interaction. 4d2d

A number of other healthy approaches to teleconferencing are being explored elsewhere [11, 12, 16, 17]. It would be interesting to interface to such systems to gain experience in their use within workshops such as described here. 4d2e

RECORDED DIALOGUE SUPPORT 4d3

INTRODUCTION 4d3a

As ARC has become more and more involved in the augmentation of teams, serious consideration has been given to improving intra- and inter-team

communication with whatever mixture of tools, conventions, and procedures will help [27, 36, 39]. 4d3a1

If a team is solving a problem that extends over a considerable time, the members will begin to need help in remembering some of the important communications -- i.e., some recording and recalling processes must be invoked, and these processes become candidates for augmentation. 4d3a2

If the complexity of the team's problem relative to human working capacity requires partitioning of the problem into many parts -- where each part is independently attacked, but where there is considerable interdependence among the parts -- the communication between various people may well be too complex for their own accurate recall and coordination without special aids. 4d3a3

Collaborating teams at ARC have been augmented by development of a "Dialogue Support System (DSS)," containing current and thoroughly used working records of the group's plans, designs, notes, etc. The central feature of this system is the ARC Journal, a specially managed and serviced repository for files and messages. 4d3a4

The DSS involves a number of techniques for use by distributed parties to collaborate effectively both using general functions in the workshop and special functions briefly described below and more fully in [39]. Further aspects are described in the section on Workshop Utility Service. 4d3a5

DOCUMENT OR MESSAGE SUBMISSION 4d3b

The user can submit an NLS file, a part of a file, a file prepared on another system in the ARPANET (document), or text typed at submission time (message) to the Journal system. When submitted, a copy of the document or message is transferred to a read-only file whose permanent safekeeping is guaranteed by the Journal system. It is assigned a unique catalog number, and automatically cataloged. Later, catalog indices based on number, author, and "titleword out of context" are created by another computer process. 4d3b1

Nonrecorded dialogue for quick messages or material not likely to be referenced in the future is also permitted. 4d3b2

One can obtain catalog numbers ahead of time to interlink document citations for related documents that are being prepared simultaneously. Issuing and controlling of catalog numbers is performed by a Number System (an automatic, crash-protected computer process). 4d3b3

At the time of submission, the user can contribute such information as: title, distribution list, comments, keywords, catalog numbers of documents this new one supersedes (updates), and other information. 4d3b4

The distribution is specified as a list of unique identification terms (abbreviated) for individuals or groups. The latter option allows users to establish dialogue groups. The system automatically "expands" the group identification to generate the distribution list of the individuals and groups that are its members. Special indices of items belonging to subcollections (dialogue groups) can be prepared to aid their members in keeping track of their dialogue. An extension of the mechanisms available for group distribution could give a capability similar to one described by Turoff [17]. 4d3b5

Entry of identification information initially into the system, group expansion, querying to find a persons or groups identification, and other functions are performed by an Identification System. 4d3b6

DOCUMENT DISTRIBUTION 4d3c

Documents are distributed to a person in one, two, or all of three of the following ways depending on information kept by the Identification System. 4d3c1

1) In hardcopy through the U.S. or corporation mail to those not having online access or to those desiring this mode, 4d3c1a

2) Online as citations (for documents) or actual text (for messages) in a special file assigned to each user. 4d3c1b

3) Through the ARPANET for printing or online delivery at remote sites. This delivery is performed using a standard Network wide protocol. 4d3c1c

Document distribution is automated, with online delivery performed by a background computer process that runs automatically at specified times. Printing and mailing are performed by operator and clerical support. With each such printed document, an address cover sheet is automatically printed, so that the associated printout pages only need to be folded in half, stapled, and stamped before being dropped in the mail. 4d3c2

DOCUMENT ACCESS 4d3d

An effort has been made to make convenient both online and offline access to Journal documents. The master catalog number is the key to accessing documents. Several strategically placed hardcopy master and access collections (libraries) are maintained, containing all Journal documents. 4d3d1

Automatic catalog-generation processes generate author, number, and titleword indices, both online and in hardcopy [38]. The online versions of the indices can be searched conveniently with standard NLS retrieval capabilities [37, 39, 41]. 4d3d2

Online access to the full text of a document is accomplished by using the catalog number as a file name and loading the file or moving to it by pointing at a citation and asking the system to "jump" there as described earlier. 4d3d3

SOFTWARE ENGINEERING AUGMENTATION SYSTEM 4e

INTRODUCTION 4e1

One of the important application areas in ARC's work is software engineering. The economics of large computer systems, such as NLS, indicate that software development and maintenance costs exceed hardware costs, and that software costs are rising while hardware costs are rapidly decreasing. The expected lifetime of most large software systems exceeds that of any piece of computer hardware. Large software systems are becoming increasingly complex, difficult to continue evolving and

maintain. Costs of additional enhancements made after initial implementation generally exceed the initial cost over the lifetime of the system. It is for these reasons that it is important to develop a powerful application area to aid software engineering. Areas of software engineering in which the ARC workshop offers aids are described below. 4e1a

DESIGN AND REVIEW COLLABORATION 4e2

During design and review, the document creation, editing, and studying capabilites are used as well as the collaboration, described above. 4e2a

USE OF HIGHER LEVEL SYSTEM PROGRAMMING LANGUAGES 4e3

Programming of NLS is performed in a higher level ALGOL-like system programming language called L-10 developed at ARC. The L-10 language compiler takes its input directly from standard NLS structured files. The PDP-10 assembler also can obtain input from NLS files. 4e3a

It is planned to extend this capability to other languages, for example, by providing an interface to the BASIC system available in our machine for knowledge workers wishing to perform more complex numerical tasks. 4e3b

We are involved with developing a modular runtime-linkable programming system (MPS), and with planning a redesign of NLS to utilize MPS capabilities, both in cooperation with the Xerox Palo Alto Research Center. MPS will: 4e3c

1) Allow a workshop system organization that will make it easier for many people to work on and develop parts of the same complex system semi-independently. 4e3c1

2) Make it easier to allow pieces of the system to exist on several processors. 4e3c2

3) Allow individual users or groups of users to tailor versions of the system to their special needs. 4e3c3

4) Make it easier to move NLS to other computers since MPS is written in itself. 4e3c4

5) Speed system development because of MPS's improved system building language facilities,

integrated source-level debugging, measurement facilities, the ability to construct new modules by combining old ones, and to easily modify the system by changing module interconnection. 4e3c5

SYSTEM DOCUMENTATION AND SOURCE-CODE CREATION 4e4

Source-code creation uses the standard NLS hierarchical file structures and allows documentation and other programming conventions to be established that simplify studying of source-code files. 4e4a

DEBUGGING 4e5

A form of source-level debugging is allowed through development of several tools, of which the following are key examples: 4e5a

1) A user program compilation and link loading facility that allows new or replacement programs to be linked into the running system to create revised versions for testing or other purposes. 4e5b

2) NLS-DDT, a DDT like debugging facility with a command language more consistent with the rest of NLS, and simplifies display of system variables and data structures, and allows replacement of system procedures by user supplied procedures. 4e5c

3) Use of several display windows so as to allow source code in some windows and control of DDT in others for the setting of breakpoints and display of variables and data structures. 4e5d

MEASUREMENT AND ANALYSIS 4e6

A range of measurement tools has been developed for analyzing system operation. These include the following: 4e6a

1) Capabilities for gathering and reporting statistics on many operating system parameters such as utilization of system components in various modes, queue lengths, memory utilization, etc. 4e6b

2) The ability to sample the program counter for intervals of a selectable area of the operating system

or any particular user subsystem to measure time spent in the sampled areas; 4e6c

3) Trace and timing facilities to follow all procedure calls during execution of a specified function. 4e6d

4) The ability to study page-faulting characteristics of a subsystem to check on its memory use characteristics. 4e6e

5) The ability to gather NLS command usage and timing information. 4e6f

6) The ability to study user interaction on a task basis from the point of view of the operating-system scheduler. 4e6g

7) The ability to collect sample user sessions for later playback to the system for simulated load, or for analysis. 4e6h

MAINTENANCE 4e7

Maintenance programmers use the various functions mentioned above. The Journal is used for reporting bugs; NLS structured source code files simplify the study of problem areas and the debugging tools permit easy modification and testing of the modifications. 4e7a

THE ARPA NETWORK INFORMATION CENTER (NIC) 4f

INTRODUCTION 4f1

The NIC is presently a project embedded within ARC [39]. Workshop support for the NIC is based on the capabilities within the total ARC workshop system. 4f1a

As useful as is the bootstrapping strategy mentioned earlier, there are limits to the type of feedback it can yield with only ARC as the user population. The NIC is the first of what we expect will be many activities set up to offer services to outside users. The goal is to provide a useful service and to obtain feedback on the needs of a wider class of knowledge workers. Exercised within the NIC are also prototypes of information services expected to be normal parts of the workshop. 4f1b

The NIC is more than a classical information center, as that term has come to be used, in that it provides a

wider range of services than just bibliographic and "library" type services. 4f1c

The NIC is an experiment in setting up and running a general purpose information service for the ARPANET community with both online and offline services. The services offered and under development by the NIC have as their initial basic objectives: 4f1d

1) To help people with problems find the resources (people, systems, and information) available within the network community that meet their needs. 4f1d1

2) To help members of geographically distributed groups collaborate with each other. 4f1d2

Following are the NIC services now provided to meet the above goals in serving the present clientele: 4f1e

CURRENT ONLINE SERVICES 4f2

1) Access to the typewriter version (TNLS) and display version (DNLS) of the Augmentation Research Center's Online System (NLS) for communique creation, access, and linking between users, and for experimental use for any other information storage and manipulation purpose suitable for NLS and useful to Network participants. 4f2a

2) Access to Journal, Number, and Identification Systems to allow messages and documents to be transmitted between network participants. 4f2b

3) Access to a number of online information bases through a special Locator file using NLS link mechanisms and through a novice-oriented query system. 4f2c

CURRENT OFFLINE SERVICES 4f3

1) A Network Information Center Station set up at each network site. 4f3a

2) Techniques for gathering, producing and maintaining data bases such as bibliographic catalogs, directories of network participants, resource information, and user guides. 4f3b

3) Support of Network dialogue existing in hardcopy through duplication, distribution, and cataloging. 4f3c

4) General Network referral and handling of document requests. 4f3d

5) Building of a collection of documents potentially valuable to the Network Community. Initial concentration has been on obtaining documents of possible value to the Network builders. 4f3e

6) As yet primitive selective document distribution to Station Collections. 4f3f

7) Training in use of NIC services and facilities. 4f3g

CONCLUSION 4f4

The Network Information Center is an example prototype of a new type of information service that has significant future potential. Even though it is presently in an experimental and developmental phase, it is providing useful online and offline services to the ARPANET community. 4f4a

PLANS FOR A WORKSHOP UTILITY SERVICE 5

MOTIVATION 5a

It is now time for a next stage of application to be established. We want to involve a wider group of people so that we can begin to transfer the fruits of our past work to them and with their assistance, to others, and so that we can obtain feedback needed for further evolution from wider application than is possible in our project alone [28]. We want to find and support selected groups who are willing to take extra trouble to be exploratory, but who: 5a1

1) Are not necessarily oriented to being core-workshop developers (they have their own work to do). 5a1a

2) Can see enough benefit from the system to be tried and from the experience of trying it so that they can justify the extra risk and expense of being "early birds". 5a1b

3) Can accept assurance that system reliability and stability, and technical/application help will be available to meet their conditions for risk and cost. 5a1c

ARC is establishing a Workshop Utility Service, and

promoting the type of workshop service described above as part of its long-term commitment to pursue the continued development of augmented knowledge workshops in a pragmatic, evolutionary manner. 5a2

It is important to note that the last few years of work have concentrated on the means for delivering support to a distributed community, for providing teleconferencing and other basic processes of collaborative dialogue, etc. ARC has aimed consciously toward developing experience and capabilities especially applicable to support remote and distributed groups of exploratory users for this next stage of wider-application bootstrapping. 5a3

One aspect of the service is that it will be an experiment in harnessing the new environment of a modern computer network to increase the feasibility of a wider community of participants cooperating in the evolution of an application system. 5a4

CHARACTERISTICS OF THE PLANNED SERVICE 5b

The planned service offered will include: 5b1

1) Availability of Workshop Utility computer service to the user community from a PDP-10 TENEX system operated by a commercial supplier. 5b2

2) Providing training as appropriate in the use of Display NLS (DNLS), Typewriter NLS (TNLS), and Deferred Execution (DEX) software subsystems. 5b3

3) Providing technical assistance to a user organization "workshop architect" in the formulation, development, and implementation of augmented knowledge work procedures within selected offices at the user organization [6]. 5b4

This assistance will include help in the development of NLS use strategies suitable to the user environments, procedures within the user organization for implementing these strategies, and possible special-application NLS extensions (or simplifications) to handle the mechanics of particular user needs and methodologies. 5b4a

4) Providing "workshop architect" assistance to help set up and assist selected geographically distributed user groups who share a special discipline or mission orientation to utilize the workshop utility services and to develop

procedures, documentation, and methodology for their purposes. 5b5

GENERAL DESCRIPTION OF SOME WORKSHOP UTILITY SUBSYSTEMS 5c

INTRODUCTION 5c1

Within a particular professional task area (mission- or discipline-oriented) there are often groups who could be benefitted by using special workshop subsystems. These subsystems may be specialized for their specific application or research domain or for support of their more general knowledge work. Our goal is to offer a workshop utility service that contains a range of subsystems and associated methodology particularly aimed at aiding general knowledge work, and that also supports in a coordinated way special application subsystems either by interfacing to subsystems already existing, or by developing new subsystems in selected areas. 5c1a

In the descriptions to follow are a number of workshop subsystem domains that are fundamental to a wide range of knowledge work in which ARC already has extensive developments or is committed to work. For each subsystem we include some general comments as well as a brief statement of current ARC capabilities in the area. 5c1b

DOCUMENT DEVELOPMENT, PRODUCTION, AND CONTROL 5c2

Here a system is considered involving authors, editors, supervisors, typists, distribution-control personnel, and technical specialists. Their job is to develop documents, through successive drafts, reviews, and revisions. Control is needed along the way of bibliography, who has checked what point, etc. . Final drafts need checkoff, then production. Finally distribution needs some sort of control. If it is what we call a "functional document" such as a user guide, then it needs to be kept up to date [39]. There is a further responsibility to keep track of who needs the documents, who has what version, etc. 5c2a

Within the ARC workshop, documents ranging from initial drafts to final high-quality printed publications can be quickly produced with a rich set of creation and editing functions. All of ARC's proposals, reports, designs, letters, thinkpieces, user documentaion, and other such

information are composed and produced using the workshop. 5c2b

Documents in a proof or finished form can be produced with a limited character set and control on a line printer or typewriter, or publication-quality documents can be produced on a photocomposer microfilm unit. 5c2c

Presently there are on the order of two hundred special directives that can be inserted in text to control printing. These directives control such features as typefont, pagination, margins, headers, footers, statement spacing, typefont size and spacing, indenting, numbering of various hierarchical levels, and many other parameters useful for publication quality work. 5c2c1

Methodology to perform the creation, production, and controlling functions described above has been developed, although much work at this level is still needed. 5c2c2

In terms of future goals, one would like to have display terminals with a capability for the range of fonts available on the photocomposer so that one could study page layout and design interactively, showing the font to be used, margins, justification, columnization, etc. on the screen rather than having to rely on hardcopy proofsheets. 5c2d

To prepare for such a capability, plans are being made to move toward an integrated portrayal mechanism for both online and hardcopy viewing. 5c2d1

COLLABORATIVE DIALOGUE AND TELECONFERENCING 5c3

Effective capabilities have already been developed and are in application, as discussed above. There is much yet to do. The Dialogue Support System will grow to provide the following additional general online aids: 5c3a

Link-setup automation; back-link annunciators and jumping; aids for the formation, manipulation, and study of sets of arbitrary passages from among the dialogue entries; and integration of cross-reference information into hardcopy printouts. Interfaces will probably be made to other teleconferencing capabilities that come into existence on the ARPANET. 5c3b

It also will include people-system developments: conventions and working procedures for using these aids effectively in conducting collaborative dialogue among various kinds of people, at various kinds of terminals, and under various conditions; working methodology for teams doing planning, design, implementation coordination; and so on. 5c3c

MEETINGS AND CONFERENCES 5c4

Assemblies of people are not likely for a long time, if ever, to be supplanted in total by technological aids. Online conferences are held at ARC for local group meetings and for meetings where some of the participants are located across the country. 5c4a

Use is made of a large-screen projection TV system to provide a display image that many people in a conference room can easily see. This is controlled locally or remotely by participants in the meeting, giving access to the entire recorded dialogue data base as needed during the meeting and also providing the capability of recording real-time meeting notes and other data. The technique also allows mixing of other video signals. 5c4b

MANAGEMENT AND ORGANIZATION 5c5

The capabilities offered in the workshop described in this paper are used in project management and administration [39]. Numerical calculations can also be performed for budget and other purposes, obtaining operands and returning results to NLS files for further manipulation. 5c5a

Where an organization has conventional project management operations, their workshop can include computer aids for techniques such as PERT and CPM. We want to support the interfacing that our Core Workhop can provide to special application systems for management processes. 5c5b

We are especially interested, at this stage, in management of project teams -- particularly, of application-systems development teams. 5c5c

HANDBOOK DEVELOPMENT 5c6

Capabilities described above are being extended toward

the coordinated handling of a very large and complex body of documentation and its associated external references. The goal is that a project or discipline of ever-increasing size and complexity can be provided with a service that enables the users to keep a single, coordinated "superdocument" in their computer; that keeps up to date and records the state of their affairs; and provides a description of the state of the art in their special area. 5c6a

Example contents would be glossaries, basic concept structure, special analytic techniques, design principles, actual design, and implementation records of all developments. 5c6b

RESEARCH INTELLIGENCE 5c7

The provisions within the Dialogue Support System for cataloging and indexing internally generated items also support the management for externally generated items, bibliographies, contact reports, clippings, notes, etc. Here the goal is to give a human organization (distributed or local) an ever greater capability for integrating the many input data concerning its external environment; processing (filtering, transforming, integrating, etc.) the data so that it can be handled on a par with internally generated information in the organization's establishing of plans and goals; and adapting to external opportunities or dangers [38]. 5c7a

COMPUTER-BASED INSTRUCTION 5c8

This is an important area to facilitate increasing the skills of knowledge workers. ARC has as yet performed little direct work in this area. We hope in the future to work closely with those in the computer-based instruction area to apply their techniques and systems in the workshop domain. 5c8a

In training new and developing users in the use of the system, we have begun using the system itself as a teaching environment. This is done locally and with remote users over the ARPANET. 5c8b

SOFTWARE ENGINEERING AUGMENTATION 5c9

A major special application area described above, that has had considerable effort devoted to it, is support of

software engineers. The software-based tools of the workshop are designed and built using the tools previously constructed. It has long been felt [24, 29] that the greatest "bootstrapping" leverage would be obtained by intensively developing the augmented workshop for software engineers, and we hope to stimulate and support more activity in this area. 5c9a

KNOWLEDGE WORKSHOP ANALYSIS 5c10

Systematic analysis has begun of the workshop environment at internal system levels, at user usage levels, and at information-handling procedure and methodology levels. The development of new analytic methodology and tools is a part of this process. The analysis of application systems, and especially of core-workshop systems, is a very important capability to be developed. To provide a special workshop subsystem that augments this sort of analytic work is a natural strategic goal. 5c10a

CONCLUSION -- THE NEED FOR LONG-TERM COMMITMENT 6

As work progresses day-to-day toward the long-term goal of helping to make the truly augmented knowledge workshop, and as communities of workshop users become a reality, we at ARC frequently reflect on the magnitude of the endeavor and its long-term nature [22]. 6a

Progress is made in steps, with hundreds of short-term tasks directed to strategically selected subgoals, together forming a vector toward our higher-level goals. 6a1

To continue on the vector has required a strong commitment to the longer-range goals by the staff of ARC. 6b

In addition, we see that many of the people and organizations we hope to enlist in cooperative efforts will need a similar commitment if they are to effectively aid the process. 6c

One of ARC's tasks is to make the long-term objectives of the workshop's evolutionary development, the potential value of such a system, and the strategy for realizing that value clear enough to the collaborators we seek, so that they will have a strong commitment to invest resources with understanding and patience. 6c1

One key for meeting this need will be to involve them in

serious use of the workshop as it develops. The plans for the Workshop Utility are partly motivated by this objective. 6c2

Although the present ARC workshop is far from complete, it does have core capabilities that we feel will greatly aid the next communities of users in their perception of the value of the improved workshops of the future. 6c3

ACKNOWLEDGEMENTS 7

During the 10 year life of ARC many people have contributed to the development of the workshop described here. There are presently some 35 people -- clerical, hardware, software, information specialists, operations researchers, writers, and others -- all contributing significantly toward the goals described here. 7a

The work reported here is currently supported primarily by the Advanced Research Projects Agency of the Department of Defense, and also by the Rome Air Development Center of the Air Force and by the Office of Naval Research. 7b

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Stanford Research Institute Augmentation Research Center
October 1969 (SRI-ARC Catalog Item 9733)

Supportive Data

TITLE:

THE AUGMENTED KNOWLEDGE WORKSHOP

AUTHORS:

Dr. Douglas C. Engelbart, Director
Augmentation Research Center

Dr. Richard W. Watson, Assistant Director
Augmentation Research Center

James C. Norton, Assistant Director
Augmentation Research Center

AFFILIATION:

Stanford Research Institute
Menlo Park, California

The Augmented Knowledge Workshop

(J14724) 1-MAR-73 14:07; Title: Author(s): Engelbart, Douglas C. , Watson, Richard W. , Norton, James C. /DCE RWW JCN; Distribution: /SRI-ARC; Sub-Collections: SRI-ARC; Clerk: LLL;

More

Alex -- thanks for the quick reply. Arpa is talking a lot about having servers all over the place, and is forcing the issue (e.g., the NMC sigma is going away and we get an ANTS).

Clearly responsiveness to users tends to be expensive, but sometimes the only expense is in taking a few moments to design something a bit differently.

At those, and other times, it is important that a case, when presented to the designer, be preseented cohesively and coherently, with sufficient justification. A 'Users Group' could attempt to grapple with user issues, deciding what kinds of things are good, bad special, etc.

In that sense, it may end up saving money. (the laughter in the background is Experience getting hysterical at such a thought.)

(by the way, some people do notice TIP people's responsiveness. I was really jazzed to see the news command altered to a more general process.)

At any rate, the issue of 'research' sites dealing with 'general services' turns out to be strange, due to the number of people using the net to accomplish other things. They are not researching the net, they are merely trying to use it to do other things. If we do not address the needs of those people (e.g., NMC guys, soon) the primary goals of those projects could be seriously affected.

Talk to you later.
D/

1

More

(J14726) 23-FEB-73 18:13; Title: Author(s): Crocker, David H. /DHC;
Distribution: /AAM; Sub-Collections: NIC; Clerk: DHC;

DVN 23-FEB-73 17:24 14727

Outline for February 26 TNLS Course

DVN 23-FEB-73 17:24 14727

Outline for February 26 TNLS Course

Outline for February 26 TNLS Course

Outline for February 26 TNLS Course

DVN 23-FEB-73 17:24 14727

Outline for February 26 TNLS Course

(J14727) 23-FEB-73 17:24; Title: Author(s): Van Nouhuys, Dirk H. /DVN; Distribution: /MDK MFA KFB(would you make 7 copies of this and bring it to the class?); Sub-Collections: SRI-ARC; Clerk: DVN; Origin: <VANNOUHUYS>ENDFEBOUT.NLS;2, 23-FEB-73 17:21 DVN ;

GPH 23-FEB-73 11:56 14728

RESPONSE TO JI - PROTOCOL NEWS

JEAN: JUST LOKED AT YOUR '(PROTOCOL-NEWS)' ... SOUNDS OK TO ME.. THINK YOU SHOULD NOTE HOWEVER, THAT DOCUMENTATION WILL BE FORTHCOMING. THIS DOCUMENTATION WILL PERTAIN TO ACCESS MECHANISMS(SP??) BOTH FOR THE PDP-10 AND TO THE 1108... THINK THAT SAYS WHAT I MEAN..? IF THERE ARE ANY QUESTIONS, PLEASE CONTACT ME.. HAVE ANOTHER QUESTION FOR YOU THO, DID YOU UNDERSTAND WHAT I MEANT WHEN I NOTED THE DEVIATION? IF NOT, THEN PERHAPS I SHOULD RE-WORD THE THING.. WHAT YOU WROTE, HOWEVER, SAYS WHAT I MEANT TO CONVEY - I THINK.. ANYWAY, --PEACE GREG 1

GPH 23-FEB-73 11:56 14728

RESPONSE TO JI - PROTOCOL NEWS

(J14728) 23-FEB-73 11:56; Title: Author(s): Hicks, Gregory P. /GPH;
Distribution: /JI; Sub-Collections: NIC; Clerk: GPH;

User Program Library: NDM as Possible Program Librarian

Addition to KEV's (14715,)

User Program Library: NDM as Possible Program Librarian

I just read KEV's suggestion for a user program library. I think this is a great idea. I would like to suggest that Dean Meyer be given the job of maintaining this library. He has demonstrated a fine programming ability and already has knowledge of many of the currently available user programs. The user program librarian would be responsible for validating user programs before their inclusion and perhaps generalizing some. The librarian would also handle documentation and publicity of the available programs. 1

User Program Library: NDM as Possible Program Librarian

(J14729) 23-FEB-73 10:19; Title: Author(s): Lehtman, Harvey G. /HGL; Distribution: /sri-arc ; Sub-Collections: SRI-ARC; Clerk: HGL;

JCN 23-FEB-73 22:27 14730

Re: Knowledge Work Definition

Duane: If you are looking for ideas about knowledge work, workshops, workers, look in (norton,cpaper,) the DCE/RWW/JCN paper sent to Bill Bethke. It will be Journal document 14724 later. It gives an overview of what we are about.. particularly in the first part where we discuss the knowledge worker. This term applies to AF people in a big way... ++. How about a call next week early. You call me. Monday?? Bye Jim 1

JCN 23-FEB-73 22:27 14730

Re: Knowledge Work Definition

(J14730) 23-FEB-73 22:27; Title: Author(s): Norton, James C. /JCN;
Distribution: /DLS; Sub-Collections: SRI-ARC; Clerk: JCN;

JI 23-FEB-73 20:36 14731

jeannie:

A nearly complete draft of the first ARPANET Newsletter is now available as (mitre-tip,ji,5g1a). Could you review it and add additional news that you may have which is currently not included. Distribution to NSAG,NLG, and PI seems reasonable; additionally, special requests have been received and I have compiled them as (mitre-tip,ji,5g2). I hope you will not be offended and accept the responsibilities of Co-editor;this seemed to us as desirable since we would like the NIC to distribute the newsletter and coordinate/collaborate in its development. If you have any major comments or suggested revisions, please call me. I will0attempt to call you early nest week to finalize arangement. Thank you for your interest and consideration.

.....regards, jean 1

(J14731) 23-FEB-73 20:36; Author(s): Iseli, Jean /JI; Distribution: /JBN; Sub-Collections: NIC; Clerk: JI;

Re--14715> Sounds like a step in favor of a USER PROGRAMS branch in locator. 1

(J14732) 22-FEB-73 20:48; Author(s): Kelley, Kirk E. /KIRK;
Distribution: /mdk ; Sub-Collections: SRI-ARC; Clerk: KIRK;

This supercedes (14558,).

Concerning the "BUG" in viewspec b when ALL levels are being referenced and the first "b" gives you 0 levels. I find this useful sometimes when I don't want to type a "d" first. But what would be even more useful, is to have the first "b" (when ALL levels are on) equal to "eb". 1

(J14733) 22-FEB-73 21:12; Author(s): Kelley, Kirk E. /KIRK;
Distribution: /np ; Sub-Collections: SRI-ARC NP; Clerk: KIRK;

; ALSO, I WILL BE AT FTP MEETING WITH BELLS ON (SLEIGH BELLS?).
EOB BRADEN 1

(J14734) 23-FEB-73 10:01; Author(s): Braden, Robert T. /RTB;
Distribution: /AAM; Sub-Collections: NIC; Clerk: RTB;

RTB 23-FEB-73 9:58 14735

ALEX, STEVE WOLFE AND I PLAN TO ATTEND THE TELNET MEETING. 1

(J14735) 23-FEB-73 9:58; Author(s): Braden, Robert T. /RTB;
Distribution: /AAM; Sub-Collections: NIC; Clerk: RTB;

WLB 23-FEB-73 11:18 14736

BUG in Goto Programs

Whenever I load my user program rel file F, I have to do an Institute Program f TWICE to get it instituted -- the first time I try, I always get the error message "illegal user program spec". 1

WLB 23-FEB-73 11:18 14736

BUG in Goto Programs

(J14736) 23-FEB-73 11:18; Title: Author(s): Bass, Walt /WLB;
Distribution: /bugs ; Sub-Collections: SRI-ARC BUGS; Clerk: WLB;

WLB 23-FEB-73 12:11 14737

BUG in GDTC Command

This may be a known bug, but GDTC (clear tty sim area) doesn't always work -- it seems to always work the first time I do it but then at some point stops working. 1

BUG in GDTC Command

(J14737) 23-FEB-73 12:11; Title: Author(s): Bass, Walt /WLB;
Distribution: /bugs ; Sub-Collections: SRI-ARC BUGS; Clerk: WLB;

Introduction 1

The purpose of this RFC is to present a framework for coordinating all the surveys and data gathering efforts concerned with "resource notebook" type of information. 1a

We have obtained agreement from ARPA with the framework, which is described below. 1b

The scheme is designed with two purposes: 1b1

a) to avoid a proliferation of data gathering efforts, which would overwhelm the sites and persons supplying the much-needed information; 1b1a

b) to give the responsibility to the NIC for coordinating the tasks associated with the resource notebook . 1b1b

Two companion documents, NIC 14514 and NIC 14515 provide supplementary information to this RFC. 1c

NIC 14514 describes the history of the Resource Notebook from 1971 to the present. 1c1

NIC 14515 contains the questionnaire that the NIC is currently sending to server sites for data on Network Resources. 1c2

A recent RFC by John Iseli and Dave Crocker (NWG/RFC# 462, NIC 14434) also addresses this same problem area. 1d

The proposed framework for data collection suggested by John and Dave is different from the framework outlined in this RFC. 1d1

Framework 2

The Network Information Center will coordinate the tasks of collecting, verifying, and disseminating information of a "resource notebook" nature. 2a

a) Collecting and Verifying the data. 2a1

Because of the magnitude of this task, regional data collectors would provide assistance both to the NIC and to the sites supplying the information. 2a1a

We think that initially there should be five regions: Boston, Washington DC, San Francisco, Los Angeles, and Mid-Continent. 2a1a1

The regional agents would collect the information from the sites in their region and forward it to NIC for inclusion in the Resource Notebook data base. 2a1b

The NIC would work closely with the regional agents to ensure that the data is accurate and up-to-date. 2a1c

b) Disseminating data. 2a2

There is presently a need to prepare different subsets or "views" of the resource notebook information. 2a2a

Regardless of which groups on the Network are given responsibility for preparing different "views" of the complete resource notebook data base, these views should be available for use on-line at the NIC as well as off-line. 2a2b

A working group of persons interested in the needs and problems of a resource notebook would meet periodically to review the situation, and to make concrete proposals for improvements. 2b

Discussion 3

We welcome discussion on this RFC. 3a

If you think it desireable, a meeting could be held at SRI-ARC to discuss the whole problem area. 3b

If a meeting is desireable, we suggest it be held soon, say on Monday March 19, 1973, at 8:30 AM in the SRI-ARC Conference Room. 3b1

Please let us have your comments by March 9. 3c

You may contact us at (415) 326-6200, ext 3617, care of Mike Kudlick. 3c1

NWG/RFC# 464 MDK 27-FEB-73 16:41 14738
Resource Notebook Framework

(J14738) 27-FEB-73 16:41; Title: Author(s): Kudlick, Michael D.
/MDK; Distribution: /NIC; Sub-Collections: SRI-ARC NIC; RFC# 464; Clerk:
MDK;
Origin: <KUDLICK>HIST-I.NLS;5, 27-FEB-73 16:24 MDK ;

sample journal session

now ia the time etc. 1

CLR 26-FEB-73 11:14 14743

sample journal session

(J14743) 26-FEB-73 11:14; Title: Author(s): Reeve, Christopher L. /CLR; Distribution: /MDK CLR; Sub-Collections: NIC; Clerk: CLR;

DIA 26-FEB-73 17:20 14744

Note about statistics of 2/20/73

They finally got the phone fixed. There was some bad stuff at the SRI end. Also, I looked at the statistics for 2/20 in detail and came to the conclusion that the system was running properly. It was very heavily loaded from about 10:30 to 14:00, mostly with people doing things like DNLS, TNLS - with an occational OUTPRC and DELD. But very heavy use - like 27 active users at times. The heaviest guy in DNLS was NORTON who was sucking 7% of real CPU time at times. Also, SYSJOB was quite high - 12 to 16% of real CPU time - during that interval. Most of that was driving the printer. The printer is a low priority but very persistent user. Don't know what more to say about it - just looks like the system was overloaded... 1

DIA 26-FEB-73 17:20 14744

Note about statistics of 2/20/73

(J14744) 26-FEB-73 17:20; Title: Author(s): Andrews, Don I. /DIA; Distribution: /JCN; Sub-Collections: SRI-ARC; Clerk: DIA;