NLS in MPS Conversion Planning Framework

MPS Conversion Planning Tasks 1

Introduction 2

Before we charge ahead with the conversion, DCE, JCN and I would like a better understanding of what we will gain from the conversion into MPS relative to the cost. Below is a brief list of advantages that I am aware of in going to MPS and some converson goals. What we would like is a document which discusses these issues and shows in detail the reasons why it is appropriate and advantagous to convert NLS to MPS and to perform the conversion this year. 2a

Such a document has never been written and there is a nagging residual management type feeling that maybe we could achieve most of the goals below with the L-10 version of NLS or that the advantages to be gained are real but are not likely to be really important for several years. 2a1

Even if the goals below can be met to a large degree by the L-10 version, the cost may be high enough that it is better to go to MPS. The first task of the MPS Design Team should be to either confirm or put these "lets hold back" type feelings to rest. 2a2

Because we feel the probability is high that the doubts will be put to rest and because most of the planning outlined below is needed even if we were to stay with L-10 for a larger time than given below, we should proceed now with MPS planning with the understanding that there will be a checkpoint when the above requested justification document is finished. 2b

Assuming as I am that we go ahead, the present plan is to begin the conversion of NLS into MPS sometime this summer. As a target date for beginning serious conversion implementation I would suggest August 1. This date will give us a chance to consider carefully the areas described below with respect to NLS, allow time for MPS to be shaken down, to have written some trial subparts of NLS in MPS, taken some measurements and fed back the results to the MPS development and NLS conversion planning. 2c

Conversion to MPS will be costly, both in terms of the effort to make the conversion and in terms of the slow down of other developments; therefore I want to go slowly with careful design and evaluation so that there is a high probability that this investment will yield high returns in the months after the conversion. 2d

During this same period we are also going to be preparing to set up the Utility and will be continuing our current ARC and NIC operations. To keep the MPS conversion planning and other effort in perspective we must realize that tasks felt to be important for the success of these efforts have a higher priority than the MPS tasks given here. An outline of tasks felt to be needed to improve NIC ARC operations and in preparation for the Utility is given in a companion document to this one (14164,). 2e

Planning Structure 3

The system we are building is being worked on and used by many people and therefore in the months ahead we need to set up design and review procedures to assure that we are incorporating this growing experience and communicating what's going on among the people and groups that need to know and can contribute. 3a

The way to do this, I believe, is with design and review teams, and written designs distrubuted to relevant parties ahead of implementation. Shortly I plan a document describing my more detailed thoughts about this process which I will distribute for review, but in the meantime we need to get the MPS effort launched. 3b

Why are we converting to MPS? As I understand it there are five prime reasons. 3c

1) It will allow a system organization which will make it easier for many people to work on and develop the same system semi-independently . 3c1

2) It will be easier to allow pieces of the system to exist on several processors in the network. 3c2

3) It will allow individual users or groups of users to tailor versions of NLS more suited to their needs. 3c3

4) It should be easier to move NLS to other systems by bootstrapping MPS because MPS is written in itself. 3c4

5) NLS should be easier to evolve both because of the increased modularity and because MPL is a somewhat higher level language than L-10 and MPS has better debugging and run time facilities. 3c5

What should some of the goals be during conversion? Several come to mind. 3d

1) To realize the potential advantages listed above in fact not theory. 3d1

2) Isolate in a well defined place(s) those uses of PDP-10, Tenex features in order to maintain the goal of future portability. 3d2

3) General cleaning of redundant code, obsolete features, poor programming and documentation practices. 3d3

4) Improved efficiency of most frequently used features. 3d4

5) Provide the foundations, hooks for better data base facilities, mixed text graphics, access to other subsystems and other features which a more general intellectual workshop is going to need. 3d5

6) Consider system organizations which could allow pieces to be moved to minicomputers such as core, command specification, editing functions, Journal, Output Processor, display drivers etc. 3d6

Planning and review for MPS conversion will consist of a number of teams: There was no way to include everyone who could contribute on one of these teams and still keep them a reasonable size. Everyone should feel free to contribute ideas, and comment on the designs which will be distributed etc. 4

One of the jobs of the primary design and review teams is to consider these ideas and to give some feedback to their contributors. We often have situations where people put ideas in the Journal about a subject and no feedback comes back. This is discouraging to the person suggesting the idea, when a few words could say that the idea is being considered, is accepted and X will be done about it, is rejected for reason Y etc. 4a

MPS Conversion Teams 5

1) A primary NLS in MPS design, planning, steering team (NMDT) consisting of three people: Charles Irby, Jim Mitchell, and Chuck Dornbush. Charles Irby will be the pusher of this team. 5a

2) A technical NLS in MPS design review team of six members

(NMRT), Bill Paxton, Ed Satterthwaite, Peter Deutch, Don Andrews, Don Wallace, and Walter Bass. Bill Paxton will be the pusher of this team. 5b

3) Management review of the plans, resources required, and design by Doug Engelbart, Dick Watson,and Jim Norton (EMC). 5c

4) Special problem area study and design teams of one or more people to consider the areas described below. 5d

5) The parallel effort on MPS development going on at Xerox-Parc with some collaboration by CHI CFD DIA. 5e

The function of groups 1-4 is as follows. 6

Special Problem Area Study Teams 6a

The special study teams are to look at areas which are currently known to be important to the evolution of NLS as a general intellectual workshop and which in many cases are either lacking or not handled as well as we know they can be in the present system. Some of the recommendations will result in implementation during the conversion and the others may not be directly implemented during the conversion but will affect basic design decisions and implementation in such a way as to more easily allow their implementation after the conversion. 6a1

The special study teams will feed written recommendations to the NMDT at appropriate points (probably a set of preliminary recommendations around March-April and more final ones in early summer). 6a2

The NMDT functions are: 6b

to prepare the justification for the conversion, 6b1

to plan the conversion strategy with appropriate stages and expected levels of effort required, 6b2

to coordinate and review the work of the special study teams, 6b3

(in particular to set some target dates for preliminary or other reports from the special design teams) 6b3a

to do the detailed core system design of NLS in MPS, 6b4

to feed back to the Xerox MPS development group needs and other information, 6b5

to interact with the NMRT for detailed feedback and review of its designs. 6b6

to help the special study teams by letting them know what types of information the NMDT needs and to be sure overlapping areas interface properly. 6b7

when suggestions of people not on the MDT or MRT are contributed to let the contributor know the state of his suggestion. 6b8

to interact with the EMC. 6b9

The functions of the NMRT are 6c

to study in detail the designs and plans of the NMDT 6c1

to feedback to the NMDT suggestions for improvement; approval for areas of design not needing further work. 6c2

to study suggestions received by other people (not on the NMDT or NMRT) about the design, to see that the points of view represented are throughly considered and where appropriate incorporated in the design. 6c3

to meet separately and with the NMDT. 6c4

My view of a review team is that its function is not in the spirit of criticism or superior capability, but is in the spirit of being sure that a wider range of experience and points of view have a way of looking in detail at a design. 6c5

The function of the EMC is 6d

to study the planning and conversion strategy and balance resource requirements with other ARC commitments, 6d1

to provide any overall ARC planning and goals needed by the NMDT for its decision processes (the NMDT, NMRT should be firm about insisting that they get from the EMC the goals they feel they need). 6d2

to review the designs at a more general level than the NMRT with respect to projected ARC needs and directions. 6d3

to review periodically the planning process, push where necessary, arbitrate any deadlocks etc. 6d4

Special Study Areas
The people listed below associated with the special study areas are not the only people who should feel free to contribute. Other people should feel free to make recommendations in these areas, and work with the people listed as their interest and time allows. The first person listed is the pusher. 6e

Command Language Cleanup and Implementation (CHI CFD LPD) 6e1

The command language of NLS has been growing in a somewhat adhoc manner and the purpose of this effort is to establish some principles and make a recommendation for modifications in the present language so that it will meet these principles. The cleanup of the command language is also needed in preparation for the Utility and our ARC, NIC operations. The types of consideration that seem needed are: 6e1a

The user view - both experienced and novice 6e1a1

The implementation view 6e1a2

Could we get parsing in one place so as to make expansion, handling of help, statistics collection, subsystem interaction easier? 6e1a2a

The relation of DNLS and TNLS. 6e1a3

The usage statistics now being collected. 6e1a4

The single multiple character problem for command specification given a finite alphabet. 6e1a5

Subsystem interaction and cross access 6e1a6

Command language is an important enough area that a special user oriented review team seems needed. This team will consist of RWW JCN MDK DCE MFA WLB and PR representing various ARC functional activities. 6e1b

It is my assumption that this problem area will result in implementation changes in the L10 version before MPS conversion so that the user interface will be the same after conversion as before. 6e1c

NLS File System (CFD JDH) 6e2

There are presently limitations on the types of strucutres and data entitites which can be stored in NLS. The function of the new NLS file system is to remove these restrictions. 6e2a

Requirements on its design will come from areas described below such as 6e2b

Data Base Facilities, Mixed Text Graphics, Large Character Set, Interface to other Subsystems... 6e2b1

The design should also consider needs for set manipulation facilities, back links... 6e2b2

I think we should definitely implement the new NLS file system as part of the conversion effort. 6e2c

Data Base Facilities (JFV) 6e3

We presently have in the system a number of data bases each with its own record format, input, update, retrieval, and format facilities; examples being master catalog, journal catalog, ident file, resource notebook, baseline record, formated indices, TENEX sequential files, etc. 6e3a

We are also probably going to want to interface to network data base resources such as the Datacomputer. 6e3b

If NLS is going to be the more general information machine we want it to be, rather than simply a fancy text machine, we need to provide some standard data base facilities. 6e3c

The emphasis should be on determining what basic functions DO WE NEED, what should be in the NLS file system as primitives to meet these, and what subset, if any, should be implemented during the conversion for the ident file or other presently existing data bases. 6e3d

Large Character Set (WLB LPD) 6e4

We presently can only handle the 127 character ASCII set (actually we are off standard by a few characters). With new types of displays having writable memory driven character generators, COM and other printing devices, we

will need to be able to handle essentially an open ended character set. 6e4a

The problem raises questions about storage and processing techniques, display or printing on terminals possibly not equipped to handle them, and network registration or standardization. The main focus here should probably be on the storage and processing techniques which should be provided in MPS-NLS. 6e4b

Mixed Text Graphics (CHI CFD KEV) 6e5

We are presently text oriented; we also need to be able to handle pictures in an integrated way. There are problems here in developing a set of primitive operations, picture - subpicutre data structures, access from other subsystems such as Basic, FORTRAN which will want to generate pictures, need for a drawing system etc. 6e5a

The main consideration should probably be on finding what implications pictures have on the new NLS file system, portrayal generator and interconnection with other subsystems. 6e5b

Interface to Other Subsystems (KEV EKM) 6e6

We claim we want NLS to be a general intellectual workshop for a wide range of people. We are never going to be able to provide all the tools people are going to want. The computer industry and users are creating thousands of such tools. Our only satisfactory strategy is to try and define those tools which must be in a core facility and to provide mechanisms to access other tools (subsystems processes) etc, on our own machine, or on the network in some integrated way so that NLS data structures, command language principles etc., can be used as front and rear ends. The basic problem is to provide the interprocess communication capabilities required. Use of Network or pseudo Network connections is probably a useful approach. 6e6a

The problem here is to determine what mechanisms are needed in MPS or Tenex to allow connection with other subsystems and what implications use of other subsystems with NLS has on definition of NLS basic functional organization. 6e6b

For example, we will probably want NLS like command languages and controls as front ends for some of these subsystems, which has implications for easy specification of parsers, format conversion routines for getting material from "foreign" subsystems into NLS data and display structures and vice versa. This area clearly overlaps with the one described next. 6e6b1

User Program Facilities (WLB CFD) 6e7

As mentioned above, we are never going to be able to program all the tools people are going to want or need. Therefore, we must provide easy to learn and useful facilities for people to provide their own. There seem to me to be at least three levels here. 6e7a

The NLS level 6e7b

Maybe NLS should be looked at as a programming language with extensible language or macro capabilities, appropriate debugging facilities etc. What would be needed in NLS to be able to do this? 6e7b1

The MPL level 6e7c

We presently have a goto program feature which allows in theory the user to write his own tools. However the present documentation and organization of NLS from this point of view effectively excludes this possibility for most users. 6e7c1

What is needed is careful thought about what basic functions would be desirable for the average user and to organize the system with these as primitive procedures etc which the user can easily use. 6e7c2

One might also want to provide high level language in MPL than is needed by system programmers which parallel closely NLS concepts, constructs such as, for all statements in this plex do X etc. The sequence generator provides this type of capability but this stuff isn't known by the average user. 6e7c3

The Other Programming Language Level 6e7d

There are reasons why in many cases it would be more appropriate for the user to create his tool in some other language available on our system or other

system in the network. It should be possible for that program to access NLS data structures, interact with the user using NLS mechanisms etc. 6e7d1

One would like to create the appropriate basic mechanisms so that one did not have to modify the compiler or runtime package of the other system, but could just use a set of utility routines in that language. 6e7d2

Detailed Look at L10 NLS (HGL & everybody) 6e8

NLS as it now exists has unused or other features which may need to be removed, unnecessary redundant code, programming and organizational practices which one would like to remove or avoid doing again during the conversion. 6e8a

A careful look needs to be taken through the system to find these, and seminars or other mechanisms found to educate people about how to avoid them in the future. 6e8b

Coding and documentation conventions (HGL KEV) 6e9

NLS has many tools to aid the coding and documentation of the system. We need to use these more widely and more uniformly so we can read and understand each others code. 6e9a

Harvey and Ken are going to start this process by preparing some draft standards for discussion and then we will try to bring up the L10 version to these standards to simplify the conversion job and training. 6e9b

They will also study MPS so that as many standards as possible can carry across and propose any new ones needed just by MPS. 6e9c

Measurement (before, during, after) (DIA) 6e10

We have been measuring NLS from several directions, command usage, PC counters, trace etc. We will want to suggest measurement capabilities which should be built into MPS, and NLS from the beginning. 6e10a

We also need to measure trial implementations of parts of NLS in MPS to provide information on programming and organizational techniques. 6e10b

Portrayal Generator (WLB) 6e11

For a long time there has been discussion of providing an integrated way to handle display and hardcopy portrayals. this study will make recommendations for what basic mechanisms are necessary to achieve this goal. 6e11a

It should be possible for example for a user willing to pay the delay for him to see Output Processor type formats on his screen. Also given special formatting on the screen there are inverse mappings needed to allow interaction with the file structure. 6e11a1

Output Processor Redesign (WLB) 6e12

Using results of the portrayal generator study, the Output Processor will need redesigning at some stage of the conversion as it's presently creaking along. 6e12a

Other Special Study Areas 6e13

The NMDT should feel free to create other special study areas if such seem needed. 6e13a

MPS Issues 7

Programmers Manual (JFV and others) 7a

A MPS programmers manual is needed. 7a1

MPS Data Structure and String Facilities (Xerox, CHI DIA CFD) 7b

General Data structure and string creation and manipulation facilities are needed in MPL. JGM is writing a draft proposal. 7b1

Improved MPS Debugger (Xerox) 7c

MPS debugging capabilities need further development so as to be more user oriented. 7c1

MPS Training 7d

Seminars will be needed on programming techniques and conversation in MPS. 7d1

NLS Constructs in MPS 7e

L10 has language constructs for interacting with the user etc. What are the plans in this regard for MPS? 7e1

ARC Maintenance and Evolution of MPS 7f

ARC needs at some point to develop the capability to maintain and evolve MPS. 7f1

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NLS in MPS Conversion Planning Framework

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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., Page, Cindy, Paxton, William H., Peters, Jeffrey C., Ratliff,
Jake, Van De Riet, Edwin K., Van Nouhuys, Dirk H., Victor, Kenneth E.
(Ken), Wallace, Donald C. (Smokey), Watson, Richard W., Andrews, Don I.,
Paxton, William H., Mitchell, James G., Deutsch, L. Peter,
Satterthwaite, Ed H./sri-arc whp jgm lpd ehs ; Sub-Collections:
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JAN 21-27, A Week In Review

In this report are several changes of interest to ARC, the biggest being that from now on statistics will be taken on a 7 day, 24 hour basis. Second, two new branches have been added for those interested, (XEROX) and (NETUSERS). -bah

JAN 21-27, A Week In Review

WEEKLY ANALYSIS REPORT: 1

2

(ARC) 2a

2a1

WEEK: JAN 21-27, 1973 (24 HOURS/DAY) 2a2

2a3

IDENT	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU	2a4
						2a5
(DIA)	1.196	55.854	.021	2.7	48:1	2a6
(MFA)	.561	12.853	.044	1.3	23:1	2a7
(WLB)	.190	9.367	.020	.4	50:1	2a8
(KFB)	.059	6.813	.009	.1	111:1	2a9
(CFD)	.666	17.878	.037	1.5	27:1	2a10
(DCE)	.583	19.333	.030	1.3	33:1	2a11
(JAKE)	1.454	33.164	.044	3.3	23:1	2a12
(WRF)	3.710	73.654	.050	8.4	20:1	2a13
(BAH)	1.073	25.087	.043	2.4	23:1	2a14
(MEH)	.522	16.150	.032	1.2	00:1	2a15
(JDH)	.426	9.193	.046	1.0	22:1	2a16
(CHI)	.861	21.675	.040	1.9	25:1	2a17
(MEJ)	2.772	50.936	.054	6.3	18:1	2a18
(DSK)	1.236	33.023	.037	2.8	27:1	2a19
(KIRK)	2.109	77.289	.027	4.8	37:1	2a20
(MDK)	.454	10.358	.044	1.0	23:1	2a21

(LLL)	.364	26.642	.014	.8	71:1	2a22
(SRL)	.034	1.750	.019	.1	53:1	2a23
(HGL)	.454	12.186	.036	1.3	28:1	2a24
(NDM)	.544	20.412	.027	1.2	37:1	2a25
(EKM)	.450	23.770	.019	1.3	53:1	2a26
(JBN)	.437	22.059	.020	1.0	50:1	2a27
(JCN)	1.444	23.371	.062	3.3	16:1	2a28
(WHP)	-	-	-	-	-	2a29
(JCP)	1.727	31.980	.054	3.9	18:1	2a30
(JR)	.012	1.663	.007	0	143:1	2a31
(PR)	.268	12.053	.022	.8	45:1	2a32
(BER)	.388	7.269	.053	1.1	19:1	2a33
(JFV)	.325	10.044	.032	.9	31:1	2a34
(EKV)	-	-	-	-	-	2a35
(DVN)	1.628	30.484	.053	3.7	19:1	2a36
(KEV)	.259	6.769	.038	.8	26:1	2a37
(DCW)	1.597	39.574	.040	3.6	25:1	2a38
(RWW)	.083	2.767	.030	.2	33:1	2a39
(JEW)	1.371	18.006	.076	4.0	13:1	2a40
			-----	-----		2a41
(TOTAL)				68.4%		2a42
(AVERAGE)			.036			2a43

2a44

HIGHEST CPU: WRF 3.710 hrs LOWEST CPU: JR
.012 hrs 2a45

HIGHEST CON: KIRK 77.289 hrs LOWEST CON: JR
1.663 hrs 2a46

HIGHEST CPU/CON: JEW .076 HIGHEST CON/CPU: JR
143:1 2a47

2a48

(RADC) 2b

2b1

WEEK: JAN 21-27, 1973 (24 HOURS/DAY) 2b2

2b3

NAME DIR	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU
					2b4
					2b5
(JHB)BAIR 188	.364	20.848	.017	.8	59:1 2b6
(WPB)BETHKE 18	-	-	-	-	- 2b7
(TJB2)BUC-RO -	-	-	-	-	- 2b8
(JPC)CAVANO 51	.062	5.468	.011	.1	91:1 2b9
(RFI)IUORNO 13	-	-	-	-	- 2b10
(FSL)LAMONICA 42	-	-	-	-	- 2b11
(TFL)LAWRENCE 80	.102	7.423	.014	.2	71:1 2b12
(JLM)MCNAMARA 120	.223	13.630	.016	.5	62:1 2b13
(RBP)PANARA 84	.094	4.216	.022	.2	45:1 2b14

(MDP)PETELL	.008	.660	.012	0	83:1
42					2b15
(RADC)RADC	.023	1.833	.013	.1	77:1
52					2b16
(WER)RZEPKA	-	-	-	-	-
40					2b17
(SLIWA)SLIWA	.071	4.458	.016	.2	62:1
20					2b18
(JRS)STELLATO	-	-	-	-	-
25					2b19
(DLS)STONE	.210	12.118	.017	.5	59:1
113					2b20
	-----	-----		-----	
---					2b21
(TOTAL)	1.157	70.654		2.6	
888					2b22

(PER CENT TOTAL DISK CAPACITY)
1.8% 2b23

2b24
(XEROX) 2c

2c1
WEEK: JAN 21-27, 1973 (24 HOURS/DAY) 2c2

NAME	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU
					2c3 2c4
(LPD)DEUTSCH	.191	7.809	.024	.400	42:1 2c5 2c6
(JGM)MITCHELL	.009	.663	.014	0.000	71:1 2c7
	-----	-----		-----	2c8
(TOTAL)	.200	8.472		.400	2c9

(NETUSERS) TOP FIVE 2d

2d1

WEEK: JAN 21-27, 1973 (24 HOURS/DAY) 2d2

2d3

NAME	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU	2d4
						2d5
(JHB)SAT=WTE	.859	25.436	.034	1.9	29:1	2d6
(UCSB)	.778	19.324	.040	1.8	25:1	2d7
(RES)SWEET	.560	28.185	.020	1.3	50:1	2d8
(CASE-10)	.509	13.240	.038	1.2	26:1	2d9
(MITRE-TIP)	.428	14.803	.029	1.0	34:1	2d10
	-----	-----		-----		2d11
(TOTAL)	3.653	113.326		8.3		2d12

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JAN 21-27, A Week In Review

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A Faster TENLDR

A new version of TENLDR incorporates symbol table routines that are 50 times faster for large programs. The net result is a performance improvement of more that 500% in loading the NLS system.

A Faster TENLDR

NEW TENLDR 1

A new and faster version of TENLDR is in the system:
TENLDR.SAV;12. 1a

The backup copy is TENLDR.OLD;10. 1b

The symbol table routines were rewritten using a hashed symbol table, resulting in a considerable speed improvement for loading large programs. 1c

INITIAL PERFORMANCE MEASUREMENTS - loading <rel-nls>xnls (cp seconds) 1d

NEW TENLDR	OLD TENLDR	
		1d1
32	178	1d2

1e

The size of the hashtable is 359. Increasing that size to 701 cut the cpu time to 30.6 seconds for loading xnls. indicating that about 3 cp seconds are used in the new symbol table routines during a load of xnls. This compares with a figure of about 149 cp seconds for the previous TENLDR spent in the symbol table routines during a load of the same xnls files, or a factor of 50 improvement in the speed of the symbol table routines. 1f

A Faster TENLDR

(J14167) 1-FEB-73 7:45; Title: Author(s): Dornbush, Charles F./CFD ; Distribution: 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., Page, Cindy, Paxton, William H., Peters, Jeffrey C., Ratliff, Jake, Van De Riet, Edwin K., Van Nouhuys, Dirk H., Victor, Kenneth E. (Ken), Wallace, Donald C. (Smokey), Watson, Richard W., Andrews, Don I./SRI-ARC ; Sub-Collections: SRI-ARC; Clerk: CFD;

DLS 1-FEB-73 9:48 14168

Status on RADC support procurement

I had the "final" meeting with our procurement on the follow-on support effort. I have to clean up a couple of minor problems, but the contract should be on its way to you next week. Procurement sees no problem in a 1 March begin date if you will agree to a fixed price contract (remember this problem from last time). They are quite adament about this One other thing--is an 8 month effort satisfactory to you? 1

DLS 1-FEB-73 9:48 14168

Status on RADC support procurement

(J14168) 1-FEB-73 9:48; Title: Author(s): Stone, Duane L./DLS ;
Distribution: Norton, James C., Van Nouhuys, Dirk H./jcn dvn ;
Sub-Collections: RADC; Clerk: DLS ;

JBN 1-FEB-73 8:16 14169

Compliance with Request for User Guide

Re: Your request for NLS User's Guide. We're sending one now. --
Jeanne 1

JBN 1-FEB-73 8:16 14169

Compliance with Request for User Guide

(J14169) 1-FEB-73 8:16; Title: Author(s): North, Jeanne B./JBN; Distribution: Walden, David C., North, Jeanne B., Watson, Richard W./dcw3 nicsta rww ; Sub-Collections: SRI-ARC NICSTA; Clerk: JBN;

THE DNLS COMMAND LANGUAGE MONITOR.

1

This report is intended to describe the function and implementation of the DNLS command language monitor, to give examples of its use, and to propose a number of improvements and extensions for this type of analysis.

2

OUTLINE

3

I. Command frequency monitoring in DNLS
II. Using the command analysis package on-line
III. Automatic statistics-gathering
IV. Proposal for next phase
V. Results of monitoring the experimental system
VI. Results of monitoring in the running system
CONCLUSIONS

4

I. Command frequency monitoring in DNLS.

5

The DNLS system, as it runs today, is driven by a language comprising over 150 main commands - a "command" being understood here as either a one-letter or a two-letter code initiating a specific NLS operation. (note that some of these commands, for instance ej for Execute Journal or gq for Goto Query, may trigger entire subsystems that have their own command sub-structure. The sub-structures are beyond the scope of this analysis.)

5a

For the purposes of display, these commands can be roughly divided into "editing commands" and "subsystems", although these names are not perfectly accurate.

5b

In the first group we find a matrix of 8 operations (copy, delete, move,...) that apply to 11 qualifiers: branch, character, group, etc. All combinations in this matrix are valid commands, including such obscure processes as "Xset Invisible". The table of editing commands therefore contains 88 elements. In addition we include in the first table such one-letter commands as Append, Break, Null file, Quit and Viewspec.

5b1

Table 1.

5b2

	brn	chr	grp	inv	lnk	num	plx	sta	tex	vis	wrd	tot
copy	-	-	-	-	-	-	-	-	-	-	-	-
delt	-	3	-	-	-	-	-	-	-	-	-	3
inst	-	2	-	-	-	-	-	2	1	-	1	6
move	-	-	-	-	-	-	-	-	-	-	-	-
repl	-	1	-	-	-	1	-	-	1	-	1	4
subs	-	-	-	-	-	-	-	-	-	-	-	-
trsp	-	-	-	-	-	-	-	-	-	-	-	-
xset	-	-	-	-	-	-	-	-	-	-	-	-

5b2a

appd 0
brek 1
null 1
quit 0

vspc 1 pt= 45300 rt= 782422

5b2b

The second group is also a matrix of seven operations that may apply to 19 qualifiers, but not all entries are valid commands. The operations are: Execute, Freeze, Goto, Jump, Load, Output and Update.

5b3

Table 2.

5b4

	Exec	Frez	Goto	Jump	Load	Outp	Updt
a	-	-	-	-	-	-	-
b	-	-	-	-	-	-	-
c	-	-	-	-	-	-	-
d	-	-	-	-	-	-	-
e	-	-	-	-	-	-	-
f	-	-	-	-	1	-	-
h	-	-	-	-	-	-	-
i	-	-	-	6	-	-	-
j	-	-	-	-	-	-	-
l	-	-	-	-	-	-	-
m	-	-	-	-	-	-	-
n	-	-	-	-	-	-	1
o	-	-	-	1	-	-	-
p	-	-	-	-	-	-	-
q	-	-	-	-	-	-	-
r	-	-	-	-	-	-	-
s	-	-	-	1	-	-	-
t	-	-	-	-	-	-	-
u	-	-	1	-	-	-	-

5b4a

5b4b

5b4c

In the implementation of an internal counting mechanism for these commands it is not feasible to restrict the analysis to the combinations shown above in Tables 1 and 2, because NLS is an evolving system where new commands appear and disappear: since the beginning of this phase several commands have been added and two have been taken out (Execute WSI measurements and Execute 940 file). The analysis package uses a 30x30 matrix to accumulate command counts, so that it becomes a simple matter to reflect such changes.

5c

In the following we describe how the package can be used as a statistical tool by the individual user (section II) through a set of simple commands, and how we intend to put it to work in a general analysis of DNLS usage (section III). In the last part (section IV) recommendations are offered for the design of the next phase.

5d

II. Using the command analysis package on-line.

6

In the early design stage for this work there was some discussion of the existing statistical commands in NLS. The discussion is documented in the Journal (12793,) (13110,) (13143,) (13191,) and led to the decision to separate timing studies of the Superwatch type from command usage analysis. The "Execute WSI Measurements" command was taken out.

6a

The analysis package which is available for on-line use is part of the "Goto Use Measurements" sub-system and is called by typing the two letters: gu.

6b

There were two sub-commands at this point (Begin and End Measurements) that triggered a timing mechanism which is probably obsolete. (Question: is this code really obsolete and, if so, could we speed up NLS by taking the measurement flag test out of all core-NLS routines?). Pending some decision on this code, I have not touched the "Begin" and "End" subcommands. Remember, however, that they are NOT part of the command usage mechanism, which is ON automatically and requires no user action to initialize it.

6c

G[oto] U[se Measurements] F[requency count]

6c1

is the command that gives a user access to the current state of the matrix. This may be followed by one of the commands:

6c2

D[isplay]
T[ables]
R[eset]
S[ave

6c3

The Display command is intended for debugging and maintenance purposes rather than for general use. It shows the state of the entire string of counters, in rows of ten numbers with a running index to the left

6c4

The Table option overlays the current status of Table 1

over the user's display (which is preserved and can be restored with a Command Delete). Hitting a CA (command Accept) will call Table 2

6c5

The Reset command will reinitialize the counting machinery

6c6

The Save command will i) automatically create a file named QBVMXYZ.LAN in the user's directory if none exists, XYZ being the user's ident, ii) write Table 1 and Table 2 as NLS statements in that file in LIFO fashion, iii) update the file and iv) reset all counters.

6c7

The file that results from use of the Save option is under user control and can be edited, formatted and processed like any other NLS file.

6c8

This set of commands therefore provides a flexible mechanism for monitoring one's own use of DNLS, running special statistical experiments, etc.

6c9

III. Automatic statistics-gathering.

7

Whenever a DNLS session terminates normally, the system executes code that has an effect similar to that of the Save command described above. The statistics that have been accumulated during the session are written out as NLS statements in that user's analysis file.

7a

A user program named "Sweeper" that we intend to run every night will gather up these statements in a single master file and reset the user files so that directory space problems are minimized.

7b

The information gathered into the master file is the following: For each DNLS session,

7c

1) The user ident
2) The date and termination time of the session
3) rt, the real time duration of the session
4) pt, the CPU time used
5) The count statistics obtained for all commands.

7c1

All times are expressed in milliseconds.

7c2

IV. Proposal for next phase.

8

The question arises of processing the information in the master file in order to produce meaningful statistics on the utilization of DNLS commands. The following is a proposal along these lines.

9

1. Daily,

10

A printout of the master file will be produced with viewspecs y and K (statement signatures).

10a

A consolidated table of command usage could be generated. 10b

Time distributions reflecting session duration (both CPU and real time) could be printed out.

10c

2. Weekly,

11

A table showing the distribution of most common DNLS commands for the ten largest users would seem to be a useful result. It would give some indication of variability in user behavior (programmers vs. non-programmers, for instance).

11a

A general table of commands with their overall usage frequency would also be useful, together with a separate table of commands that have not been used at all during that period.

11b

A general user population profile would be a good way of graphically reflecting command usage.

11c

Individual profiles could also be generated, using as a basis the command ranking derived from observation of the entire user population. (See example below from my own experiments).

11d

3. Monthly,

12

We could again produce consolidated tables and profiles. 12a

Some tables could be selected for their usefulness in timing studies. For example, assuming we had ten tables giving CPU time and real time on the basis of ten frequently-used commands, we could solve the linear system to obtain the time coefficients for each command, thus producing a very accurate measure of command efficiency.

12b

4. Example:

13

This proposal can be illustrated by the consolidated tables and a profile obtained from the three DNLS sessions that were required to enter and edit Parts I through IV of the present report.

14

Table 3.

14a

	brn	chr	grp	inv	lnk	num	plx	sta	tex	vis	wrd
copy	-	-	-	-	-	-	-	-	-	-	-
delt	-	7	-	-	-	-	-	-	-	-	1
inst	-	10	-	-	-	-	-	30	1	-	4
move	-	-	-	-	-	-	-	1	-	-	-
repl	-	5	-	-	-	1	-	-	3	-	4
subs	-	-	-	-	-	-	-	-	-	-	-
trsp	-	1	-	-	-	-	-	-	-	-	-
xset	-	-	-	-	-	-	-	-	-	-	-

14b

appd 2
brek 1
null 0
quit 0
vspc 4 pt= 307 sec. rt= 5789 sec.

14b1

The table above was obtained by adding together the elements of three matrices resulting from the three separate DNLS sessions. Similarly we can derive a table of usage for the main subsystems:

14b2

Table 4.

14c

	Exec	Frez	Goto	Jump	Load	Outp	Updt
a	-	-	-	-	-	-	-
b	-	-	-	-	-	-	-
c	-	-	-	-	-	-	-
d	-	-	-	-	-	-	-
e	-	-	-	2	-	-	-
f	-	-	-	-	3	-	-
h	-	-	-	-	-	-	-
i	-	-	-	11	-	-	-
j	-	-	-	-	-	-	-
l	-	-	-	-	-	-	-
m	-	-	-	-	-	-	-
n	-	-	-	-	-	-	4
o	-	-	-	4	-	-	-

14c1

14c2

p	-	-	-	-	-	-	-
q	3	-	-	-	-	3	-
r	-	-	-	-	-	-	-
s	-	-	-	7	-	-	-
t	-	-	-	-	-	-	-
u	-	-	3	-	-	-	-

14c3

These tables lead to the following ranking of commands:

Table 5.

15

30	is	5	rc	4	iw	3	eq	1	rn
11	ji	4	v	3	rt	2	a	1	it
10	ic	4	rw	3	lf	2	je	1	ct
7	dc	4	jo	3	oq	1	dw	1	ms
7	js	4	un	3	gu	1	b		

15a

And they result in the following profile:

16

```
is  ********************************
ji  ***********
ic  **********
dc  *******                                                    16a

js  *******
rc  *****
v   ****
rw  ****
jo  ****
un  ****
iw  ****
rt  ***
lf  ***
oq  ***                                                        16b

gu  ***
eq  ***
a   **
je  **
dw  *
b   *
rn  *
it  *
ct  *
ms  *
```

16c

These measurements indicate that in the course of the three sessions, 24 commands appeared, of which 18 were used more than once, and six more than five times. The timing studies also lead to an estimate of the overall cost of producing such a document, which (at current BBN rates) would be of about $50 for computer

cost alone.

17

There are probably many other useful results that could be derived from the information contained in the master file as described above. In a future phase, the timing studies could be refined and they could be combined with an analysis of command sequences.

18

V. Results of monitoring the experimental system.

19

During the first weeks of January, the monitoring facility was implemented in the experimental system. We saved the measurements obtained in a limited number of sessions by five different users. Their primary activity was text-editing and viewing. Although the total amount of connect time was small (about eight hours) the results show some interesting facts. The following table lists the commands that account for 50% and 75 % of overall usage.

19a

Table 6: Experimental system.

	JFV	CHI	MDK	JFV	-PR	JFV	total	CHI	JBN	DVN	total	cumul
ji	11	6	5	4	18	3	47	1	4	29	81	81
is	30		14			8	52	3	2	8	65	146
ic	10		3		8		21	3		22	46	192
jl		5		1		1	7	3		27	37	229
v	4			7		1	12	8	12		32	261
js	7	3		2		5	17	2	1	7	27	288
lf	3		1	6	1	5	16		4	7	27	315
dc	7		8		5		20			3	23	338
jo	4			3	2	3	12		1	7	20	379
rc	5		2		2		9	1	1	6	17	396
it	1		1				3			15	17	413

rw	4	1	3			8	1		7	16		
429												36
jb									16	16		
445												37
un	4	2	1	3	1	11	2	1	1	15		
460												38
rt	3			1		4		1	7	12		
472												39
a	2		1		8	11				11		
483												40
gu	3			1		4			6	10		
493												41
jc				2	1	3			7	10		
503												42
jr		2				2			7	10		
513												43

44

In the next table are the commands that were used less than ten times in this series of sessions, i.e. those commands used in the lower 25% of the command usage.

45

Table 7. Experimental system (cont.) Lower 25% 46

													47
iw	4	1	3				8				1	9	48
ds					3		3	1	1	4		9	49
oq	3			1	1	3	8			1		9	50
dt					4		4			4		8	51
ju		2	1	1	1	3	6			1		7	52
gp								3		4		7	53
eq	3		1	1			5		1	1		7	54
mb			1		2		3		1	3		7	55
mg					6		6					6	56
je	2			1	1		4			2		6	57
jn				4			4			2		6	58
gd				5			5					5	59
mc			1		1		2			3		5	60
jd						1	1			4		5	61
ms	1	1	1				3	2				5	62
n				4			4					4	63
od						1	1			3		4	64
dg		1	1				2	2				4	65
jp					2	1	3		1			4	66
b	1	1	1		1		4			1		4	67
rn	1						1			3		4	68
q		1				2	3					3	69

ej							1		2	3	70
es									3	3	71
ct	1					1			2	3	72
jt									3	3	73
dp			3			3				3	74
ja			2			2				2	75
cs		1				1		1		2	76
cb			2			2				2	77
el				1		1		1		2	78
tc				1		1			1	2	79
cg				1		1				1	80
mt									1	1	81
cc					1	1				1	82
dw	1					1				1	83
ed		1				1				1	84
uo									1	1	85
jh				1		1				1	86
xw									1	1	87
fr								1		1	88
rv							1			1	89
tn									1	1	90
											91

to	115	29	49	53	72	41	359	36	34	252	681	92
pt	307	79	89	126	101	89	791	55	70	442	1358	93
rt	5789	977	1621	1281	2082	4574	16324	1444	2011	8382	28161	94
r1	2.7	2.7	1.8	2.4	1.4	2.1	2.2	1.5	2.0	1.7	1.9	95
r2	50.3	33.4	33.1	24.1	28.8	111.5	45.4	40.1	59.1	33.2	41.3	96

r1: process time per command, seconds.
r2: real time per command, seconds.

97

From this experiment we derive a first evaluation of the average cpu time per DNLS commandd (1.9 seconds) and of the average real time per command: 40 seconds. It is interesting to compare these figures to similar measurements under normal running conditions.

98

VI. Results of monitoring in the running system.

99

The measurement system was turned on in the running DNLS and statistics were gathered for eleven users during an entire day (January 22). The master file was then analyzed leading to the statistics of Tables 8 and 9 below. (Sessions by Kirk were distributed into two groups, KK1 and KK2.)

100

Table 8 shows the commands representing 50% and 75% of total usage.

101

Table 8. Running System. 102

DNLS command usage statistics for one day.

103

user		JEW	DVN	JCN	JBN	EKM	MDK	KK1	KK2	CHI	JAK	MFA	DCE	total
1	ji	21	5	59	21		3	122	39	1	17	7	8	303
2	is	11		6	19		11	58	33	1	2	2	1	144
3	rw	2		29	2			44	29			2	2	110
4	lf	12	4	25	23		3	5	6		3		12	93
5	ic	7	3	7	6			31	31	2	3	1	1	92
6	jl	17	9	19	7	3		6	3	6	1	5	3	79
7	jf	3	5	18	6			16	12			7	6	73

104 105 106 107 108 109 110 111 112

8	iw	2		1			42	18		2				113
65														
9	ms	4			1		1	28	26					114
60														
10	gd	5	2	9	2			23	12		2		1	115
56														
11	rc	4		3	9			13	16		6	2	2	116
55														
---														117
12	dc	2		7	13		3	12	11	1	3	2		118
54														
13	js	11	1	12	5		11	3	3	3				119
49														
14	jo	5	1	18	12			7	3		2			120
48														
15	ds	4	2		4		1	10	9	1	16			121
47														
16	gu		1	30				13						122
44														
17	jr	3	4	8				20	5				1	123
41														
18	jp	2			5	1		21	6	1	3		1	124
40														
19	rt	1		1	8		1	6	12		10			125
39														
20	dw	3		1				27	6					126
37														
21	dt	3		1	14			9	6				2	127
35														
22	mb	3	1	2	9		12	8						128
35														

23 v 1 11 21 1
34 129

24 it 23 8 3
34 130

131

Table 9 lists the commands accounting for the remaining 25%:

Table 9. Running system (cont.)

DNLS command usage statistics for one day.

	user	JEW	DVN	JCN	JBN	EKM	MDK	KK1	KK2	CHI	JAK	MFA	DCE	total
25	uo		2	11				12	8					33
26	ju	2		1			1	20	5				2	31
27	b	5		3	2			9	8					27
28	jh			2			2	15	7			1		27
29	a	1	3	2				5	9			1		21
30	mg	3		1				8	8					20
31	cs	1		1	1			11	6					20
32	oq	2	2	5	2		2	1	1	2			1	18
33	gp	6		2		3				4			2	17
34	eq	1	3	1	6	4					1			16
35	ct			10			2	1	1					14

36	cw	1					7	6							
14															149
37	el	1		1	1		1	2	3	1	1	1	2		
14															150
38	xw			2				7	5						
14															151
36	db			2	5				2			3	1		
13															152
37	un	6			5		1		1		3	1	6		
11															153
38	of	1		1	2			3	3		1				
11															154
39	eu			10									1		
11															155
40	je	2	1		1	2		3	1						
10															156
41	ja	2						8							
10															157
42	rs							3	6						
9															158
43	dg	1	1				1	2	3						
8															159
44	mc			1	3			2	2						
8															160
45	mt	1					1	3	2						
7															161
46	mp	2						3	2						
7															162
47	jc	5						1	1						
7															163
48	gs			4			3								
7															164

49	dv	1				2	3						
6													165
50	rv	3				1	2						
6													166
51	cc			1		3	2						
6													167
52	jd		3	1			1		1				
6													168
53	xc		1	1		4							
6													169
54	jt		1			2	1		1		1		
6													170
55	jb	1	1			2	1						
5													171
56	rg					4	1						
5													172
57	ej		1			1	2	1					
5													173
58	od		2	3									
5													174
59	n	2		1	1								
4													175
60	ed	3					1						
4													176
61	mw					3	1						
4													177
62	xs			1		3							
4													178
63	tw					3					1		
4													179
64	q		2					2					
4													180

65	fs	2		2							
4											181
66	cb			2			2				
4											182
67	tc	1	1					1			
3											183
68	jn				1		1		1		
3											184
69	er		3								
3											185
70	cg	1					1	1			
3											186
71	di					2		1			
3											187
72	sp	2						1			
3											188
73	tt						1	2			
3											189
74	cv			2							
2											190
75	cp							2			
2											191
76	gn	1							1		
2											192
77	dl	1					1				
2											193
78	rp						2				
2											194
79	iv						1	1			
2											195
80	tv			2							
2											196

```
 81 fr                    1
1                                                                197

 82 fa              1
1                                                                198

 83 ip         1
1                                                                199

 84 ii         1
1                                                                200

 85 ea              1
1                                                                201

 86 ei                                                  1
1                                                                202

 87 sv              1
1                                                                203

 88 cl                              1
1                                                                204

 89 tb                              1
1                                                                205

 90 ts                                   1
1                                                                206

 91 mi                                   1
1                                                                207

 92 ri                                   1
1                                                                208

 93 rl   1
1                                                                209

 94 rb                                        1
1                                                                210

 95 sw                                   1
1                                                                211

 96 gb                                       1
1                                                                212
```

```
-------------------------------------------------------------------
-----                                                              213

total 187   65  342   248   13   68   690   404  29   82   36
57 2219                                                            214

pt    419  386  475   418   88   60   778   587 102  300   65
96 3774                                                            215

rt   6833 1373 4812 16243 3550  618 23240 24105 720 4787 1061
2294                                                               216

-------------------------------------------------------------------
-----                                                              217

r1    2.2  5.9  1.4   1.7  6.8  0.9   1.1  1.4  3.5  3.7  1.8
1.7  1.7                                                          218

r2   36.5 20.5 13.6  65.5 273.1 9.1  33.1 58.8 58.8 58.4 29.5
40.2 40.4                                                          219


total cpu time: 1 hour.
total connect time: 25 hours

average cpu time per DNLS command: 1.7 seconds.
average real time per DNLS command: 40 seconds.                    220

-------------------------------------------------------------------
-----                                                              221
```

CONCLUSIONS

222

Monitoring of the DNLS command language both in experimental and in normal running conditions shows that less than twelve commands account for 50% of overall usage, and about 23 commands account for 75% of total usage.

223

Table 10. Usage of subsystems.

223a

	Exec	Frez	Goto	Jump	Load	Outp	Updt
							223a1
a	1	1		10		-	
b	-		1	5			
c	-		-	7		-	
d	4		56	6		5	
e	-		-	10			
f	-			73	93	11	
h				27			
i	1			303			
j	5						
l	14			79	-		
m	-		-				223a2
n	-		2	3			11
o	-			48			33
p			17	40			
q	16					18	
r	3	1		41			
s	-	4	7	49		-	
t	-			6			
u	11		44	31			
							223a3
TOT	55	6	127	738	93	34	87
							223a4

Table 11. Usage of Editing commands.

223a5

	brn	chr	grp	inv	lnk	num	plx	sta	tex	vis	wrd	total
copy	4	6	3	-	1	-	2	20	14	2	14	66
delt	13	54	8	3	2	-	-	47	35	6	37	205

inst	-	92	-	1	-	-	-	144	34	2	65	338
move	35	8	20	1	-	-	7	60	7	-	4	142
repl	1	55	5	1	1	-	2	9	39	6	110	229
subs	-	-	-	-	-	-	3	-	-	1	1	5
trsp	1	3	-	-	-	-	-	1	3	2	4	14
xset	-	6	-	-	-	-	-	4	-	-	14	24
TOT	54	224	36	6	4	-	14	285	132	19	249	1023

223a6

```
appd 21
brek 27          Total cpu time: 1 hour
null  4          Total connect time: 25 hours
quit  4
vspc 34
```

223a7

It is interesting to observe how close the estimates of cpu time per command and connect time per command are found for the experiemntal and the running conditions, respectively 1.9 vs. 1.7 and 41.3 vs.40.4 seconds.

224

We propose to periodically conduct such analyses of command frequency (every six months, for instance) in order to monitor changing usage patterns of our system.

225

One possibly fruitful application of this set of statistics would be to speed-up the DNLS processor. The results presented above (especially those of Tables 10 and 11) indicate that there is a set of about twelve to twenty commands that could be regarded as primary candidates for such an optimization effort.

226

226a

227

(J14170) 1-FEB-73 14:57; Title: Author(s): Vallee, Jacques F./JFV;
Distribution: 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., Page, Cindy, Paxton, William H., Peters, Jeffrey C., Ratliff,
Jake, Van De Riet, Edwin K., Van Nouhuys, Dirk H., Victor, Kenneth E.
(Ken), Wallace, Donald C. (Smokey), Watson, Richard W., Andrews, Don
I./SRI-ARC; Sub-Collections: SRI-ARC; Clerk: JFV;
Origin: <VALLEE>MAGICK.NLS;6, 30-JAN-73 16:03 JFV ;

KIRK 31-JAN-73 20:33 14171

A couple of nteresting bugs with right access and delete branch.

I did 6 hard to find edits in <SIGART> directory before the system decided that I didn't have right access. These edits appeared to me to have been made when I made them but weren't there after I went out and connected to the directory. I did not have a partial copy and did not try to update. 1

Also, when I first logged in, I deleted some journal messages and was attempting to delete the whole journal branch but instead it displayed everything as if I hadn't deleted it except for the first (JOURNAL) statement which it replaced (without deleting) by copying the next first level statement (a couple of links). I did this 3 times before finally thinking of doing a recreate display after which everyting I had bugged to delete dissappeared. I did not have viewspec v on and had not used it, but it sounds like a mixed up implementation of it. 2

KIRK 31-JAN-73 20:33 14171

A couple of nteresting bugs with right access and delete branch.

(J14171) 31-JAN-73 20:33; Title: Author(s): Kelley, Kirk E./KIRK;
Distribution: Kaye, Diane S., Lehtman, Harvey G., Irby, Charles H.,
Kaye, Diane S., Wallace, Donald C. (Smokey)/bugs dsk dcw ;
Sub-Collections: SRI-ARC BUGS; Clerk: KIRK;
Origin: <SIGART>BUG.NLS;1, 31-JAN-73 20:20 KIRK ;

NJN 1-FEB-73 7:53 14172

Random items

Hi, Dirk. 1

Thanks for sending the mss. I haven't received it yet, but I got your message. 2

Thanks also for the latest NLS tip, though I must say that Dave asks alot of questions that he could easily figure out for himself. Why aren't people more self-reliant in this world? 3

I get so many questions and complaints from people, that only sheer laziness could have prompted them to ask. 3a

Maybe it has something to do with overspecialization. 3b

Actually i have figured out some nice things about moving and copying from one file to another, but only after getting myself in big trouble. 4

At one point I went over allocation and discovered that NLS freezes up when that happens. After screwing around trying to get myself out of that bind, I managed to only lose one journal message, and save the rest of my files. 4a

Any further word on updating initial files. I haven't tried it since my disastrous day. 5

Business: Is there any way of getting a copy of the NLS system to put on BBN-TENEX. Someone in the tenex group is interested in NLS as an editor (specifically DNLS) but it is impossible to run it over the net, i.e. going through two tenexes. 6

What I mean is permission to have it. Transferring it is simple. Who gets asked about this, Doug? 6a

Also they have asked me to demonstrate DNLS. I mentioned shared screen, which would be helpful to me in that I still don't know how to do alot of things, not having had time to practice. 6b

That's about all. Been too upset and busy to answer your letter. Maybe this weekend. 7

Nancy 8

Random items

(J14172) 1-FEB-73 7:53; Title: Author(s): Neigus, Nancy J./NJN; Distribution: Van Nouhuys, Dirk H./DVN; Sub-Collections: NIC; Clerk: NJN;

NJN 1-FEB-73 8:01 14173

FTP Mail

Mike-- Has there been any progress in implementing the FTP mail facility at the NIC? People at BBN-Tenex are very interested in seeing it happen. It is hoped that this will deposit mail through NLS into the user's initial file, presuming of course that the NIC ident was specified. Then the new Journal subsystem could be used to read it. Implementation of this would keep alot of users from tying up your system just to send mail. Comments or status information would be appreciated. Thanks --Nancy 1

NJN 1-FEB-73 8:01 14173

FTP Mail

(J14173) 1-FEB-73 8:01; Title: Author(s): Neigus, Nancy J./NJN;
Distribution: Kudlick, Michael D./MDK; Sub-Collections: NIC; Clerk: NJN;

RWW 1-FEB-73 8:27 14174

Seminar Wed Feb 7 on NLS Internal Measuremnts

The seminar at 3:00 nest Wed will be by Don Andrews talking about the view of NLS he is seeing from trace and other internal system measurements. 1

RWW 1-FEB-73 8:27 14174

Seminar Wed Feb 7 on NLS Internal Measuremnts

(J14174) 1-FEB-73 8:27; Title: Author(s): Watson, Richard W./RWW; Distribution: 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., Page, Cindy, Paxton, William H., Peters, Jeffrey C., Ratliff, Jake, Van De Riet, Edwin K., Van Nouhuys, Dirk H., Victor, Kenneth E. (Ken), Wallace, Donald C. (Smokey), Watson, Richard W., Andrews, Don I./sri-arc ; Sub-Collections: SRI-ARC SRI-ARC; Clerk: RWW;

SRL 5-FEB-73 12:59 14176

Transmittal to Richard E. Sweet

ARPA Network Information Center
Stanford Research Institute
Menlo Park, California 94025

NIC 14176
5-FEB-73

1

2

TRANSMITTAL TO: Richard E. Sweet
Xerox PARC
Computer Systems Bldg.
3180 Porter Drive
Palo Alto, CA 94304

3

FROM: Susan Lee (SRI-ARC)
Station Agent

4

5

At the request of Harvey Lehtman (SRI-ARC) I am enclosing the following documents:

6

NIC 7052 L10 A Programming Language for the Augmentation Research Center 6a

NIC 13136 In the L10 Compiler: "FLAG" is really a reserved symbol <sometimes> 6b

NIC 13510 Changes and Additions to the L10 Compiler 6c

NIC 10226 L10 Change 6d

NIC 10561 L10 Changes 6e

SECTION 7 and SECTION 8 of NIC 9246 L10 Programming Guide 6f

Transmittal to Richard E. Sweet

(J14176) 5-FEB-73 12:59; Title: Author(s): Lee, Susan R./SRL;
Distribution: Agent, Station/SA; Sub-Collections: SRI-ARC; Clerk: LLL;
Origin: <LANE>NIC-14176.NLS;1, 5-FEB-73 12:57 LLL ;

Transmittal to John Melvin

ARPA Network Information Center
Stanford Research Institute
Menlo Park, California 94025

NIC 14177
5-FEB-73

1

2

TRANSMITTAL TO: John Melvin
University of Southern California
Information Sciences Institute
4676 Admiralty Way
Marina Del Rey, CA 90291

3

FROM: Susan Lee (SRI-ARC)
Station Agent

4

5

At your request, I am enclosing two copies of the following document:

6

NIC 7052 L10 A Programming Language for the Augmentation Research Center

6a

Transmittal to John Melvin

(J14177) 6-FEB-73 16:04; Title: Author(s): Lee, Susan R./SRL;
Distribution: Agent, Station/SA; Sub-Collections: SRI-ARC; Clerk: LLL;
Origin: <LANE>NIC-14177.NLS;2, 6-FEB-73 10:17 LLL ;.GPN=-1;

Transmittal to K. Sakurai

ARPA Network Information Center NIC
14178
Stanford Research Institute
5-FEB-73
Menlo Park, California 94025 1

2

TRANSMITTAL TO: K. Sakurai, Director
Maruzen Company, Ltd.
Book Department
P.O. Box 5050
Tokyo International 100-31
JAPAN 3

FROM: Susan Lee (SRI-ARC)
Station Agent 4

At your request I am enclosing the following documents: 5

NIC 14045 Tree Meta Report -- Preliminary Draft; 25-MAR-71 5a

NIC 14046 Tree Meta Report -- Preliminary Draft 5b

Transmittal to K. Sakurai

(J14178) 5-FEB-73 12:20; Title: Author(s): Lee, Susan R./SRL;
Distribution: Agent, Station/SA; Sub-Collections: SRI-ARC; Clerk: LLL;
Origin: <LANE>NIC-14178.NLS;1, 5-FEB-73 12:13 LLL ;

Letter to Packet Radio Group Members

ARPA Network Information Center
Stanford Research Institute
Menlo Park, California

NIC 14181
9 APR 73

TO: Packet Radio Group Members

FROM: Susan Lee (SRI-ARC)

SUBJECT: Packet Radio Temporary Notes #16 and #19

For some reason there has been a problem with the numbering of Packet Radio notes. I would like to ask that you check your copies of notes 16 and 19 and change the numbers as follows:

Note #16 should be NIC #13861.

NOTE #19, Spread-Spectrum Considerations, should be NIC #13878.

If you have made further distribution of these notes please check all copies to avoid confusion in the future.

Letter to Packet Radio Group Members

(J14181) 6-APR-73 11:19; Title: Author(s): Lee, Susan R. /SRL;
Distribution: /SA; Sub-Collections: SRI-ARC; Clerk: LLL;
Origin: <LANE>NIC14181.NLS;2, 6-APR-73 11:17 LLL ;

SRL 22-FEB-73 21:19 14183

TRANSMITTAL TO: Ira W. Cotton

TRANSMITTAL TO: Ira W. Cotton
National Bureau of Standards
B-216 Technology
Washington, D.C. 20234

FROM: Susan Lee (NIC)
Station Agent 1

At your request we are sending the following documents: 1a

NIC 11076 Introduction to OUTPUT PROCESSOR USERS GUIDE
NIC 11077 OUTPUT PROCESSOR USERS GUIDE 1a1

SRL 22-FEB-73 21:19 14183

TRANSMITTAL TO: Ira W. Cotton

(J14183) 22-FEB-73 21:19; Title: Author(s): Lee, Susan R. /SRL ;
Distribution: /SA ; Sub-Collections: NIC ; Clerk: KIRK ;

SRL 22-FEB-73 21:18 14184

TRANSMITTAL TO: William McNally

TRANSMITTAL TO: William McNally
NASA Lewis Research Center
Mail Stop 5-9
21000 Brookpark Rd.
Cleveland, Ohio 44135

FROM: Susan Lee (NIC)
Station Agent

**1

At your request we are sending the following documents: 1a

NIC 7104 Current Network Protocols
NIC 10814 TNLS BEGINNERS GUIDE 1a1

The procedures for using the Journal are being updated and a copy will be sent to you in a couple of weeks. 1b

SRL 22-FEB-73 21:18 14184

TRANSMITTAL TO: William McNally

(J14184) 22-FEB-73 21:18; Title: Author(s): Lee, Susan R. /SRL ;
Distribution: /SA ; Sub-Collections: NIC ; Clerk: KIRK ;

SRL 22-FEB-73 21:21 14185

TRANSMITTAL TO: Ron Stoughton

TRANSMITTAL TO: Ron Stoughton
Computer Systems Laboratory
% Computer Center
University of California at Santa Barbara
Santa Barbara, California 93106

FROM: Susan Lee (NIC)
Station Agent 1

At the request of Jim White (SRI-ARC), I am sending you the following documents. 1a

NIC 10703-8, 10713 DNLS PRELIMINARY REFERENCE GUIDE 1b

SRL 22-FEB-73 21:21 14185

TRANSMITTAL TO: Ron Stoughton

(J14185) 22-FEB-73 21:21; Title: Author(s): Lee, Susan R. /SRL ;
Distribution: /SA ; Sub-Collections: NIC ; Clerk: KIRK ;

SRL 22-FEB-73 21:14 14186

TRANSMITTAL TO: Dr. Estil V. Hoversten

TRANSMITTAL TO: Dr. Estil V. Hoversten
Defense Communications Agency
Attention: Code 101C
Washingtong D.C. 20305

FROM: Susan Lee (NIC)
Station Agent 1

At the request of Robert E. Kahn, your name has been placed on the ARPANET Satellite System Group distribution list. 1a

I am enclosing the ASS Notes which have been issued to date. Notes 13, 14, and 23 are obsolete. You will receive all new ASS Notes as they are distributed. 1b

encl: 1c

11283	11284	11285	11286	11287	11288	11289
11290	11291	11292	11293	11294	11616	11624
11862	11865	11866	11867	12166	12534	12734
12735	12736	12744	12759	13044	13150	13147
13469	13647	11881				

1c1

SRL 22-FEB-73 21:14 14186

TRANSMITTAL TO: Dr. Estil V. Hoversten

(J14186) 22-FEB-73 21:14; Title: Author(s): Lee, Susan R. /SRL ;
Distribution: /SA ; Sub-Collections: NIC ; Clerk: KIRK ;

1

Transmittal to Station Agents -- 71 NIC 14190
Jeanne North 23 FEB 73 2

3

Enclosed: 4

NIC 13846 *Online Group Membership Lists and Indexes to Notes; Jeanne North JBN (SRI-ARC) 4a

NIC 13859 Papers Presented at ARPA CONTRACTORS MEETING, San Diego, California; January 8-9-10, 1973 4b

NIC 13887 TIPUG Note #7 TIP User's Group Distribution List Update; Phyllis Hauser (BBN-NET) 4c

NIC 14133 *RFC #449; INWG Note 18, The Current Flow-control Scheme for IMPSYS. Dave Walden (BBN-NET) 4d

NIC 14317 *NWG/RFC #453 Meeting Announcement to Discuss a Network Mail System; Michael D. Kudlick MDK (SRI-ARC) 4e

5

JBN 22-FEB-73 18:52 14190

Transmittal to Station Agents -- 71

*sent to Liaisons 6

14190 Distribution

Van De Riet, Edwin K. , Van Nouhuys, Dirk H. , Victor, Kenneth E. (Ken) , Wallace, Donald C. (Smokey) , Watson, Richard W. , Andrews, Don I. ,
Agent, Station , Hoffman, Carol B. , Lee, Susan R. , Michael, Elizabeth K. , Dornbush, Charles F. , APC, 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

JBN 22-FEB-73 18:52 14190

Transmittal to Station Agents -- 71

(J14190) 22-FEB-73 18:52; Title: Author(s): North, Jeanne B. /JBN ;
Distribution: /SA SRI-ARC ; Sub-Collections: NIC SRI-ARC; Clerk:
KIRK ;

SRL 22-FEB-73 19:39 14191

TRANSMITTAL TO: Robert Clements

TRANSMITTAL TO: Robert Clements
Bolt Beranek and Newman Inc.
50 Moulton Street
Cambridge, Massachusetts 02138

FROM: Susan Lee (NIC)
Station Agent 1

At your request we are sending the following documents: 1a

NIC 13011 RFC 426 Reconnection Protocol
NIC 13774 RFC 442 The Current Flow-Control Scheme for IMPSYS 1a1

SRL 22-FEB-73 19:39 14191

TRANSMITTAL TO: Robert Clements

(J14191) 22-FEB-73 19:39; Title: Author(s): Lee, Susan R. /SRL ;
Distribution: /SA ; Sub-Collections: NIC ; Clerk: KIRK ;

SRL 22-FEB-73 19:41 14192

TRANSMITTAL TO: Robert Braden

TRANSMITTAL TO: Robert Braden
Campus Computing Network
5308 Math Sciences Building
University of California at Los Angeles
Los Angeles, California 90024

FROM: Susan Lee (NIC)
Station Agent 1

At the request of Connie Rosewall (UCSB), I am enclosing the following documents: 1a

NIC 5480		An NCP for the ARPA Network
NIC 5831	RFC 119	Network FORTRAN Subprograms
NIC 5832	RFC 120	Network PL1 Subprograms 1a1

SRL 22-FEB-73 19:41 14192

TRANSMITTAL TO: Robert Braden

(J14192) 22-FEB-73 19:41; Title: Author(s): Lee, Susan R. /SRL ;
Distribution: /SA ; Sub-Collections: NIC ; Clerk: KIRK ;

SRL 22-FEB-73 21:16 14193

TRANSMITTAL TO: Miles Fidelman

TRANSMITTAL TO: Miles Fidelman
P. O. 145
Prudential Center
Boston, Mass 02119

FROM: Susan Lee (NIC)
Station Agent 1

At your request we are sending the following documents: 1a

NIC 10508 The Terminal IMP for the ARPA computer network
NIC 7590 NIC User Guide
NIC 10916 Terminal Interface Message Processor User's Guide 1a1

The last half of the NIC User Guide is being updated and I'll send you a copy in a couple of weeks. 1b

SRL 22-FEB-73 21:16 14193

TRANSMITTAL TO: Miles Fidelman

(J14193) 22-FEB-73 21:16; Title: Author(s): Lee, Susan R. /SRL ;
Distribution: /SA ; Sub-Collections: NIC ; Clerk: KIRK ;

SRL 22-FEB-73 19:42 14194

TRANSMITTAL TO: Jerry Burchfiel

TRANSMITTAL TO: Jerry Burchfiel
Bolt Beranek and Newman Inc.
50 Moulton Street
Cambridge, Massachusetts 02138

FROM: Susan Lee (NIC)
Station Agent 1

At your request we are sending the following documents: 1a

NIC 7182 Net RJS Remote Operator Commands
NIC 7183 Campus Computing Network RJS 1a1

SRL 22-FEB-73 19:42 14194

TRANSMITTAL TO: Jerry Burchfiel

(J14194) 22-FEB-73 19:42; Title: Author(s): Lee, Susan R. /SRL ;
Distribution: /SA ; Sub-Collections: NIC ; Clerk: KIRK ;

NOTE TO STATION AGENTS: 2/15/73

Regarding NIC 14188--This document has been sent to Liaisons, but due to its size will be made available to Station Agents only on special request.

Transmittal to Station Agents -- 72
Jeanne North

NIC 14204
15-FEB-73

Enclosed:

NIC 13299	*NWG/RFC #430, Comments on File Transfer Protocol; R.T. Braden (UCLA)
NIC 13773	*NWG/RFC #441, Inter-Entity Communication--An Experiment; Bob Bressler/Bob Thomas (BBN)
NIC 14136	*NWG/RFC #452, TELNET Command at Host LL; Joel Winett (LL)
NIC 14188	*INWG Note 17 and NMG Note 12; Throughput in the ARPA Network--Analysis and Measurement; John M. McQuillan (BBN)
NIC 14375	*NWG/RFC #455, Traffic Statistics (January 1973); A. McKenzie (BBN)
NIC 14376	*NWG/RFC #456, Memorandum; M.D. Kudlick (SRI)
NIC 14416	*NWG/RFC #461, TELNET Protocol Meeting Announcement; A. McKenzie (BBN)
NIC 14417	*Advanced Notice of an RFC re: FTP Meeting; A. McKenzie (BBN)

*sent to Liaisons

SRL 22-FEB-73 19:40 14205

TRANSMITTAL TO: Kim Gostelow

TRANSMITTAL TO: Kim Gostelow
ONSENOORT - 46
Amsterdam, Buitenveldert
NETHERLANDS

FROM: Susan Lee (NIC)
Station Agent 1

At the request of Vint Cerf (SU-ERL), I am enclosing the following documents. 1a

NIC 12174 Network Measurement Group Note 10
NIC 10942 Network Measurement Group Note 7
NIC 10352 Network Measurement Group Note 2 1a1

SRL 22-FEB-73 19:40 14205

TRANSMITTAL TO: Kim Gostelow

(J14205) 22-FEB-73 19:40; Title: Author(s): Lee, Susan R. /SRL ;
Distribution: /SA ; Sub-Collections: NIC ; Clerk: KIRK ;

ARPA Network Information Center
Stanford Research Institute
Menlo Park, California 94025

NIC 14211
20 FEB 73

TRANSMITTAL TO: Liaisons, Associates, and Station Agents

FROM: Susan Lee (NIC)
Station Agent

Enclosed is an update to NIC 10916, the TIP User's Guide. Instructions are enclosed for the insertion of these updated pages.

SRL 22-FEB-73 19:38 14213

TRANSMITTAL TO: Margaret Iwamoto

TRANSMITTAL TO: Margaret Iwamoto
University of Hawaii
THE ALOHA SYSTEM
2540 Dole Street
Honolulu, Hawaii 96822

FROM: Susan Lee (NIC)
Station Agent 1

At your request we are sending the following document: 1a

NIC 9635 RFC 318 Suggested Telnet Protocol Changes 1a1

SRL 22-FEB-73 19:38 14213

TRANSMITTAL TO: Margaret Iwamoto

(J14213) 22-FEB-73 19:38; Title: Author(s): Lee, Susan R. /SRL ;
Distribution: /SA ; Sub-Collections: NIC ; Clerk: KIRK ;

TRANSMITTAL FOR NIC 6740 - LETTER 9 NIC 14229
ARPA Network Information Center
Stanford Research Institute (ARC) 6-FEB-73

This letter transmits the following documents which together constitute the functional document NETWORK RESOURCE NOTEBOOK, NIC 6740. 1

NIC 6740	p. i, p. ii	Feb. 1973	1a
NIC 13490	ARPAnet Map	Jan. 1973	1b
NIC 14215	AMES-67	Feb. 1973	1c
NIC 14227	BBN-TENEX	Feb. 1973	1d
NIC 12163	(Figure in NIC 14227)	Oct. 1973	1e
NIC 14216	LL-TX2	Feb. 1973	1f
NIC 14217	MIT-DMCG	Feb. 1973	1g
NIC 10279	(Figure in NIC 14217)	Jul. 1971	1h
NIC 14218	MIT-ML	Feb. 1973	1i
NIC 14219	MIT-MULTICS	Feb. 1973	1j
NIC 14220	SRI-AI	Feb. 1973	1k
NIC 10277	(Figure in NIC 14220)	Jul. 1971	1l
NIC 14228	SRI-ARC	Feb. 1973	1m
NIC 10274	(Figure in NIC 14228)	Mar. 1972	1n
NIC 14221	SU-AI	Feb. 1973	1o
NIC 14222	UCLA-CCN	Feb. 1973	1p
NIC 14223	UCSB-MOD75	Feb. 1973	1q
NIC 14224	USC-ISI	Feb. 1973	1r
NIC 14225	UTAH-10	Feb. 1973	1s

Also enclosed are a notebook with a set of dividers. Please retain all of the section dividers sent to you even though several of the sections do not at this time have any text in them. We will be sending you the text to insert as soon as it is available. 2

You should also retain NIC 7120, Functional Documents and Their Revision; the Transmittal Letter divider, and any transmittal letters (such as this one). 3

Distribution of the Resource Notebook is made from: 4

ARPA Network Information Center
Stanford Research Institute
Augmentation Research Center
333 Ravenswood Avenue
Menlo Park, California 94025 4a

TRANSMITTAL FOR NIC 6740 - LETTER 9 NIC 14229
ARPA Network Information Center
Stanford Research Institute (ARC) 6-FEB-73

If you have any questions, contributions, problems, or complaints, please direct them to Jake Feinler, Caretaker of the Resource Notebook, (415) 329-0740. 5

TRANSMITTAL FOR NIC 6740 - LETTER 9 NIC 14229
ARPA Network Information Center
Stanford Research Institute (ARC) 6-FEB-73

(J14229) 6-FEB-73 15:19; Title: Author(s): Feinler, Elizabeth J. (Jake)/JAKE; Distribution: Agent, Station/SA; Sub-Collections: SRI-ARC; Clerk: LLL;
Origin: <STATION-AGENT>JAKETRANS6740.NLS;2, 6-FEB-73 14:11 LLL ;

DCE 2-FEB-73 13:50 14245

Abstract for NCC paper 'Design considerations for Knowledge Workshop Terminals'

For National Computer Conference, June 73, New York City; abstract sent to Ira Cotton, NBS, chairman of session on 'Intelligent Terminals'.

Abstract for NCC paper 'Design considerations for Knowledge Workshop Terminals'

This paper assumes that: "intelligent terminals" will come to be used very, very extensively by knowledge workers of all kinds; terminals will be their constant working companions; service transactions through their terminals will cover a surprisingly pervasive range of work activity, including communication with widely distributed people; the many computer-aid "tools" thus accessible will represent a thoroughly coordinated "knowledge workshop"; most of these users will absorb a great deal of special training toward effectively harnessing their respective workshop systems -- in special working methods, conventions, concepts, and procedural and operating skills. 1

We have ten years of concentrated experience in developing and using terminal systems whose evolution has been explicitly oriented toward such a future environment; from this background, two special topics are extracted for this paper: 2

What we have learned about and the means we have evolved for controlling interactive-display services: the particular devices (mouse, keyset, keyboard), feedback, and protocol/skill features; and design data, usage techniques, learnability experience, and relevant needs and possibilities for alternatives and extensions. 2a

Our considerations and attitudes regarding distribution of function between terminal and remote/shared resources -- including assumptions about future-terminal service needs, our networking experience, and foreseen trends in the associated technologies. 2b

DCE 2-FEB-73 13:50 14245

Abstract for NCC paper 'Design considerations for Knowledge Workshop Terminals'

(J14245) 2-FEB-73 13:50; Title: Author(s): Engelbart, Douglas C./DCE ; Distribution: Cotton, Ira W., Norton, James C., Watson, Richard W., Irby, Charles H., Andrews, Don I., Bass, Walt, Dornbush, Charles F., Hardy, Martin E., Hopper, J. D., Kaye, Diane S., Kudlick, Michael D., Lehtman, Harvey G., Norton, James C., Rech, Paul, Vallee, Jacques F., Van Nouhuys, Dirk H., Victor, Kenneth E. (Ken), White, James E. (Jim), Stone, Duane L./iwc jcn rww chi dia wlb cfd meh jdh dsk mdk hgl jcn pr jfv dvn kev jew dls ; Sub-Collections: SRI-ARC; Clerk: DCE ;

RMS 2-FEB-73 15:34 14246

Message to Buz Owens

Sorry about the delay in preparing the tape you requested. No excuse except absent-mindedness. Somehow I had in my notes that you wanted listings of the NCP, but Bob Ploger tells me you want a listing of IMPDIAG -- so you got both. 1

The tape you sent is in the mail and should arrive shortly. It has standard labels (SER=L17464) and is 1600 BPI. Twelve data sets have been written (DCB=(LRECL=121,BLKSIZE=7986,RECFM=FB)) whose names are as follows: 2

NET.NCP.LOG 2a

NET.NCP.FLIH 2b

NET.NCP.DATA 2c

NET.NCP.WATCHDOG 2d

NET.NCP.SLIH 2e

NET.NCP.UTIL 2f

NET.NCP.CMD 2g

NET.NCP.MSG 2h

NET.NCP.SVC 2i

NET.NCP.OPCOM 2j

NET.NCP.NCPMONIT 2k

NET.NCP.IMPDIAG (what you really wanted) 2l

The following JCL will print IMPDIAG (at UCSB at least): 3

```
//IMPDIAG JOB .............                                    3a
//PRINT EXEC PGM=IEBPTPCH,REGION=36K                          3b
//SYSPRINT DD SYSOUT=A                                        3c
//SYSUT1 DD DISP=OLD,UNIT=3400-3,VOL=SER=L17464,LABEL=(12,SL),  3d
//          DSN=NET.NCP.IMPDIAG                               3e
//SYSUT2 DD SYSOUT=A                                          3f
```

Message to Buz Owens

```
//SYSIN DD *                                                    3g

   PRINT PREFORM=M                                              3h

/*                                                              3i
```

If I can be of further assistance, please let me know. I will try to be more swift next time. 4

RMS 2-FEB-73 15:34 14246

Message to Buz Owens

(J14246) 2-FEB-73 15:34; Title: Author(s): Stoughton, Ronald M./RMS;
Distribution: Owen, A. D. (Buz), Bryan, Roland F./ADO RFB;
Sub-Collections: NIC; Clerk: RMS;
Origin: <UCSB>ADO.NLS;1, 2-FEB-73 15:22 RMS ;

RMS 2-FEB-73 16:10 14247

IMNLS settings for UCSB Imlac

Smokey,
The following is a list of IMNLS parameters suitable (my best guess) for UCSB's Imlac: 1

```
INTCO=1,INTKBD=1,INTTMR=0,
ARMWRD=72B,IOGEAR=0,TABLET=0,LVH=0,
SERINT=0,PARCHK=0,DPAGE=1B4,
LCHT=1040B,KEYBD=STDKBD,LOADER=40B,
LDFMT=4
```
1a

I've made the following assumptions: 2

No mouse, keyset, or tablet implies IOGEAR,TABLET=0. 2a

LDFMT=4 applies to special TTY Bootstrap, i.e., data is transmitted thusly: x100dddd (four bits of real data per byte). 2b

If Imlac has no timer, 40 cycle sync should be armed. 2c

Follow the majority when in doubt. 2d

Thanks for all your help. Let me know if UCSB students keep bugging you and I will try to call them off. 3

IMNLS settings for UCSB Imlac

(J14247) 2-FEB-73 16:10; Title: Author(s): Stoughton, Ronald M./RMS;
Distribution: Wallace, Donald C. (Smokey)/DCW; Sub-Collections: NIC;
Clerk: RMS;
Origin: <UCSB>IMOP.NLS;1, 2-FEB-73 16:05 RMS ;

RMS 2-FEB-73 16:21 14248

Response to NIC 13617

Re: request for infor on Network resident macro prodessors. I'm not sure exactly what you are looking for. Could you be more explicit? Are you aware that 360/PL-1 contains a macro processor? 1

RMS 2-FEB-73 16:21 14248

Response to NIC 13617

(J14248) 2-FEB-73 16:21; Title: Author(s): Stoughton, Ronald N./RMS; Distribution: Poh, Susan S./SSP; Sub-Collections: NIC; Clerk: RMS;

RMS 2-FEB-73 16:46 14249

Response to NIC 13785

UCSB has a NGP-0 server at socket x'705' (see RFC 398, NIC 11911). This serivce was made available prior to the last NGG meeting at MITRE. I am not aware of anyone having attemted to use it with the exception of ourselves for testing of DRS. 1

Response to NIC 13785

(J14249) 2-FEB-73 16:46; Title: Author(s): Stoughton, Ronald M./RMS; Distribution: Cotton, Ira W./IWC; Sub-Collections: NIC; Clerk: RMS;

AAM 2-FEB-73 6:15 14250

Request for names of owners of BBN Report 1822

Dear John,
When your TIP was delivered, we should have left at least one copy of BBN Report #1822 (Specifications for the Interconnection of a Host and an IMP). There may also be other individuals at your site who have copies of this document (neglecting its occurrance in the "Protocols Notebook"). Unfortunately, due to a glitch in my mailing lists , I don't have any names and addresses for the "owners" at your site, so I haven't sent any of them the update which went to most sites in January. Would you please supply me with the list of one (or more) individuals who should be added to the mailing list? 1

AAM 2-FEB-73 6:15 14250

Request for names of owners of BBN Report 1822

(J14250) 2-FEB-73 6:15; Title: Author(s): McKenzie, Alex A./AAM;
Distribution: Davidson, John/JD; Sub-Collections: NIC; Clerk: AAM;

HELP2

(J14251) 2-FEB-73 10:10; Title: Author(s): Stern, Dale H./DHS;
Distribution: Stern, Dale H., Murray, Hallam G./DHS HGM;
Sub-Collections: NIC; Clerk: ARCG;

ARCG 2-FEB-73 8:51 14252

ATTEMPT 3

I FOUND THE TNLS BEGINNERS GUIDE. LET'S SEE IF THIS GETS TO YOU 1

ATTEMPT 3

(J14252) 2-FEB-73 8:51; Title: Author(s): ARC, Guest O./ARCG; Distribution: Stern, Dale H., North, Jeanne B./DHS JBN; Sub-Collections: SRI-ARC; Clerk: ARCG;