18408 Distribution

John W. McConnell, L. Peter Deutsch, James G. Mitchell, Alan C. Kay, Marilyn F. Auerbach, Martin E. Hardy, Charles H. Irby, Mil E. Jernigan, Jeanne B. North, James C. Norton, Dirk H. Van Nouhuys, Richard W. Watson, Steve D. Crocker, Thomas F. Lawrence, John F. Heafner, Dan L. Murphy, Patrick W. Foulk, Richard A. Winter, Harold R. Van Zoeren, Alex A. McKenzie, Abhay K. Bhushan, Peggy M. Karp, Mario C. Grignetti, Diana L. Jones, Susan R. Lee, James M. Madden, A. Wayne Hathaway, Barbara Barnett, Elizabeth K. Michael, Julie B. Moore, Marcelle D. Petell, Duane L. Stone, Joan E. Slottow, Jeffrey C. Peters, William P. Jones, Elizabeth J. (Jake) Feinler, Kirk E. Kelley, Ralph Prather, Kay F. Byrd, Gino Pucine, Thomas B. Gray, Raynor K. Rosich, Prentiss H. Knowlton, Marvin L. Graham, Jaacov Meir, Gary R. Grossman, W. Jack Bouknight, Michael S. Sher, Daniel L. Slotnick, Kathy Beaman, John D. Day, David H. Crocker, Beauregard A. Hardeman, Richard C. Roistacher, Ferg R. Ferguson, Ernest H. Forman, Linda L. Lane, Douglas C. Engelbart, Jeanne B. North
Jeanne M. Leavitt, Rodney A. Bondurant, Jeanne M. Beck, Mark Alexander Beach, Judy D. Cooke, Marcia Lynn Keeney, Carol B. Guilbault, Susan R. Lee, Elizabeth K. Michael, Charles F. Dornbush, Elizabeth J. (Jake) Feinler, Kirk E. Kelley, N. Dean Meyer, James E. (Jim) White, Diane S. Kaye, Paul Rech, Michael D. Kudlick, Ferg R. Ferguson, Douglas C. Engelbart, Beauregard A. Hardeman, Martin E. Hardy, J. D. Hopper, Charles H. Irby, Mil E. Jernigan, Harvey G. Lehtman, Jeanne B. North, James C. Norton, Jeffrey C. Peters, Jake Ratliff, Edwin K. Van De Riet, Dirk H. Van Nouhuys, Kenneth E. (Ken) Victor, Donald C. (Smokey) Wallace, Richard W. Watson, Don I. Andrews

(J18408) 14-AUG-73 15:24; Title: Author(s): N. Dean Meyer, Charles H. Irby, Charles F. Dornbush/NDM CHI CFD; Distribution: /SRI-ARC(seminar to be held soon) TU; Sub-Collections: SRI-ARC TU; Clerk: NDM;
Origin: <MEYER>COMLANG.NLS;23, 14-AUG-73 15:19 NDM ; .D=On; .PN=0; .PLev=1; .YBS=1; .SN=0; .SNF=76; .RM=72; .BRM=70; .SNFShow=<=4; .F="page .GPN;"; .FP=FR; .H1="Proposed Changes in the NLS Command Language"; .LM=3; .BLM=0;

Proposed Changes in the NLS Command Language

Your comments are requested.

Proposed Changes in the NLS Command Language

After analyzing experience gained in teaching NLS and after analyzing many comments from users, some extensive revisions to the NLS command language are being planned. In most cases these changes will have no effect on the capabilities of NLS, but should make the system significantly easier to learn and to use. This brief document is a preliminary announcement and a request for feedback from NLS users. Comments should be directed to Charles Irby (CHI) at SRI-ARC. 1

The next section will explain the rationale for the changes; the last section will detail the expected user impact of the changes. For the syntax of the actual proposed command language, please see (userguides,commands,1). 1a

Rationale for Changes 2

The major motivation for changing the NLS command language is to facilitate learning and use. These goals are embodied in some philosophical and several syntactic changes which will (we hope) make the system: 1) conceptually simpler, and 2) more consistent, and 3) easier to discover. 2a

Three areas of change are intended to make the system conceptually simpler: 2b

Explicit Definition of Subsystems 2b1

The command language will be partitioned into distinct command language subsystems, each with a specific purpose. The bulk of the commands will be in the EDITOR subsystem; examples of other subsystems are the Journal, Programs and the Calculator. 2b1a

Subsystem control is accomplished with the following commands: 2b1b

The Goto command allows a user to enter a subsystem.

The Execute command allows a user to execute a command in another subsystem without leaving the current subsystem.

All subsystems will terminate with the Quit command, as will NLS.

Keyword Recognition Modes 2b2

For many years the single-charcter recognition scheme has been used in NLS. As the system has grown, some keywords have come to require two characters for recognition and others are strangely named (e.g. Goto Sort and Xset). We feel that it is very important for an experienced user to be able to specify commands quickly and simply. We also recognize the need to have a consistent form for commands, reasonable names, and an extensible, easily-learned scheme for recognizing command keywords. Thus, we intend to implement several different recognition schemes (optionally selectable by the user), one of which will provide the concise specification characteristic of the current scheme. 2b2a

We presently intend to implement three distinct recognition modes: 2b2b

Mode 1: Anticipitory Recognition Mode

In this recognition mode a command keyword is identified and completed by the system after the minimum number of characters to uniquely determine the command have been typed. Additional characters are not permitted as the system will assume recognition of the keyword upon encountering the minimum number of characters, thus the system anticipates the specification of a keyword based only upon recognition of a minimum unique sequence of characters.

Mode 2: Demand Recognition

This recognition mode delays keyword recognition until the user types an acceptable right delimiter (ALTMODE or SPACE for now) and is patterned after the scheme employed by TELNET. This scheme will not permit the user to type invalid input characters as it will inform the user of his erroneous input and discard any characters which cannot legally follow the already specified text. The user manually forces keyword recognition and feedback of the full keyword text by typing a right delimiter. Note that the user may specify more than the minimum number of characters required to uniquely determine the keyword if he so desires.

Mode 3: Expert or Combined mode

In this scheme the most commonly used keywords will be recognized by their first character, as are most commands now. All keywords may be recognized by invoking one of the previously described recognition modes. This alternate recognition mode is entered by typing a left delimiter (SPACE for now). Thus mode 3 is a combination of single character command recognition which covers only a subset of the command keywords and another more general recognition mode entered by typing a SPACE. Because of the more difficult behaviour of this form of recognition, it is expected that it is appropriately suited to only the more experienced NLS users, who really want the rapid interaction capabilities which only a single character recognition scheme can deliver. Note that the left delimiter serves as an "escape" to a more general form of recognition, thus single character recognition may be used in conjunction with any more general recognition algorithm.

The novice user may find modes 1 or 2 more to his liking than the system default of mode 3. 2b2c

Intuitiveness 2b3

The order of operand selection in Move, Copy, and Append will be changed to conform to the customary English usage. The Move and Copy will be of the form "Move/Copy This to There", rather than its current form "Move/Copy to There, This". Append will be "Append This to That", instead of "Append to That, This". 2b3a

Note that this could be considered as being inconsistent with the Insert command, though this inconsistency should prove minor and unimportant.

Two types of consistency are sought: 2c

Internal Consistency 2c1

The general command form is Command-Verb Command-Noun, followed by any necessary operands. Only a few exceptions will be found in some subsystems. 2c1a

All addressing will be made consistent; there are now conflicts between TNLS dynamic addressing, links, and TENEX file naming conventions. Dynamic addressing will be available in both TNLS and DNLS (userguides,commands,3). The link filename format will be adopted as an NLS-wide standard. 2c1b

DNLS-TNLS Consistency 2c2

The notion of command defaulting in DNLS will be eliminated. Instead of being left with the previous command, the user will be returned to the Command Reset state after each command (as in TNLS). This will allow easier backing up through a command specification. 2c2a

In DNLS, the command defaulting makes it difficult to differentiate a new command from a literal. Lack of command defaulting will allow dynamic addressing and literals as the first operand seletions; a literal character will not be confused with a new command specification.

For example, if one types:

msmc ...

the present DNLS will give you:
Move Statement Move Character ...

and the new DNLS in rocognition mode 3 will respond:
Move Statement mc ...

Terminating any editing command with INSERT or REPEAT (what used to be called CDot for historical reasons) characters will be shorthand for Command Accept (CA) followed by the INSERT or REPEAT commands, respectively. These will always be single character commands for quick editing.

The INSERT command will allow one to quickly insert a new statement after the statement just edited.

The REPEAT command will allow one to repeat the last used command, possibly defaulting one of the operands to the Control Marker (CM) instead of asking the user to select it. This will set up a state, or command mode, out of which the user will have to Command Delete.

The concept of Address Expression (ADDR) will be generalized for DNLS, TNLS, And DEX such that wherever a statement name or number is currently used, an appropriate Address Expression will be allowed (as in links, Jumps, etc.) (see the Appendix of -- userguides,commands,3). An ADDR will be consistent with existing links, the same ADDR will work in TNLS and in DNLS, and the elements of the expression will be reasonably mnemonic. 2c2b

Jump Command changes 2c2c

SP command in TNLS will be replaced by Jump to.

In DNLS, ihe Jump commands will be made to be like the rest -- with no state of their own.

In other words, after executing a Jump command, you will be left at the Command Reset instead of in Jump mode.

The subcommands of Jump to End will be deleted, to be replaced by Dynamic addressing (see -- userguides,commands,3).

The Jump File Link command will be the same as the present Load File command, jumping to the origin statement of the

file (statement identification in the link will be ignored). Jump to Link will remain the same.

To make the many capabilities of NLS easier to discover, powerful help facilities will be available. The help capabilities will take three forms, all of which will be available in both TNLS and DNLS: 2d

1) The system will prompt the user for the type of input it expects. 2d1

2) If at any point the user is confused, typing a question mark ? will list all the available aternatives at that point in the command. A control character will cause the user to enter the HELP subsystem at the description of that command., 2d2

3) Typing Goto Help CA, or just Help CA will invoke the HELP subsystem. From this subsystem, the user can find the syntax, an explanation, and an example for every command and explanations of important NLS concepts. 2d3

The Important Changes 3

This section lists the changes which are expected to most affect NLS users. The list is different for TNLS and DNLS users, so they will be mentioned seperately. For the complete syntax of the commands, see (userguides,commands,1). 3a

TNLS 3b

In an address expression, statement names, numbers, and SIDs will no longer be preceded by a period; all structure relations must now be preceded by a period and all entity relations must be preceded by a plus or minus sign (see userguides, commands, 3). These relations may be clustered together in a string; the period or sign covers all relations following it up to the next space. 3b1

In the Move, Copy, and Append commands, operands will be specified in the "FROM TO" order, rather than "TO FROM". 3b2

Some of the commands will be renamed. One new commands recognition scheme will require a space before some of the commands. Alternative command recognition schemes will allow users to make the system behave in a manner consistent with their own personal and historical preferences; the choice is up to the user. Users will, of course, have to specify many commands in a different way, using different keywords. 3b3

To move the CM, the user will have to use the Jump command instead of the SPACE command. 3b4

Execute and Goto will have specific meanings, as described above (2b1). Some commands formerly under these headings will be renamed. Goto will cause the user to enter a different subsystem. Quit will cause him to return to the previous subsystem. Execute will allow execution of one command in another subsystem. 3b5

Any parameters which may be changed by the user (e.g. viewspecs) can be changed with the Set command. Their current status can be printed with the Show command. They may be reset to their default settings with the Reset command. 3b6

Commands may be terminated by a REPEAT or an INSERT character in place of a CR. These are user-settable keys. REPEAT will put one in a repetitious mode. The command so terminated will be repeated, and in some cases operands will be defaulted to the position of the CM after the previous command, until the user types a CD. (This is like the present center-dot <↑b>.) INSERT

is a non-repetitious terminator which allows the user to immediately insert a new statement after the statement just edited. Both of these may be used at the command level. They will behave there as if the user terminated his last command with that character. 3b7

The syntax of the Substitute command has been markedly changed to conform to the VERB-NOUN form. (This change has been in effect for some time on an experimental basis for non-network users.) See (userguides,commands,substitute) for the command syntax. 3b8

When a literal is the most likely operand, the OPTION character will allow the user to type in an address instead of a literal. When an address is most likely, the OPTION key will allow a literal input. OPTION will be a user-settable key. 3b9

Commands are being added to allow some degree of file manipulation directly from NLS without going to the executive. The following commands will be available: 3b10

Delete File
Trim File Directory
Restore Deleted file
Restore Archived file
Expunge Deleted files
Expunge Archived file
Connect to directory
Show File Directory
Insert File directory
Show Archive status
Show Disk space status
Archive File
Protect File 3b10a

The Assimilate command will be eliminated. In its stead, the Copy, Move, Substitute, and Delete commands will allow a filter to be specified which will allow selective editing. 3b11

When a location at which to place something is required, the user may optionally specify "to precede" or "to replace" as well as the traditional default "to follow". 3b12

The Null file command will be called "Create File". 3b13

The Unlock command will be called "Delete Modifications". Once deleted, they may be restored with the command "Restore Modifiations", assuming the partial copy has not been expunged. 3b14

The Output Device Teletype will be replaced by two more powerful commands: Output Terminal, and Output Remote printer. The user may have the system replace form feeds with CR LF's and may have it wait at page breaks to allow loading of a letterhead into the device. This should for most purposes take the place of the TENEX subsystem SENDPRINT. 3b15

A Renumber SIDs command will allow the SIDs to be made sequential. 3b16

Terminal links can be established from NLS with the commands: Connect Tty and Disconnect Terminal. These will be the equivalents of the executive commands LINK and BREAK links. 3b17

DNLS 3c

The command state will no longer be defaulted to the previously used command, but will return to the command reset state after each command. Terminating a command with REPEAT will put the user in a defaulted repeat mode similar to centerdot and to the current command defaulting. To enter any other command, the user must leave the REPEAT mode with a CD. 3c1

The Jump commands will have no state either, Each new Jump will have to be specified as a Jump. However, dynamic addressing will allow the user to specify a series of "jumps" within one command by stringing together address elements (as in TNLS). 3c2

Some of the commands will be renamed. One new commands recognition scheme will require a space before some of the commands. Alternative command recognition schemes will allow users to make the system behave in a manner consistent with their own personal and historical preferences; the choice is up to the user. Users will, of course, have to specify many commands in a different way, using different keywords. 3c3

In the Move, Copy, and Append commands, operands will be specified in the "FROM TO" order, rather than "TO FROM". 3c4

Execute and Goto will have specific meanings, as described above (2b1). Some commands formerly under these headings will be renamed. Goto will cause the user to enter a different subsystem. Quit will cause him to return to the previous subsystem. Execute will allow execution of one command in another subsystem. 3c5

Any parameters which may be changed by the user (e.g. viewspecs) can be changed with the Set command. Their current status can

be printed with the Show command. They may be reset to their default settings with the Reset command. 3c6

Commands are being added to allow some degree of file manipulation directly from NLS without going to the executive. The following commands will be available: 3c7

Delete File
Trim File Directory
Restore Deleted file
Restore Archived file
Expunge Deleted files
Expunge Archived file
Connect to directory
Show File Directory
Insert File directory
Show Archive status
Show Disk space status
Archive File
Protect File 3c7a

The Assimilate command will be eliminated. In its stead, the Copy, Move, Substitute, and Delete commands will allow a filter to specified which will allow selective editing. 3c8

The Null file command will be called "Create File". 3c9

A Runumber SIDs command will allow the SIDs to be made sequential. 3c10

The Unlock command will be called "Delete Modifications". Once deleted, they may be restored with the command "Restore Modifiations", assuming the partial copy has not been expunged. 3c11

Window control will be done with the following commands: 3c12

Split window Horizontal
Split window Vertically
Move boundary 3c12a

The Split commands will always divide the window into two equal parts; from there the user may move the boundaries to get different effects. 3c12b

The addressing in DNLS will be generalized to included address expressions similar to those presently used in TNLS in addition to BUG selections. See (userguides,commands,3) for a complete description of this new dynamic address capability in DNLS. Since dynamic addressing expressions may include markers, the

ability to input markers by holding down the right button on the mouse will disappear. 3c13

Terminal links can be established from NLS with the commands: Connect Tty or Connect Displays and Disconnect Terminal. These will be the equivalent of the TENEX LINK and BREAK commands and the NLS Execute Connect commands. 3c14

Commands may be terminated by a REPEAT or an INSERT character in place of a CA. These are user-settable keys. REPEAT will put one in a repetitious mode. The command so terminated will be repeated, and in some cases operands will be defaulted to the position of the CM after the previous command, until the user types a CD. (This is like the present center-dot <↑b>.) INSERT is a non-repetitious terminator which allows the user to immediately insert a new statement after the statement just edited. Both of these may be used at the command level. They will behave there as if the user terminated his last command with that character. 3c15

When a location at which to place something is required, the user may optionally specify "to precede" or "to replace" as well as the traditional default "to follow". 3c16

Conclusion 4

The planned changes to the NLS command language are pervasive; they are tentatively scheduled for this November. It is not without consideration of the large NLS user community (present and future) that we suggest such changes. We encourage and solicit your comments and suggestions. 4a

DHC 14-AUG-73 16:31 18409

Training

Dick and Dirk -- Now that I am back from vacation, I am being inundated (again) for an NLS class. There are 2-4 people from UC San Diego, 2-4 people from CCN and 4-6 (8?) people in our Computer Science Department who want to attend. What is the estimation on the conversion to the new User interface?

If it is more than a few months a way, I would like to re-issue my request for a class here.

--Dave.

1

18409 Distribution
Richard W. Watson, Dirk H. Van Nouhuys,

Training

(J18409) 14-AUG-73 16:31; Title: Author(s): David H. Crocker/DHC;
Distribution: /RWW DVN; Sub-Collections: NIC; Clerk: DHC;

DHC 14-AUG-73 16:34 18410

Making TNLS more widely available

The following is a suggestion from Chuck Kline (CSK). I almost dismissed it out of hand, but then realized that I was not sure of the arguments against it:

Making TNLS, sans ident or journal systems, available as a standart Tenex subsystem. This of course assumes that NLS does not have horrible hooks furied into Tenex. I guess it would also require (perhaps) distribution of the Output Processor as well.

Thoughts?

--Dave.

18410 Distribution

Nps Np, Richard W. Watson, Charles H. Irby, Richard W. Watson, Dirk H. Van Nouhuys,

DHC 14-AUG-73 16:34 18410

Making TNLS more widely available

(J18410) 14-AUG-73 16:34; Title: Author(s): David H. Crocker/DHC;
Distribution: /NP RWW DVN; Sub-Collections: NIC NP; Clerk: DHC;

DHC 14-AUG-73 16:37 18411

jean -- Just got back from vacation and am beginning to clean up loose ends: Steve mentioned someone named Stan (or Norm) Cohen at Argonne. He wanted me to contact you about him and something to do with the Net.

Qu'est ce que il desire? --dave 1

18411 Distribution
Jean Iseli,

(J18411) 14-AUG-73 16:37; Title: Author(s): David H. Crocker/DHC;
Distribution: /JI; Sub-Collections: NIC; Clerk: DHC;

baby7's first steps.

the day before wednesday was tuesday. 1

and so forth.and so on. 2

Contradictions have been alleged in our description of the elephant in the zoo file. 3

Such profundity should go over the system more often. 4

18412 Distribution
Dirk H. Van Nouhuys, Susan R. Lee, Richard W. Watson,

baby7's first steps.

(J18412) 14-AUG-73 16:42; Title: Author(s): Jeanne M. Leavitt/JML;
Distribution: /DVN SRL RWW; Sub-Collections: SRI-ARC; Clerk: JML;
Origin: <LEAVITT>THURSDAY.NLS;1, 14-AUG-73 16:30 JML ;

BAH 14-AUG-73 17:03 18413

NEW RADCJ CATALOG

Duane, I've sent you a copy of the most recent index of RADC journal items. This list is more complete than the last one. There is also an online version which can be accessed via the following links: 1

AUTHOR 1a

(catalog,radcjaincnl,entry) 1a1

NUMBER 1b

(catalog,radcjnincnl,entry) 1b1

TITLEWORD 1c

A-F 1c1

(catalog,radcjtafincnl,xentry) 1c1a

G-O 1c2

(catalog,radcjtgoincnl,entry) 1c2a

P-Z 1c3

(catalog,radcjtpzincnl,entry) 1c3a

Please address any pertinent comments to me. Thanx. 2

2a

-bah 3

18413 Distribution

Duane L. Stone, Dirk H. Van Nouhuys, Beauregard A. Hardeman,

BAH 14-AUG-73 17:03 18413

NEW RADCJ CATALOG

(J18413) 14-AUG-73 17:03; Title: Author(s): Beauregard A. Hardeman/BAH; Distribution: /DLS DVN BAH; Sub-Collections: SRIARC RADC ; Clerk: BAH;

DHC 14-AUG-73 17:58 18414

Re Neted

Funny of the day: Mike just concurred with my comment about NETED and promised to change it when 'going to press'. My thinking (and Jon's) was that if we are going the be so careful not to tout it as THE Network editor, then let's not give it a name which implies that it IS the Network editor. bye. --dave. 1

18414 Distribution
Nancy J. Neigus,

Re Neted

(J18414) 14-AUG-73 17:58; Title: Author(s): David H. Crocker/DHC;
Distribution: /NJN; Sub-Collections: NIC; Clerk: DHC;

Status of Printer Use

The printer is back on port 4. Port 5 is captured. It will be released when the TIP is reloaded. PLEASE don't forget to Give Back the port after send print. IF the TIP has been done at all, you must set the data rate: @ d r 4599 LF.

1

Status of Printer Use

(J18415) 15-AUG-73 07:02; Title: Author(s): James H. Bair/JHB;
Distribution: /RADC; Sub-Collections: RADC; Clerk: JHB;

IWC 15-AUG-73 07:11 18416

Documentation Inquiry

Can you provide me with a list of documents Mitre has written under your ARPA network contract. Have you performed some sort of survey of network resources? Can we get copies? Thanks 1

Documentation Inquiry

(J18416) 15-AUG-73 07:11; Title: Author(s): Ira W. Cotton/IWC;
Distribution: /JI; Sub-Collections: NIC; Clerk: IWC;

RWW 15-AUG-73 08:18 18459

We Are Considering Making TNLS and DNLS Widely Available

Dave, we are considering making NLS available as a Tenex subsystem. It presently runs at BBN as far as I know. There are some legal issues that Engelbart is looking at. 1

RWW 15-AUG-73 08:18 18459

We Are Considering Making TNLS and DNLS Widely Available

(J18459) 15-AUG-73 08:18; Title: Author(s): Richard W. Watson/RWW;
Distribution: /DHC; Sub-Collections: SRI-ARC; Clerk: RWW;

BASIC GRAPHICS PROTOCOL DEVELOPMENT ON THE ARPA COMPUTER NETWORK

by

Ira W. Cotton

National Bureau of Standards

Washington, D. C. 20234

ABSTRACT

A serious impediment to the more widespread success of computer graphics in productive applications has been the lack of standardization in the area. The development of common languages or even exchange standards between systems of different manufacture has lagged far behind such development in general scientific and business data processing. The recent growth of computer networks, however, has provided both the means and the motivation to develop standards for the exchange of graphic information between different systems. In the network environment such standards are called "protocols."

One well-known network which has been extensively documented is sponsored by the Advanced Projects Research Agency (ARPA) of the U. S. Department of Defense. A major concern of the participants on the ARPA network has been the development of specialized protocols for particular types of information exchange. One such specialized protocol which is under development is a Network Graphics Protocol for the exchange of picture descriptions and operator inputs between different systems.

This paper will discuss the development of this protocol, present the details of the initial level of the protocol, and illustrate its use. The protocol is sufficiently general so that its use need not be restricted to the ARPA network. Furthermore, the protocol is still evolving and adaptive to user requirements, so the article concludes with an invitation to comment on or contribute to the evolution of the protocol.

BASIC GRAPHICS PROTOCOL DEVELOPMENT ON THE ARPA COMPUTER NETWORK

by

Ira W. Cotton

Management 249

George Washington University

ABSTRACT

A serious impediment to the more widespread success of computer graphics in productive applications has been the lack of standardization in the area. The development of common languages or even exchange standards between systems of different manufacture has lagged far behind such development in general scientific and business data processing. The recent growth of computer networks, however, has provided both the means and the motivation to develop standards for the exchange of graphic information between different systems. In the network environment such standards are called "protocols."

One well-known network which has been extensively documented is sponsored by the Advanced Projects Research Agency (ARPA) of the U. S. Department of Defense. A major concern of the participants on the ARPA network has been the development of specialized protocols for particular types of information exchange. One such specialized protocol which is under development is a Network Graphics Protocol for the exchange of picture descriptions and operator inputs between different systems.

This paper will discuss the development of this protocol, present the details of the initial level of the protocol, and illustrate its use. The protocol is sufficiently general so that its use need not be restricted to the ARPA network. Furthermore, the protocol is still evolving and is adaptive to user requirements.

Introduction

One of the major reasons commonly cited for the failure of computer graphics to achieve some of the goals formerly predicted for it is the almost total lack of standardization in the area. In contrast to such areas as general purpose scientific and business data processing where standardization of such languages as FORTRAN and COBOL has permitted the development of a wide array of library programs and general purpose application packages, nearly every graphic application has been programmed from scratch without regard to previous programming efforts. As one author put it:

> "Why cannot a graphic application be picked off the shelf and implemented at a low cost? Unfortunately it seems to be the rule in this particular field of data processing that there are very few shelves to pick from..." <SO72>

Computer graphics followed neither the lead of pure peripheral devices, where plug-for-plug compatibility became the rule rather than the exception, nor of general purpose data processing systems, where compiler languages provided some measure of machine independence. Graphics systems remained each one unique and incompatible with the other. Despite the occasional publication of an article claiming that a software package could be used on multiple systems,<WO66> the cost and effort required to implement a package on multiple systems generally outweighed the benefits of actually doing it.

Computer networks forced the issue by providing the physical means to test software on many different types of computer systems and with many different types of terminals. The need for convenient procedures for inter-computer data exchange to achieve resource-sharing provided the extra impetus for the needed standardization efforts.

Graphic standardization on the ARPA network has not focused on the standardization of graphic languages as such. Rather, the effort has been directed to the development of a set of protocols for the language independent and system independent representation of graphic data, both images for output and representations of operator inputs. These representations could be referred to as a language, but the term protocol is more characteristic of their structure and intended use and so will be retained for this discussion.

> Thus far a hierarchy of successively more complex image protocols has been developed, and a low-level input protocol.

The first level of the image protocols has been adopted for implementation <MI72>, as has the input protocol <C072a>, and several sites presently have working realizations of these protocols <HA73, KB72>.

The higher levels of the image protocols are still under consideration <MI72>, and higher levels of input protocol have yet to be proposed (although a single structure for all levels has been proposed <C072b>).

The basic data flow involved in the use of a network graphics protocol is illustrated in figure 1. An application program generating pictures expressed in terms of the output or image protocol can be used by any terminal with an interpreter for the protocol. Conversely, any terminal whose input devices yield data expressed in the input protocol can communicate with any application program expecting data in this form. The interpreters for the protocols (input and output) do not have to be located in the same machine which supports the graphics terminal.

Network Graphics Working Group

Function-oriented protocols <CR72> in the ARPA network are defined by working groups comprised of interested individuals from each of the participating sites in the network community. These specialized working groups meet periodically, first to establish a specialized protocol for a particular need, then to consider changes based on experience gained in implementation and usage of the protocol. Since these working groups are really breaking new ground, it is not expected that satisfactory protocols can be established by simply holding several committee meetings. Rather, the protocols are expected to evolve to meet the needs of the network community, and the function of the working groups is to insure that this evolution is orderly and sensible.

The first meeting of the Network Graphics Working Group was hosted by Project MAC in July 1971 outside Boston. This was primarily an organizational meeting designed to outline the problems, review the means available to solve it, and establish an initial course of action. No specific decisions were made regarding protocols, but a number of experiments were planned between selected pairs of network participants.

The second working group meeting was held at Stanford Artificial Intelligence Laboratory in November 1971. At this meeting the results of some of the experiments were discussed, and the details of the Level 0 protocol which are explained in the present report were worked out. Special subcommittees were established to draft proposals for higher levels of the

protocol and to begin to consider the procedure for the initialization of connections between processes.

The third meeting was held at The Mitre Corporation in McLean, Virginia during April 1972. Debate continued on the general approach to be taken towards connection, attention handling and higher levels of the protocol. The results of experiments were described and a few others were planned. Overall, little substantial progress was made, however.

The fourth and most recent meeting was held at the Center for Advanced Computation on the campus of the University of Illinois in July 1973. This was possibly the most productive of all the meetings, partly because some experience had by now been gained with network graphics and partly because attrition had left only the "hard core" graphics proponents in the group. The proposed higher levels were consolidated somewhat depending on whether or not the graphics user process was expected to be able to transform the image, and a richer structure for handling attentions was developed. However, these developments are still being worked into draft form and they will not be reported here.

The Concept of "Levels"

An early decision of the Graphics Working Group was that there would not be a single comprehensive graphics protocol covering all devices, but that several levels of the protocol would be specified, corresponding roughly to complexity of implementation or of display device capability. It was envisioned that protocol levels would be implemented incrementally at the various sites according to their needs and capabilities. A number of rules are required to make this approach both possible and practical:

The connection mechanism between processes must convey the knowledge of the protocol level at which communications are to occur. Sites must not send data in a higher level form than the communicant indicates it is able to accept.

The implementation of a given level of the protocol should require no knowledge of any higher levels of the protocol. As a corollary, a change made in a given level of the protocol should have no effect on all lower levels.

Further, a string of commands and data which is syntactically and semantically correct at a given level of the protocol should produce identical results on any interpreter of that level or higher. That is to say, the protocol levels should be upwards compatible.

Finally, any aspects of the protocol which may be explicitely left unspecified in the detailed description of a given level of protocol SHALL be explicitely specified in any public descriptions of actual implementations. That is, at given levels of the protocol, certain functions are not rigidly defined, but are left to the discretion of implementers to do in the most appropriate way for their own system. What is required is that descriptions of actual implementations describe what they have done in these cases.

Basic Data Forms

One of the earliest topics of discussion at the working group meetings was the definition of a standard coordinate system for network usage. It was somewhat surprising to discover that there were nearly as many different candidate coordinate systems as there were different graphical devices in the network community. All four corners of the standard viewing rectangle were represented as origins, as well as the center of the screen. What was NOT surprising was that each delegate believed that the coordinate system employed by his hardware was the natural and obvious system to be adopted for network use.

Before deciding on the coordinate system origin, it was agreed that the "network virtual screen" would be represented as a unit square as shown in Fig. 2, so that all coordinate values would be fractional. This would allow network graphic data to utilize the maximum resolution available with any given word size, and would permit all users to easily convert the data to a form appropriate to the resolution of his own device. A full unit, therefore, would represent 512, 1024, 2048 or however many raster units or inches, depending on the particular specific output device.

Following this, the coordinate system origin was chosen to be the middle of the screen. This decision was in keeping with the desire to obtain the maximum utilization from the limited number of data bits available for the representation of coordinate values. Also, a single data representation was desired for both incremental and absolute vectors. It was observed that a sign bit would always be required regardless of the location of the origin, since incremental vectors required it. If the origin were located at one of the corners, one bit of resolution would be essentially wasted for absolute vectors, since all vectors would end in a single quadrant. By placing the screen origin in the middle, absolute vectors could terminate in any of four quadrants and the sign bit, already required for incremental vectors, could be used to extend the resolution of absolute vectors.

For the Level 0 protocol, it was decided that all coordinate

values, including the specification of points and vectors, would be represented in two bytes of data (as a fraction, as already explained). A simple algorithm could be developed for each output device to map such values into the fixed point integers normally required to represent coordinates in such devices. Higher levels of the protocol would permit fractions with larger numbers of significant bits, and a correspondingly improved resolution. Even at Level 0, however, the resolution provided by 16 bits is more than adequate for the resolution of most output devices, which rarely exceed 12 or 13 bits of resolution.

Level 0 Image Protocol

The Level 0 image protocol was purposely kept as simple as possible so that implementation could be quickly accomplished and experimentation with the protocol begun. In addition, the capabilities of this protocol would satisfy the requirements of many graphic devices currently in use on the network, including all the storage tube displays and drum or flat bed plotters.

In accordance with this desire, the criteria was established that a command be included only if its output or effect were a function solely of the immediate data supplied and the current "beam position" at the start of the command. In other words, the interpreter for Level 0 would not need any internal storage for "modes" or pushdown stacks. With this restriction, a very simple implementation should be possible; it was even envisioned that the translator could be implemented in a hardware "black box" for particular output devices.

Figure 3 illustrates the commands in the Level 0 Image Protocol with their operands as presently defined. The individual commands are explained below:

Null - This command has no arguments and no effect. It is the equivalent of a "no-op" (no operation) command.

Erase - Erase screen and reset beam to origin (without inking). This command indicates that a new picture is about to be drawn. It must be eventually paired with an "End of Picture" command.

Move Absolute - Move the beam (without inking) to the specified coordinate location. The two arguments indicate respectively the X and Y values of the location with respect to the screen origin.

Move Relative - Move the beam (without inking) to the specified location. The two arguments indicate respectively the X and Y

values of the location with respect to the current location of the beam.

Draw Absolute - Draw a line (move with inking) from the current beam position to the specified position. The two arguments indicate respectively the X and Y values of the final position with respect to the screen origin.

Draw Relative - Draw a line (move with inking) from the current beam position to the specified potion. The two arguments indicate respectively the X and Y values of the final position with respect to the current location of the beam.

Dot Absolute - Move the beam (without inking) to the specified location and display a dot there. The two arguments indicate respectively the X and Y values of the position where the dot is to be drawn with respect to the screen origin.

Dot Relative - Move the beam (without inking) to the specified location and display a dot there. The two arguments indicate respectively the X and Y values of the position where the dot is to be drawn with respect to the current location of the beam.

Text - Display a string of characters across the screen starting at the current beam position. The argument is a string of variable length whose first byte is a count of the number of characters which follow the count. (Thus the string is of length <count> + 1). The characters in the string are coded in network ASCII; all codes between 0 and 127 (decimal) inclusive are permitted. (At Level 0 the proper interpretation of control characters is encouraged but not required). Characters are to be drawn in the "normal" size for the output device; if there is no "normal" size, the size should be chosen so that seventy-two characters may be displayed per line. The orientation of the beam following this command is left unspecified, except that another Text command immediately following will append its text to the previous string. The position of the first character with respect to the initial beam position is similarly unspecified.

TextR - Display text and restore beam position. This command has the same arguments and functions identically to the Text command, except that at the end of the command the beam position is invisibly restored to its original position (and is thus defined). Note that two TextR commands in immediate sequence will overwrite each other.

End of Picture - This command denotes the end of a new picture.

It must be paired with a preceeding Erase command. It has no arguments.

Escape - Escape to device-specific code. This command is really not part of the Level 0 protocol and its use is not encouraged. It was included so that specific applications could perform functions (such as setting special modes) which are not supported by the protocol. The operands are a one byte value and a string of variable length. The value is a code assigned to the specific device which is to perform the special function. (Other devices should ignore this command). The first byte in the string is a count of the data bytes following in the string. (Thus the string is of length <count> + 1). The device to which the data bytes are passed is free to interpret the data bytes in any way appropriate; however, it should endeavor to restore the beam to its original position at the start of the command.

Level 0 Graphic Input Protocol

The Level 0 Graphic Input Protocol was also kept as simple as possible. The minimum facilities which were felt to be necessary were the ability to input text and to indicate position. How these functions are accomplished are not within the scope of the protocol; the protocol merely permits data of these two general types to be sent back to the graphic application program in a standardized format. We suggest later that one of the advantages of such a protocol is the ability for intelligent devices to "lie" about how such data were obtained.

Figure 4 illustrates the commands in the Level 0 Graphic Input Protocol. The individual commands are explained below:

Textin - This command permits an arbitrary text string to be input. The origin field may be used, if desired, to specify the method which was used to input the text. The use of this field is not required. The length field indicates how many characters follow in the data field. Characters are represented in network ASCII; all codes between 0 and 127 (decimal) are permitted.

Posit - This command permits simple position data to be conveyed. The origin field may be used, if desired, so specify the method which was used to input the text. The use of this field is not required. The length field contains an integer number indicating the number of bytes of data which follow. This includes data for both X and Y coordinates. (Thus, the number of bytes of X coordinate data is <count>/2). At Level

0, the count should always be 4, since all coordinates are expressed as fractional data, two bytes in length.

Higher Level Image Protocols

Image protocols beyond the basic Level 0 were originally conceived to be based on a layered approach of arbitrary height. Each higher level would add additional features such as graphic subroutining or viewports which assumed the capabilities of the lower layers. After much discussion it was agreed that this approach was unnecessarily complex. All that was really needed was at most two additional layers. Unusual features could be separately negociated at any level.

The distinction between the new layers was whether or not the terminal (or "last intelligent host" which was supporting the terminal) was assumed capable of applying further transformations to the display file. In the simple case it was not, and the data which was sent to it corresponded to a segmented, but unstructured, display file. If transformations could be applied, structure would need to be sent as well.

The segmented file system is adequate to selectively display images on the screen. In a sense, each segment corresponds to a virtual screen which may be mapped in any way desired onto the physical screen. Since no structure is sent for any of the images in each segment, segments must be manipulated (displayed, deleted, detected with an input device) as a whole. However, since as many segments as desired may be defined, the units for display manipulation may be apropriately sized. The protocol to support a segmented system is reasonably straightforward, and one was outlined at the last working group meeting. As of the present time however, the details have not been published.

The structured file system offers unlimited flexability, since structure is sent with the picture. Transformations may be applied to portions of the image as desired. The development of a protocol to support this capability is a challenging task which will be undertaken at the next graphics working group meeting.

Higher Level Input Protocols

The general structure which was set up for enabling and reporting attentions throughout the network was much richer than was envisioned at any of the earlier meetings. The concept of device classes was kept; thus attention sources from a network graphics terminal were classed as one of the following types: character generating (e.g., a keyboard or function button), one-dimensional (e.g., a dial or knob), or coordinate device (further subdivided

into inking devices, tracking devices, positioning devices and identifying devices). Device types have to be specifically enabled by the application (with an optional filter) before they may generate attentions. At the time they are enabled, the data which will be sent when an attention is generated is also specified. Considerable flexibility is provided for the filters (special temporal and/or spatial conditions which govern the generation of attentions -- e.g., generate an attention is a tracking device is moved a set distance in any direction) and the specification of the data reported. The status of devices other than just the one which generated the attention may be specified to be reported as well.

The details of this scheme are being worked out by a subcommittee of the working group and have not yet been distributed for the approval of the group. It is recognized that some experimentation with this scheme will be necessary before a suitable protocol results.

Additional Applications of a Graphics Protocol

The primary application for the type of protocol which has just been described is for the exchange of graphical information between systems without regard for the type of hardware involved. Throughout the paper, output has been stressed. This was because the output protocol is much more fully developed than the input protocol. However, standardizing input descriptions is a valuable accomplishment in its own right.

Many of the benefits from the input protocol asise from the ability of a terminal with adequate intelligence to lie about the origin of data which it transmits through the network. As has been explained in detail elsewhere <C072b>, this permits terminals to simulate the functioning of particular input devices which they may not actually have, and to extend the capabilities of devices which they do. For example, even a simple keyboard may be used to simulate a device such as a tablet or light pen if the codes which are typed are properly formatted to look like they were produced by the actual devices. Functions such as tracking which are not generally attention-generating may be made to do so by the use of programmed spatial filters as already explained. Devices such as light pens and tablets may be made more precise by recomputing points which they yield to be actually on rather than near desired structures. Finally, providing a standardized interface for input devices also facilitates the integration of new input devices into the system. A small module need only be added to make them look like the device from which the application program expects to receive data.

Protocol Realizations and Experience With Usage

The development of the protocols which have been described here are still at rather a primitive stage. The basic level has been used <HA73> and some difficulties noted even with it.<KE72> Higher levels are still in the process of definition, and the protocols can truly be said to be evolving in response to users' needs. Readers with interest and experience in graphics are encouraged to obtain the primary protocol documentation and participate in its continued evolution.

BIBLIOGRAPHY

CR72 Crocker, Stephen D. et. al. "Function-oriented protocols for the ARPA computer network." SJCC 1972, pp. 271-279.

CO72a Cotton, Ira W. "Level 0 graphic input protocol." Request for Comment #336 (Unpublished document: ARPA Network Working Group, 5 May 1972).

CO72b Cotton, Ira W. "Network graphic attention handling." On-Line 72 Symposium, Brunel University, September 1972.

HA73 Harslem, Eric F. and Suzanne D. Landa. "VIEW: a distributed system for graphical analysis of large data bases." AIAA Computer Network Systems Conference, Huntsville, Alabama, April 16-18, 1973. (Paper #73-431).

HU67 Hurwitz, A. and J. P. Citron. "GRAF: graphic additions to FORTRAN." SJCC, 1967, pp. 533-557.

JO68 Johnson, C. I. "An experimental PL/I extension for graphic programming." Report No. 320-2025, IBM Cambridge Scientific Center, 1968.

KE72 Kelly, Karl C. and Jaacov Meir. "Some experiences in implementing network graphics protocol level 0." Request for Comment #387 (Unpublished document: ARPA Network Working Group, 10 November 1972).

MI72 Michener, James, et. al. "Graphics protocol - level 0 only." Request for Comments #292 (Unpublished document: ARPA Network Working Group, 12 January 1972).

MI73 Michener, James, et. al. "Graphics protocol." Request for Comments # 493 (Unpublished document: ARPA Network Working Group, 26 April 1973).

SM71 Smith, D. N. "GPL/I - a PL/I extension for computer graphics." SJCC, 1971, pp. 511-528.

SO72 Soop, Karl. "The design and use of a PL/I-based graphic programming language." ONLINE 72 Conference Proceedings, Vol. 2, pp. 601-618, 1972.

W066 Wolk, P. M. "A system for machine independent plotting." UAIDE Conference Proceedings, 1966, pp. V1-V5.

Note: Unpublished ARPA documents are available through the Network Information Center, Stanford Research Institute, Menlo Park, California.

Basic Graphics Protocol Development on the ARPA Computer Network

(J18460) 15-AUG-73 08:21; Title: Author(s): Ira W. Cotton/IWC;
Distribution: /IWC MLK(Please mail this copy to me flat - Ira Cotton);
Sub-Collections: NIC; Clerk: IWC;
Origin: <NBS-TIP>PROTOCOL-COTTON.NLS;2, 14-AUG-73 11:28 IWC ;

NJN 15-AUG-73 08:26 18461

Mail Protocol

Jim--
I had a few comments about the MAIL Protocol but most of them have been answered by you already. The others get answered when I remind myself that an automated user-process will be handling the other end. Some of these I will mention anyway because someone is sure to bring up the question of the protocol being human- usable. 1

I want to second Alex's point about different EXIT commands. At this point there is nesting of functions and subsystems to depth 2 only. It is always conceivable that the nesting will grow. I think the EXIT commands can remain as is, but that the replies should be changed. Instead of a simple 200 OK, the reply should state which function was exited. 1a

The problem here is that the user might be confused (which is likely considering the complexity of the protocol) about how much he has done and how much the server has under- stood. A status command of some sort might be useful to tell the user ofthe current state of the mail attributes. I realize this is totally unnecessary for a user-process, and I mention it only in the light of the above. 1b

The most important item is the status of MAIL vis-a-vis FTP and other protocols. I agree with you and others that MAIL should have the same status as RJE in the hierarchy, but only temporarily. 2

Besides the problems of login and accounting you have the proliferation of processes, in that the mail server must call up his ftp user-process to have it ship a file over from the other guys server. This ends up involving two servers and two user-processes, which is ridiculous. RJE has the same problem. 2a

Note that this also occurs if the server must verify an author. He must tell his mail user-process to call up the verification agent's server and go through the bit with him, and then return the information to the current job. 2b

Hopefully this problem will be cleared up in a reasonable single access protocol. I think it is important that we get going on UULP or whatever you want to call it. I have already talked to Postel, DCrocker and Padlipsky about having a meeting some time in September or October either here at BBN (I will host it) or in California around the time of the USING meeting. I am not interested in implementing UULP as it stands; in fact I would like to ignore all the human engineering aspects of the spec and concentrate on defining a good protocol, and inte- grating the current set of protocols. I would like it to be a small (by

invitation only) meeting of protocol-oriented people. Would you let me know what are good dates and places for you, and who else you think should be there? Other than the people I mentioned above, I feel strongly about having Bob Thomas there. The rest is open to suggestion.

--Nancy

NJN 15-AUG-73 08:26 18461

Mail Protocol
- - - -

(J18461) 15-AUG-73 08:26; Title: Author(s): Nancy J. Neigus/NJN ;
Distribution: /JEW ; Sub-Collections: NIC; Clerk: NJN;

WEEK1: ENDING 3 AUG 73 1

jtsa efforts 1a

mrs. caral giammo of the joint technical support activity reviewed efforts initiated in the areas of dms evaluation methodology on 1 and 2 august. Mrs giammo will send a copy of her trip report to this office. 1a1

PRC -- presentation by Aaron Navarro and Ron Romanczuk -- notes available -- see capt daughtry. 1a1a

SAI -- presentation by george pan -- notes available -- see 1lt wingfield. 1a1b

SDC -- overview by Bill Rzepka -- refer to outline provided by SDC personnel-- see iuorno. 1a1c

1a2

1a3

ids investigation 1b

Database is continually being updated and scanned by icl etc --- the four update programs are being revised and debugged. Sgt Johnson writing COBOL-IDS (using the COBOL RPG) to generate reports on manhours by workunit to note composite past monthly, past quarterly, and cummulative hours spent on job segments by employee - see Sgt Johnson- Capt daughtry. 1b1

expansion of data base to fifth sub-file to accommodate travel expenditures (TDY) by personnel, project, etc --- to date no data acquired -- see Capt Daughtry. 1b2

ids data query 1c

serious investigation beginning -- no problems anticipated in using the system-- see Capt Daughtry. 1c1

wwmccs 1d

need dd form 1398 forms from key individuals to get clearance for wwmccs investigation -- gcos course # 630 to be offerred at mclean virginia available for two (2) isim/isis personnel interested in wwmccs investigation. course to be two weeks long (part a and b only) and taught by Jeff North. 1d1

(J18462) 15-AUG-73 09:24; Title: Author(s): William P. Bethke/WPB;
Distribution: /FJT JLM; Sub-Collections: RADC; Clerk: WPB;
Origin: <BETHKE>STATUSJOBS.NLS;1, 9-AUG-73 16:21 WPB ;

Ms. smith, Per the ARPANETNEWS (8/73) I would greatly appreciate it if you could send me a copy of the ILLIAC-IV System User's Guide. We are not now ILLIAC users, but might be able to take advantage of some of its capabilities in future work. M. R. Leavitt (MRL) 1

(J18463) 15-AUG-73 09:44; Title: Author(s): M. R. Leavitt/MRL;
Distribution: /MS; Sub-Collections: NIC; Clerk: MRL;

MRL 15-AUG-73 09:46 18464

Dave, I would greatly appreciate being put on the membership rolls of USING per the note in the ARPANETNEWS (8/73). Many thanks. Mike Leavitt (MRL).

1

(J18464) 15-AUG-73 09:46; Title: Author(s): M. R. Leavitt/MRL;
Distribution: /DHC JI; Sub-Collections: NIC; Clerk: MRL;

DVN 15-AUG-73 10:19 18465

ARPA May Not Try Output Device Experimental Teleype 'Till Next Week

I reached the ARPA office by Phone this morning. John Perry is on the west coast on business and vacation this week. I talked with his secratary, Paula Kazanjian. She has some NLS training. I asked her to try O D E T if she had a chance, but it is not clear she will. It is a bit of an undertaking for her So we may have to wait till next week..

1

DVN 15-AUG-73 10:19 18465

ARPA May Not Try Output Device Experimental Teleype 'Till Next Week

(J18465) 15-AUG-73 10:19; Title: Author(s): Dirk H. Van Nouhuys/DVN; Distribution: /PK2 JSP EKM GLB GLB(could you try tis?); Sub-Collections: NIC SRI-ARC ARPA; Clerk: DVN;

DVN 15-AUG-73 11:32 18466

Assimilate loops

If you assimilate branch 0 of a file to it's own tail, it loops. I very easilly made an unbearably large file that way. 1

DVN 15-AUG-73 11:32 18466

Assimilate loops

(J18466) 15-AUG-73 11:32; Title: Author(s): Dirk H. Van Nouhuys/DVN; Distribution: /BUGS LEG(so you know I did it); Sub-Collections: SRI-ARC BUGS; Clerk: DVN;

DVN 15-AUG-73 11:34 18467

Online Distribution for Laura Gould

Would you Mark Laura Gould (LEG) for onlinedistribution as well as off line?..Thanks 1

DVN 15-AUG-73 11:34 18467

Online Distribution for Laura Gould

(J18467) 15-AUG-73 11:34; Title: Author(s): Dirk H. Van Nouhuys/DVN; Distribution: /MLK LEG(so you'd know I did it); Sub-Collections: RADC NIC; Clerk: DVN;

Initial Query/Help System: Draft

NOTE: This is a highly preliminary draft which is submitted only because I will be on vacation until 27 August. The first part of this paper is based primarily on work by DSK, MDK, and myself with contributions by CHI, RWW, JAKE, NDM and KIRK (though they may not recognize them) I accept full reponsbility for the current document. The second part is based on earlier discussions and is primarily of historical interest. There are some errors and also some things that may change. Those items which I feel to be open questions are noted. The database description seems adequate for almost any system I can envision and is compatible with the current resource notebook database. First stage functions are, I feel, well determined. There are branches in which I had hoped to discuss some proposed additions useful for a real query system which could operate over things like the catalog; I have some fairly detailed ideas and will put them in on my return. Please address any comments to me and DSK and watch for the revision. 1

Parameters to Query 2

The DNLS version of the systems is currently under consideration and is not described below, though the functions should remain the same. 2a

When a system routine calls QUERY, it passes the information listed below. HELP proposes to enter QUERY either from the top of the help data base (via user command "HELP" or "GO TO HELP") or sideways via "↑?" when getting "?" help on a specific command. In the latter case, we intend to pass enough information from the parser to allow Query to position the user at an advantageous place in the DB. 2b

The general parameters are 2c

1. File name 2c1

2. Parser address or code (determines specific initialization - for example, HELP system does not allow certain Query commands, and disallows user movement to non-help files.) 2c2

3. Starting location within file, or 0.; (we also discussed the need, during searching, for Query to know the "top" file in the DB. This should not be a paramete to a program, it should be a link in a file, so that it may be changed without recompiling the system.) 2c3

NOTE: "↑?" is probably not a good choice. It comes through as a CR 2d

HELP User Commands 3

While the functions are well determined, the command syntax is open. That proposed below is a working model and is presented with suggestions of possible alternatives. Parsers ARE easy to change (before the system is brought up for the public) 3a

There are 2 types of commands - res-word<CR> and name-list<?>. 3b

The former are official HELP/QUERY commands, the latter are interpreted as paths to statement names in the data base (no SHOW or BRING commands). (If a non-command word is followed by a CR, it is searched for anyway in spite of the fact that it should have been followed by a "?". This is possible because of the limited number of reserved words.) NOTE: Whether we do it this way or have explicit command verbs is an open question. We must, however, be able to differentiate between names in the data base and commands, e.g., "QUIT". See further discussion below. 3b1

Assuming this scheme is used, CHI points out that the more common operation is the request for the display of a node and that the "easier" character (CR) should be used for that function. He suggests perhaps " " for executing commands. 3b1a

Name-lists 3c

If more than one name, separated by spaces, appears in the name-list, the latter names are searched for under the earlier names. Case does not matter. 3c1

CHI points out that many inexperienced users of the initial query system put spaces in strange places forcing him to write a deblank procedure. This sort of consideration fits with some comments on non-printing characters made by Laura Gould when she was here. Perhaps we should use some visible separator (":", ".", etc.) 3c1a

See the discussion of the search algorithm. 3c2

Items may also be selected by number. These numbers refer to the items specified in a menu list (see below) from an earlier selection. If the name-list begins with a number, that number refers to the immediately preceding menu. If a number appears in the middle of a name-list, it modifies the specified node immediately preceding it in the name-list as if a menu were printed at that location. 3c3

If part of a list is invalid, the user will be presented with the last valid location found before the error occurred. 3c4

NOTE: Specification of path-names will be identical in the first stage of implementaton of the more complete Query with the addition of more complex means of searching files (by content with a more varied syntax) in later implementations and the possibility of a set system. Additionally in Query, there will be commands to permit a user to move around in the tree. 3c5

In Help, we want to avoid confusing the user with the notion of the data base as tree and thus only provide the following commands. See the discussion of query moving commands below. 3c5a

Typing '? gets the user a list of HELP commands. They are 3d

HELP<CR> (or HELP?) - introduction to the HELP system 3d1

ctrl O - stop printing (TNLS only) 3d2

ctrl ? - return to original Data Base entry node 3d3

NOTE: "↑?" comes through as CR This will not work. 3d3a

QUIT<CR> - back to NLS 3d4

[future: Content searching expressions.] 3d5

********* 3d6

BACK-- Command to go back to the last place seen (sort of a jump return which decides whether it is a jump return or jump file return depending on the state of a query stack which would be larger than the NLS 5 file depth.) In discussion on 14-AUG-73 we decided that even without telling the user about the tree structure, this would be a reasonable function to have. It would go back one level at a time and could be modified like a name list. Thus one culd have something like "BACK BACK 3?", the third menu item under the node seen two node displays back. Perhaps a better syntax would have "←" or "<" rather than a word. 3d7

Again, the function is highly desirable, though the syntax is currently up in the air. MDK may object to its inclusion in the Help system because it is an additional command which may confuse the user. 3d7a

Note on the choice of commands-- some open questions 3e

The reader will note that this proposal does not have any explicit commands like "Show" or "Bring", but does have the

equivalent functions. "Bring" is in fact removed because a redesign of the data-base into several files linked appropriately together permits the use of a single function; it also permits the elimination of separate query commands in the parser for different data bases-- all official data bases are linked to by the central data base file. Additionally, unofficial data bases may be accessed by NLS link syntax at the command level in Query, if not Help. 3e1

It was felt that the Help commands should be a subset of the Query commands. 3e2

Users of Help should not be hampered from getting useful information with only a limited knowledge of the system; users experienced with query should not have to learn a new system. 3e2a

Some members of the Help team (MDK, DSK) feel that explicit command verbs such as "Show" are unnecessary and confusing to the Help user. Some members of the Query team (JAKE, RWW) feel the command verbs are useful in Query and also feel that with additional functions antcipated in Query ("Find", "Set system manipulation", "Output preparation", etc.), a more complete parser with verbs would be advantageous though again is not absolutely necessary. HGL oscillates between the two poles, though currently tends toward the latter argument. It does seem that whichever choice is made should be the same for both systems for reasons of consistency, though this of course is not necessary from a programming point of view. (The fuctions can be the same with different parsers.) 3e3

It should be noted that the choice of one or the other mode is not absolutely necessary immediately; the FUNCTIONS to be implemented in this first stage are well defined and parsers are easy to change. However, after the 1 November Utiltiy deadline, it will be difficult to change from a user standpoint. 3e4

Query Data Format 4

This appears to be well defined and applicable to both Query and Help. It also has the advantage of being compatible with the current Resource Notebook data-base while at the same time being more flexible. In the course of discussion, the following versions evolved. The first is upwardly compatible with the second. 4a

The Query data base-- First version (not to be implemented) 4b

There are two functional components of the HELP data base, addressable nodes and non-addressable nodes; addressable nodes subordinate to an addressed node are displayed in a menu format for selection by the user plexes. When the user types "name?", the system finds an addressable node of that name. It then prints out the information at the node, including the menu, if one is present, following the rules outlined below. 4b1

1. ADDRESSABLE NODE - any named statement. 4b1a

The complete form-- 4b1a1

(name) text.....text ..... ##(link1) (link2) ...
(linkn) [queryviewspecs]## END OF STATEMENT 4b1a1a

Name delimiters may be defined by the user and need not be parentheses. "END OF STATEMENT" and spaces appear only for clarity in this example. The material enclosed in and including the "##" brackets need not be present. 4b1a2

See "Special Data Base Commands" for description of the information following the first "##". 4b1a3

2. MENU - the first named substatement to the addressable node of format and all of its named successors. 4b1b

Statements become part of a "menu" dynamically simply by the fact that their "up" has been addressed for printout by a command of the form "name?". 4b1b1

When this happens, the system gives special treatment to the statements constituting the "menu". 4b1b2

During printout, the items are numbered automatically by the system. Anytime the system does this for the user, it is showing him some of the specific choices he has. The user may then type the name or number of the choice he makes: "8?"(meaning "Show me menu item #8") 4b1b2a

3. UNADDRESSABLE NODE - any unnamed statement. 4b1c

Node printing algorithm 4b2

When a request to show a node has been parsed and the node found, the following steps are followed to print out the information to the user: 4b2a

Print out all the text at the node and all text to which it links. 4b2a1

Print the first line of text of named substatements (if this the node is to be printed in linear menu mode.) A number is assigned to these named substatements. Any text linked to by the substatements will not be printed. 4b2a2

All lines of text of all unnamed suubstatements of the node will be printed. 4b2a3

1. If a link is taken by the system (for printout purposes) the original statement and its special commands remain in control of the print operation. Any links or viewspecs encountered at the new linked-to location are ignored. 4b2b

2. If a link is taken, the system does not print any menus located beneath the linked-to statement. 4b2c

3. The Query viewspecs have a scope of only the addressable node in which they physically occur. 4b2d

4. If the user has the "names-off" NLS viewspec set, it controls only printout of text, In any menu printout, names will show. 4b2e

The Query data base-- Second version 4c

There are two functional components of the HELP data base, addressable nodes and non-addressable nodes. A named statement is always addressable; an unnamed statement may be either. 4c1

Either type of statement may include the text of other statements (WITHOUT their included (i.e., linked to) text to prevent loops) in a manner described below. Additionally, addressable nodes may (or may not) include the substructure of included nodes in its menu along with the primary node's substructure. 4c2

When the user types name?, the system finds an addressable node of that name. It then prints out the information at the node, including the menu, if one is present, following the rules outlined below. 4c3

1. ADDRESSABLE NODE - 4c3a

Named statements 4c3a1

Named statements may have, following their name, normal text interspersed with any number of Query executable text blocks. 4c3a1a

Unnamed addressable statements 4c3a2

Unnamed addressable statements may have, following an initial "*" (which is not printed to the user in the Query system), any amount of normal NLS text (including none) interspersed with any number of Query executable text blocks. 4c3a2a

Query executable text blocks 4c3a3

Within these executable text blocks, delimited on either side by "##", there may be any number of normal NLS links each possibly followed by a special Query viewspec text enclosed in square brackets ("[" and "]"). 4c3a3a

Name delimiters may be defined by the user and need not be parentheses. 4c3a4

2. NON-ADDRESSABLE NODE - 4c3b

Non-addressable nodes are unnamed statements which do not begin with an "*". They may include the text of other nodes by having Query executable text blocks, but substructure as well as text linked to by the included nodes will not be included. 4c3b1

3. MENU AND NODE PRINTING ALGORITHM - 4c3c

When a request to show an addressable node has been parsed and the node found, the following steps are taken to print out the information and further selection menu to the user: 4c3c1

Print out all the text at the node including the name if it has one, but not including the "*" in the case of an addressable unnamed statement, to the first Query Executable Text block (if one is present.) 4c3c1a

Whenever an executable text block is encountered, do the following: 4c3c1b

Print out the text of the included node IGNORING ANY FURTHER LINKS IN THE NODE (somewhat arbitrarily, but to avoid loops). If the "include

substructure" query viewspec is associated with this included node, begin to print out the substructure according to the general substructure rules described below following any formatting viewspecs given in the primary node to describe how the included node and substructure are to be printed. Continue processing the primary node as described above until the end of the node is reached. 4c3c1b1

Continue printing the text of the primary node and the text referred to by Executable text blocks until the end of the statement is reached. The substructure of the node itself will be printed when the end of the statement is reached or when a viewspec-only field link is encountered. The text will be printed in the format specified by either the default query viewspecs or those included in a Query viewspec block not modifying a link to another node. (An NLS link with only viewspecs refers to the manner in which the current node is to be formatted.) 4c3c1c

Rules for printing substructure and creating menus 4c3c1d

If the substatement is an addressable node and the linear menu viewspec is in effect, print the first line of text of the node (and/or any included text up to a combined total of one line). A number is assigned to the statements sequentially from 1 throughout all the included substructure of the primary node. 4c3c1d1

Thus, for example, 1, 2, and 3 may come from the first included text, 4 and 5 may come from the second, and 6, 7, 8, and 9 may come from the substructure of the primary node. Moreover, they may be formatted differently and non-addressable nodes may be interspersed. These numbers may then be used in selections by the user. 4c3c1d1a

If the substatement is an addressable node and the columnated menu query viewspec is in effect, a number will be assigned in the usual fashion, but only the name will be printed (on named nodes). These will be printed three to a line until a nonaddressable node or an unnamed addressable node is encountered. Unnamed addressable nodes will have

a number assigned and the first line of text printed outside of the columnated format. 4c3c1d2

If the substatement is a non-addressable node, all lines of text will be printed. This includes all the text at included nodes, though no addressable substructure may be included. 4c3c1d3

If a link is taken by the system (for printout purposes) the original statement and its special commands remain in control of the print operation. Any links or viewspecs encountered at the new linked-to location are ignored. 4c3c1e

The Query viewspecs have a scope of only the addressable node in which they physically occur. 4c3c1f

Statements become part of a "menu" dynamically simply by the fact that their "up" has been addressed for printout by a command of the form "name?" either directly or indeirectly through a link. 4c3c2

When this happens, the system gives special treatment to the statements constituting the "menu". 4c3c3

During printout, the items are numbered automatically by the system. Anytime the system does this for the user, it is showing him some of the specific choices he has. The user may then type the name or number of the choice he makes: "8?"(meaning "Show me menu item #8") 4c3c3a

The executable text block may be the proper location for ZOG like true executable text for firing up forks, etc. (Perhaps in the last one only?) 4c3c3b

Please note that the current Resource Notebook database is fully compatible with the above defintion and need not be changed. The full power may be used by the Help system, but care should be used since no database debugger will exist in the first stage. 4c3c3c

Special Data Base Commands 4d

Special query viewspecs may be imbedded after links in query executable text blocks. In the case of HELP, this takes some of the burden off the user (and complicates the data base building task instead) by allowing, for example, the flow through the data to be forced from within the data (via

viewspecs), instead of having the user type in commands like (up) (back) (↑), etc. to control his own flow. 4d1

These commands are strictly optional. 4d2

They must always be at the end of a named (addressable) statement. To locate them, the system scans backwards from the end and checks if the last characters in the node are "##". If they are, the system scans until it finds the matching beginning pair. 4d3

LINKS - 4d3a

The purpose of links here is to allow the printout to proceed in another statement or file (eliminating the need to copy data which is already located elsewhere.) 4d3a1

It also allows the user to control the viewspecs with which the data at this node is printed (at this own risk). 4d3a2

Anytime the system gets a bad link or a bad data base command, it simply ignores it with no message to the user. (Or catches any NLS errors and feeds back some more intelligible message to the HELP/QUERY user.) 4d3a3

After "executing" such a link, the system returns to process the next link in the list, and so forth. The data base builder may choose to allow selections from either the included nodes or the primary node by including substructure in menu selections by use of the special query viewspecs. 4d3a4

QUERY VIEWSPECS - The purpose of these special viewspecs is to allow unusual formatting for printout or display, to control the flow through the data base and to turn on the special information for debugging the data base. 4d3b

The viewspecs list is delimited by square brackets and the elements are separated by commas. [NOTE: Do we really want commas?] 4d3b1

i = Include substructure at the node in the menu. 4d3b1a

c = During printout, "columnate" all menu items. This means that only menu statement names are printed, three to a line. 4d3b1b

Interspersed non-named statements non-addressable

will be printed in their entirety then followed by additional collumnated named nodes at the some level. 4d3b1b1

Interspersed non-named statements addressable will have their first line only printed and will then be followed by additional collumnated named nodes at the some level. 4d3b1b2

l=number - Sets the number of options which are printed at one time. When this number has been printed and there are more, the print program stops and asks the user: "Do you want more?" If he types "No", it is back in regular mode; if he types "yes" it repeats the operation on the next group of menu options. Default: 21 options 4d3b1c

p - Print QUERY viewspecs and links for debugging the data base and QUERY program. Default: Do not print information between the "##" and the end of statement. 4d3b1d

Restrictions 4e

For HELP, names must contain only dashes and alphanumeric characters. 4e1

In general, names which are columnated must contain 19 or less characters. There is no restriction if the columnation viewspec is not selected. 4e2

Search Algorithm for Statement Names-- OPEN QUESTION 5

The possible search algorithms for the query system can be as varied and complex as we are crazy enough to create We can experiment with possible implementations, but the problem is currently unsolved for query in general. (ZOG permits the user to either use a system default search algorithm or create his own using straightforward primitives.) 5a

A possible solution which would work adequately for HELP is the following. When the user types text followed by a question mark, QUERY assumes he is requesting a printout from the data base. To locate the correct branch for printout, a search is made as follows: 5b

1. Follow canonically down current branch (not taking any links). If this fails, do (2). 5b1

2. Starting at the top of the DB, search the entire DB,

beginning with the top statements of plex 1, and proceeding to successively deeper levels, one at a time, taking all links.(?) 5b2

Another possible solution is the following. It assumes the maintenance of a (to the user) infinitely large stack of return locations (certainly not the 5 location limit of the rest of NLS). This is necessary for the "back return" function anyway. 5c

1. Follow canonically down current branch (not taking any links). If this fails, do (2). 5c1

2. Go to the next return location back and do the search. If this fails, repeat this step until the end of the stack is reached. Then go to te top of the data base and do the search. 5c2

Because the user may specify a name list (which could be forced to start at the top of the data-base, he can avoid some very long searches. This method satisfies the assumption that the user wants nodes in the context of what he has seen. 5c3

Eventually, we hope to have a data base verifier program which will among other things, locate possible search loops. In the meantime the data base builder is strongly warned to avoid loops. 5d

User Entry into Query 6

The user may take advantage of QUERY for viewing his own data base. To access QUERY and specify his own file, he executes the NLS command: 6a

Go to Query [OPTION (link to "top" of user DB)] 6a1

Or, in query, type in link syntax. 6b

Things to be filled in on my return: 7

Query and the set system 7a

Content searches 7b

Ambiguous specifications 7c

Error handling 7d

Query databases and the datacomputer 7e

********** Items from an earlier document which should be fleshed out or flushed out on the basis of more recent discussion above follow. 8

Modifications and minor evolution in existing features 9

The following modifications to the query system were discussed at a meeting of the query team and assigned priorities: 9a

Highest priority 9b

Shortening of introductory messages, clean up help. 9b1

Rather than print out the same lengthy introductory message everytime a user enters query, a short message telling what to type to see a more complete prompting should be displayed. 9b1a

"?" for general (short) help message of query commands at any time. 9b1a1

"H[elp]" for local help. 9b1a2

We probably don't want "S[how] help" for this function; there may be a (help) branch in the file. 9b1a2a

Moreover, the current practice of having within the data base the text of examples of how to select an item should be discouraged. 9b1b

Menu or data base file with list of the following items: 9b2

A link to the file contatining the head of the data base. 9b2a

This file could be used for part of the help message. 9b2b

Maybe have executable and non-executable links? If character precedes a link, it is to be executed when show is typed. 9b2c

This convention could be used for viewspecs, too. (I don't think the scanning time is crucial, but we will have to experiment.) It would probably not be reasonable to print the links out to the users. 9b2c1

Get rid of "Bring"-- Only have "show" 9b3

There should be no distinction between bring and show. Even if parts of the query data base are in different files, the user should be able to think of them as a single forest of trees. (See ZOG's notion of a forest.) 9b3a

The user would only be able to access a name which is a

direct (not necessarily an immediate) descendant of a node. To get a similar name down from another node, the user would have to move back up to the top of the tree. (I want to avoid the confusion involved in explaining the existence of different files to the user if possible. How can this be done?) 9b3b

Difficulty here: see discussion of multiple names; this will work nicely in the case of intra-file searches, but for inter-file searches (show personnel when the user is in the resource notebook head file) many separate files wil have to be opened and manipulated. Show limited number and ask if user wants more? 9b3b1

Have an inversion process to be run whenever the data base is changed? (The Datalanguage provides this option; it is stressed in their document that an inversion makes retrievals easy, but makes file management more difficult. Given the size of the database for the resource notebook, and the (hopefully) infrequent database changes, this is probably the way to go. I propose to implement this system without inversions at first and will see how slow retrievals are. 9b3b2

(I guess a user would soon learn that limitless searches are expensive over a large data base. If we permit modified searches ("sri-arc personnel station agent" or even (if the user had printed the resource notebook menu out and sri-arc were number 15 and the resource notebook were number 3 in the database menu and the user had seen this earlier in the session) "database 3 15 personnel station-agent".) 9b3b3

Generate numbers (not statement numbers) for the substructure of a node being displayed. The user may use them to select an item (as well as being able to select them by name). 9b4

Permit the use of a name followed by a list of numbers or names in a single command. 9b5

Solve multiple name problem. Print out the number of hits below the current point with a list of node names as in ZOG (more difficult to implement, but more useful in providing context and more difficult to use for the user.) 9b6

"S[how] top" to get back to top of the tree? 9b7

Commands to get to the top of a database, to the top of the system. 9b7a

Initial Query/Help System: Draft

(J18468) 15-AUG-73 13:03; Title: Author(s): Harvey G. Lehtman/HGL;
Distribution: /SRI-ARC JI; Sub-Collections: SRI-ARC; Clerk: HGL;
Origin: <LEHTMAN>QUPLAN.NLS;6, 15-AUG-73 12:55 HGL ;

DHC 15-AUG-73 14:26 18469

Using vs. Users

Mike -- Ihaven't seen the exact working of the Arpanet news. Do you want to actively participate in USING activities or do you wish merely to monitor its activities (group USERS)? We are trying to keep the Using membership to 'workers'. --Dave 1

DHC 15-AUG-73 14:26 18469

Using vs. Users

(J18469) 15-AUG-73 14:26; Title: Author(s): David H. Crocker/DHC;
Distribution: /MRL; Sub-Collections: NIC; Clerk: DHC;

KEV 15-AUG-73 14:59 18470

response to 18403, miscellaneous IMLAC stuff

dave,

you must use Binary Output for loading over the network and it is probably best to use Binary Output for running NLS in general . If you are using Binary Output, there is NO EASY WAY to undo the Intercept None (we've checked with BBN). (Since you say you can run without the Binary Output it is possible to undo the Intercept None programatically, however we don't have the time or the manpower to do this at least until after Oct. 15, and maybe not even then. i will put it on my list of things to think about and if i ever get the time will get back to you about it.)

as far as the IMLAC putting up the circle on command accept, that sounds like a nice idea. There might be some synchronization problems, but i'm not sure. however, as far as we are concerned, IMNLS is a dead program, except for bug fixing, as we plan to switch over to network standard graphics for running DNLS on IMLACs. 1

KEV 15-AUG-73 14:59 18470

response to 18403, miscellaneous IMLAC stuff

(J18470) 15-AUG-73 14:59; Title: Author(s): Kenneth E. (Ken) Victor/KEV; Distribution: /DHC JEW CHI DCW; Sub-Collections: SRI-ARC; Clerk: KEV;

RLT 13-AUG-73 07:43 18471

Questions and Information re Utility

HI Martin. Thpught it was time I got back to you with some of the info I have gathered up here in the last two weeks plus I am curious as to the progress on the line processor (is it officially named yet?). 1

Our tentative configuration is still a half dozen TNLS terminals and one DNLS. This will probably be it until early next year. A lot depends on how fast your second version of the line processor develops. 2

Questions: 3

Any date on line processor availability yet? 3a

Might we obtain the specs -- two reasons 3b

1 We might be able to get our people to build one or two for us. 3b1

2 We would like to show them to the manufacturing arm to get production cost estimates. 3b2

Are you going to be able to add a printer to the line processor? There is a 2400 baud one available here that might be nice. More info is coming which I will forward to you if you are interested. I will be seeing a demo of it on Aug 21. 3c

What line speeds, on a dedicated link, should we be looking at? 3d

The last word one the Utility was 8 300 baud dial up ports that were capable of 1200 baud. If we can go in faster with the line processor will we just use multiples of 1200 and these ports or what? 3e

Has your 1200 baud modem arrived? I think we can get one up here if you want to try it. However my experience over the last two weeks make their usefullness doubtful. The terminal has to be very good to filter out the line noise. I have had some trouble in this respect. 3f

Can you give me a name, address, and telephone number to contact for Canadian representation for the Delta Data 5200 terminal? 3g

Our VUcom I terminal can only be used for TNLS. Our labs had requested an OEM from CDC on a terminal with edit and addressable cursor. (Because of Bell Canada, Canadian CDC seem to have a lot more development latitude than CDC Terminal Division) The request would require a mod that is uneconomical on less than 100 terminals. Consequently any DNLS terminal we use will have to come from outside.

However with a little luck we might get under the labs umbrella if they make a bulk purchase. Currently one they are looking at is the Super Bee. 4

I am curious, and probably out of line, but is it possible for the software to slow down the I/O on a 1200 baud modem? When dialing up,the first character might indicate usage at 300 baud and the I/O contoller would adjust. This would permit a range of TNLS terminals without limiting access, and ,even more importantly, permit high speed dial-up "mousing" in DNLS. THis is likely a question for DEC or TYSHARE. 5

DVN 15-AUG-73 20:18 18472

DRAFT August Quarterly Management Report

I will forward this draft to SRI editing tomorrow (8/16). I send you a copy to let you see my changes before it goes to Doug and Bart Cox for approval.

DRAFT August Quarterly Management Report

ARPA Order Number: - Program: - 1

Title: Network Information Center and Augmentation System Development 1a

Contractor: Augmentation Research Center, Stanford Research Institute 1b

Date of Contract: 10 May 1972 1c

Amount of Contract: $2,270,000 1d

Contract Number: F30602-72-C-0313 1e

Principal Investigator: Dr. Douglas C. Engelbart, phone (415) 326-6200, ext. 2220 1f

Contract Expiration Date: 10 February 1974 1g

I RESEARCH PROGRAM AND PLAN 2

As per our proposal and contract, work is progressing in the following areas: 2a

Developing Service Functions for: 2a1

External users - the Network Information Center (NIC) 2a1a

Internal users - prototype systems such as: 2a1b

Dialog Support System (DSS) 2a1b1

Documentation Production and Control System (DPCS) 2a1b2

Software Engineering Augmentation System (SEAS) 2a1b3

System Developers' Handbook System (SDHS) 2a1b4

Developing service delivery and marketing principles and practices 2a2

Providing operational marketing and delivery of services within the ARC and NIC customer markets 2a3

II MAJOR ACCOMPLISHMENTS 3

Network Information Center 3a

During the past quarter the major accomplishment has been a

thorough review of the NIC, its costs, services, and plans for the future. The results of this analysis are outlined in our proposal to ARPA for a two-year extension of our contract beginning in February, 1974. 3a1

Upgrading and cleaup of the NIC Query Language has made it easeir to use and more powerful. 3a2

Dialog Support System 3b

In the last quarte we have received in excess of 150 requests for network Journal delivery in response to a recent questionnaire distributed by the NIC, and updated the Ident system accordingly. Many ARPANET Journal users are now regularly receiving messages and citations at their own sites via the network. 3b1

Our FTP server process has been modified to permit a network user to retrieve Journal files in sequential, unstructured form without explicit login to the ARC system or aid from NLS. 3b2

Our File Transfer Protocol (FTP) server process has been further modified to permit users to enter messages or files into the ARC Journal from their own local mail systems via the network, again without explicit login or use of NLS. 3b3

Design work for the Multi-site Journal and Ident system is continuing. As an outgrowth of this work, we have designed and specified a mail protocol, currently under review by members of the Network Working Group, for general network use. 3b4

Software Development 3c

In this quarter we brought into operation a group allocation system to control user login and thus allocate our computer resources A study made by Analysis indicated that controlling access to the system (login) was an adequate resource allocation scheme. 3c1

We designed and partially implemented a new command language interpreter and a new command language based on user feedback and training experience. 3c2

We began work on Alpha-Numerice Display NLS to permit display NLS to run on many display terminals without graphics capabilities. We designed and built a Line Processor which uses Intel MCS-4 computer chips. 3c3

A Network Graphics Protocol proposal was developed and submitted to the Network Graphics Group. 3c4

We developed mechanisms for generation of a System Guide to NLS based on the object and source code. The guide consists of an alphabetic listing of all data and procedures used in NLS (along with comments, calling arguments, and location in ssurce code files) and an index based on non-trivial words in comments on procedures. A cross reference facility shows what procedures call other procedures, etc. 3c5

Dex II is in operation (missing some of the more sophisticated features). 3c6

The NLS Calculator was released to users. 3c7

Analysis 3d

The identity of the Analysis function within ARC has been emerging steadily. Over the last three months, Analysis has been working in the following areas: 3d1

Analysis of the NIC 3d1a

Telephone Survey of NIC Station Agents 3d1a1

Evaluation of Costs of NLS Support for a medium sized community of users 3d1a2

Survey of NIC-PSO work and expenditures 3d1a3

Analysis of evolutionary information centers 3d1b

Technological transfer to VELA community 3d1c

Analysis of needs for personal information management 3d1d

Definition of functions of Analysis and participation in proposal writing. 3d1e

Analysis of office automation requirements 3d1f

Analysis of Journal system 3d1g

Comparsons of text editors 3d1h

Comparisons of user accounts reported by SUPERWATCH and the "Accounts" files (There is still a discrepancy) 3d1i

Log-in and duration of connection Statistics. 3d1j

Preparation for Workshop Utility 3e

Interaction with Tymshare on Utility computer preparations and staffing continued. 3e1

Tymshare has selected a lead operator and a systems programmer. We are discussing operational procedures and the facility configuration. 3e2

We now estimate service will begin between October 15 and November 1. 3e3

At ARC, we have hired an experienced-in-NLS behavioral psychologist who will coordinate training and user development for the Utility user groups. 3e4

Our Utility systems programmer is working on procedures for quality assurance as new versions of NLS come into operation on the Utility. 3e5

III PROBLEMS ENCOUNTERED 4

No outstanding problems. 4a

IV FISCAL STATUS 5

Estimated expenditures and commitments to date are: $1,740,000 excluding computer lease commitments. Funds required to complete the work within funding limitations are: $530,000. Estimated date of completion of work: February 10, 1974. 5a

V ACTION REQUIRED BY THE GOVERNMENT 6

None 6a

VI Next Quarter Plans 7

Network Information Center 7a

Work has begun to allow NIC catalogs to be produced on the 360 at UCSB which is a more appropriate machine for this type of work than ARC's PDP-10. 7a1

The analysis of the NIC begun last quarter will continue and changein NIC services s suggested by the analysis will begin implementation. 7a2

Dialog Support System 7b

During the next quarter, our work on the Multi-site Journal will continue. An initial, two-site system will be implemented to support the Utility. Specifications for the full system will be completed, and work on its implementation will begin. 7b1

We will continue to bring our work in this area to bear upon the development of the general, network mail protocol. 7b1a

Software Development 7c

We will finish the new command language. 7c1

We will get Alpha-Numeric Display NLS to work and modify display support code in Tenex so DNLS can be run under standard Tenex using Imlac protocol or Alpha-Numeric Displays. 7c2

Specification of the Forms System will be completed. 7c3

Specification of privacy features for the Journal will be completed. 7c4

Specification of a new display system for ARC will be completed. 7c5

Specification of the Networks Graphics Protocol (help) will be completed. 7c6

Analysis 7d

Plans for the next quarter are to: 7d1

Continue analysis of the NIC 7d1a

Begin analysis of the dialog support system 7d1b

Analyze needs of network communities (energy communities first) 7d1c

Develope the "evolutionary information center" concept and survey other existing information centers 7d1d

Analyze needs of community special interest groups 7d1e

Assess our group allocation system works which partitions computer access to users according to their type of work. 7d1f

Preparation for Workshop Utility 7e

Final stages of operational planning will take place, leading to initial service late in the reporting period . 7e1

Approved by:

D. C. Engelbart, Principal Investigator

8

DRAFT August Quarterly Management Report

(J18472) 15-AUG-73 20:18; Title: Author(s): Dirk H. Van Nouhuys/DVN;
Distribution: /RWW JEW CHI PR JCN SRL; Sub-Collections: SRI-ARC; Clerk:
DVN;
Origin: <VANNOUHUYS>QMR.NLS;5, 15-AUG-73 20:14 DVN ;

RWW 15-AUG-73 15:23 18474

Visit the Week of 20th by Steve Crocker and Connie Mc Lindon

Steve Crocker will bring to ARC for introduction Constance (Connie)Mclindon a new ARPA employee. Connies background is in Computer Science (an MS I think). She has been doing COBOL progrmming. Her job is to get all ARPA data processing, managemet info systems etc under control nd play a lead role in their office automation work. He says she is sharp and somewhat sceptical of the new waves of the future, which I guess includes NLS. Steve will sendmessage on Fri the day he want to bring her by. Probably monday the 20th. She will be a key contact for JCN. 1

DVN 15-AUG-73 21:07 18475

New Member for DIRT

Marcia, would you also make LEG a member of DIRT?..thanks 1

DVN 15-AUG-73 21:07 18475

New Member for DIRT

(J18475) 15-AUG-73 21:07; Title: Author(s): Dirk H. Van Nouhuys/DVN; Distribution: /LEG MLK; Sub-Collections: SRI-ARC; Clerk: DVN;

DVN 15-AUG-73 21:41 18476

Let's Start Planning for Learning User Programming

Shouldn't we start making concrete plans for some one comming here to get to know user programming. Dean Meyer will be leaving for scool in a little over a month. 1

DVN 15-AUG-73 21:41 18476

Let's Start Planning for Learning User Programming

(J18476) 15-AUG-73 21:41; Title: Author(s): Dirk H. Van Nouhuys/DVN; Distribution: /DLS JPC RWW(fyi) JCN NDM(fyi) HGL(fyi); Sub-Collections: RADC SRI-ARC; Clerk: DVN;

ADO 16-AUG-73 12:26 18477

second trial journal via ftpmail submit
- - - -
This is the second trial attempt to submit a message via the
ftp mail facility to the nic journal. by me, that is.

if you recieve this, and you're not me, please ignore it. 1

Is there a future for networks. Is the medium the message?
------- 2

3

ADO 16-AUG-73 12:26 18477

second trial journal via ftpmail submit
- - - -
This is the second trial attempt to submit a message via the
ftp mail facility to the nic journal. by me, that is.

(J18477) 16-AUG-73 12:26; Title: Author(s): A. D. (Buz) Owen/ADO ;
Distribution: /ADO ; Sub-Collections: NIC; Clerk: ADO;

briefing for 5550 steering group - 16 aug 73

presentation to proj. 5550 steering group on augmented knowledge workshop. 1

briefing for 5550 steering group - 16 aug 73

view graph one -
AUGMENTED KNOWLEDGE WORKSHOP 2

BASIC PREMISE OF THIS EFFORT 2a

2a1

"ON-LINE COMPUTING TECHNOLOGY HAS ADVANCED TO THE POINT WHERE ITS DAILY USE CAN SIGNIFICANTLY ENHANCE THE PERFORMANCE OF INDIVIDUALS AND ORGANIZATIONS ENGAGED IN KNOWLEDGE WORK." 2a2

KNOWLEDGE WORK = THE SYSTEMATIC ORGANIZATION OF INFORMATION AND CONCEPTS. THE KNOWLEDGE WORKER IS THE PERSON WHO CREATES AND APPLIES KNOWLEDGE TO PRODUCTIVE ENDS, IN CONTRAST TO THE MANUAL WORKER WHO APPLIES MANUAL SKILLS OR BRAWN. 2a3

SIGNIFICANTLY ENHANCE =
ACCOMPLISH MORE WORK,
OF HIGHER QUALITY,
WITH FEWER PEOPLE,
IN LESS TIME 2a4

briefing for 5550 steering group - 16 aug 73

view graph two - 3

OBJECTIVE 3a

3a1

TO INCORPORATE ON-LINE DECISION AIDS INTO AN AIR FORCE ENVIRONMENT 3a2

TO EVALUATE ON-LINE DECISION AIDS WITH REFERENCE TO AF NEEDS 3a3

TO DO NEEDED DEVELOPMENT TO MOLD AN ON-LINE SYSTEM TO SATISFY UNIQUE AF NEEDS 3a4

TO DEVELOP IN-HOUSE AN AUGMENTED KNOWLEDGE WORKSHOP TEST-BED 3a5

TO PARTICIPATE IN THE DEVELOPMENT OF THE PROTOTYPE INTEGRATED BASE COMMUNICATIONS TEST BED 3a6

3a7

briefing for 5550 steering group - 16 aug 73

view graph three - a 4

AIR FORCE PROBLEM 4a

4a1

INCREASED ADMINISTRATIVE LOAD BEING PLACED ON TECHNICAL AND SCIENTIFIC AND MANAGERIAL PERSONNEL 4a2

ADVANCED COMMUNICATION AND DATA PROCESSING CAPABILITY NOT AVAILABLE ON-LINE TO PEOPLE WHO NEED IT MOST 4a3

THE SHEER VOLUME OF PAPER AND THE PROBLEMS OF DISTRIBUTION, FILING RECOVERING AND MANIPULATING IS OVERWHELMING 4a4

4a5

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view graph three - b 5

5a

OPERATIONAL DEFICIENCY (IES) 5b

5b1

CC-3 CP 5b2

CC-4 NETTING WMCCS ALA ARPA NET 5b3

IN-5 HUMINT COLLECTION AND EXPLOITATTION SYSTEM 5b4

IN-6 NEEDS MIS 5b5

MS-5 AUTOMATED AIR STAFF PLANNING& ADMIN SYSTEM 5b6

MS-8 INTEGRATED BASE COMM SYSREM 5b7

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view graph four - 6

TABLE 1. TOTAL REPRESENTATIVE BASE INFORMATION TRANSFER STUDY (TAKEN FROM ARTHUR D. LITTLE, INC. REPORT ON USER NEEDS FOR COMM SUPPORT ON AN AIR FORCE BASE) 6a

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view graph five - 7

ARC'S ON-LINE SYSTEM (NLS) ALLOWS 7a

7a1

RAPID CREATION, EDITING, AND PROD OF DOCUMENTS 7a2

SENDING OF MESSAGES AND DOCUMENTS 7a3

FILE SHARING 7a4

ON-LINE MEETINGS 7a5

REMOTE CONFERENCING 7a6

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view graph six - 8

BLOCK DIAGRAM OF NLS 8a

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view graph seven - 9

TECHNICAL APPROACH 9a

9a1

TAKE ADVANTAGE OF THE AUGMENTED KNOWLEDGE WORKSHOP EFFORT THAT HAS BEEN ON-GOING SINCE 1959 (ARPA) 9a2

DEVELOP TRAINED PERSONNEL, HARDWARE ,ACCESS TO ARPANET TO AUGMENT A TYPICAL SECTION, A BRANCH, A DIVISION AND ?? 9a3

INTEGRATE FRONT-END SYSTEMS THAT ARE SPECIFIC TO AIR FORCE NEEDS IE. DATA MANAGEMENT, GRAPHICS, COMPUTER AIDED INSTRUCTION 9a4

EVALUATE THE IMPACT OF THE AUGMENTED WORKSHOP ON TIMELINESS OF WORK, QUALITY, DEMANDS ON TIME OF HIGHER LEVEL PERSONNEL 9a5

DEVELOP A BODY OF INFORMATION TO ENABLE VALID DECISIONS ON THE INTRODUCTION OF THE TECHNOLOGY INTO THE AIR FORCE 9a6

9a7

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view graph eight -a 10

AUGMENTED KNOWLEDGE WORKSHOP - FLOWCHART 10a

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view graph eight - b 11

ACCELERATED PROGRAM 11a

IS DIVISION - ABOUT 100 PEOPLE 11a1

NEED:
TERMINALS - 100K - 20 DNLS
COMM LINES - INTERNAL BASE/ROME LINES
TIP PORTS - HAVE ENOUGH
TRAINING - MOSTLY INTERNAL
X % NLS WHERE 100% - 500K 11a1a

FY-74 - 100K FOR TERMINALS + MORE NLS - 100K
-75 - 300K - NLS
-76 - 500K 11a1b

11a1c

MCI -ABOUT 50 PEOPLE 11a2

NEED:
TERMINALS - 20 TO 25
COMM LINES - 50
TIP PORTS - 10 TO15 FROM BOSTON AREA
TRAINING - TWO TO THREE MAN/MONTHS FROM SRI
NLS - 10 TO 20% 11a2a

FY-74 - 10-20K FOR TERMINALS
-75 - 100K TERMINALS (20), 100K NLS (20%)
-76 - 250K NLS (50%) 11a2b

11a3

11b

11c

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view graph nine - 12

CAPABILITY 12a

12b

NOW 12c

ON-LINE SYSTEM (NLS) 12c1

MESSAGE SENDING 12c2

JOURNAL SYSTEM 12c3

NETWORK INFO CENTER (NIC) 12c4

CALCULATOR 12c5

STAFFMEET 12c6

TICKLER FILE 12c7

NEAR FUTURE 12d

NLS/IDS 12d1

AKW'D BRANCH 12d2

ON-LINE CONFERENCING 12d3

FORMS ENTRY AND PRINTER 12d4

LINE DRAWING 12d5

LATER 12e

DELPHI 12e1

COMPUTER AIDED INSTRUCTION 12e2

briefing for 5550 steering group - 16 aug 73

view graph ten - 13

END PRODUCT AND PAYOFF TO THE AIR FORCE 13a

13a1

AN AUGMENTED KNOWLEDGE WORKSHOP TEST-BED 13a2

A SYSTEM TAILORED TO THE NEEDS OF THE AIR FORCE 13a3

TRAINED PERSONNEL 13a4

A BODY OF EXPERIENCE AND EVALUATION UPON WHICH TO BASE FUTURE DECISIONS 13a5

EJK 16-AUG-73 13:36 18478

briefing for 5550 steering group - 16 aug 73

(J18478) 16-AUG-73 13:36; Title: Author(s): Edmund J. Kennedy/EJK;
Distribution: /; Sub-Collections: RADC; Clerk: EJK;
Origin: <KENNEDY>BRIEFING.NLS;1, 15-AUG-73 08:29 EJK ;

notes on ma for base comm

Notes on base comm study 1

from executive summary 1a

base comm mission analysis study (1985)--initial effort on total system basis-identify, iinvesigate & propose conceptual solutions ot base comm and info transfer probbblems. 1a1

major concern-cost 1a2

main areas user needs - yardstick for cost efectiveness - technology s of a 1a3

needs - sampled 161 bases - not one truly representative. each in sme way too specialized 1a4

another approach - categorize the mission and support areas common to af basis ie. personnel , ops,mission type. from these they selected 20 for analysis. size, structure ,population, prevalence were determined and normalized info transfer needs determined for each group. 1a4a

some doubt on validity 1a5

detailed listing of user id'd deficiencies inadequate because the userway of working is heavily biased by the comm facilities availale to him. 1a5a

most info flow is outside the base comm system. info transferred via letters, forms manuals or conversations face to face 1a5b

there is a table whichshows the total representative base info transsfer summary 1a6

need improved hw & sw to manage and monitor a base comm syst 1a7

they present four concepts of systems. concept 1 is based on using the present base info transfer systt made up of many different subsysts 1a8

the concept of choice (as of this reading) is 4a this concept provides a set of distributed hub switches under the control of a common center. subscribers will be connected to the nearest hub via coax subscriber loops, with broadband coax cable trunks interconnecting the hubs. 1a9

mch talk about need for new & better termminals ie low cost, crypto secure,credit card idvoice actuated i/o alos talk about

notes on ma for base comm

technologies ie flat plate displays. ram expansion/improvement. standard lsi apllications. optical fiber distribution systems 1a10

some discussion of mn/machine and mach/machine i'face. these are most inefficient ie systems operate in the 100megabit rate, human voice is in the 100wpm range. the brain thru its ensors can function in ranges from a few bits/sec to tens of kilobits/sec make a plea for cybernetics orieted research and technolofgical advances leadinto more direct man/machine coupling direct voice by 1985? 1a11

from a d little study on current needs 1b

user or user group uses a paticular mode of comm because its inherent capabilities meet his needs. that is,one mode is rarely used because of another's deficiencies 1b1

when there is an authority relationship RECORD comm ie amil and message are used extensively - for the record 1b2

when there is a work relationship face to face is consideredd most effective, but separate locations of ten prohibit. telephone whhich permits real time interaction becomes primary comm mode 1b3

conclusion is that if written mode is repalaced with electronic comm syt it should be structure along organizational lines and that a memory mus be provided 1b4

icreased use of computers by air base user groups are creating immediate need for improved data comm systs. most frequently id'd need is for remote terminals in work areas tied in to autodin and decicated data syst's 1b5

to study 20 selected user groups they had to go to 8 bases. griffiss was used for bomber-tanker and fighter-intercepto groups looking at the chart actualy gafb could have been used for most of the twenty. 1b6

the afsc center/division that was used for the study was at eglin. however the model was base on info obtained from afsc org's at the followeing wpafb,edwards,eglin, lg hanscom and andrews 1b7

in their model theysay that data aquisition and procurement anre heavily dependent on comm support. 1b8

2875 man user group 1b8a

notes on ma for base comm

this user group also corresponds closel to a command hq in its use of theprinciple modes of comm. 1b8b

various enter/division ser groups hav eremote access to edp facilities and data files and this represents an increasing trend within afsc. 1b8c

current deficiencies 1b8d

autovon - can't get a line 1b8d1

frequently miss important calls due to being out of the office. 1b8d2

message distribution on base is slooooooow 1b8d3

'broadcasted distribution' of technical reports necessary, no capability to access central file, wastes trransmission(mail)capacity, consumes file space. 1b8d4

data & graphics - wasted time delivering data to computer, formats for milscap external comm not designed for manual processing, much time wasted in processing. 1b8d5

over next 15 yrs. the no. of afsc center/division user groups is expected to derease through consolidation and, with few exceptions the size of the resultant groups willl be a bout the same as the strengths are now. these changes will have minimal impact onn overall comm needs of the user group (sic)m 1b8e

from litton BCM study 1c

the approach stresses - high bandwidth use factor (100 full duplex telephone channels per MHz) low cost per instrument and centralized computer control 1c1

p system dev and acq costs reduced because of close correspondence between hardware & technologies needed for wired city systems and the af. 1c2

importance of voice comm varies for support group - 37% of total. for the mission user - 73%. for the hospital user group - 83%. 1c3

in their model of a composite af base they have 2,050 telephones and 100 hot lines to service 4,640 people 1c4

litton anticipates that a large amount of the distribution of

notes on ma for base comm

hard copy can be accomplished by electronic means the remaining means of info transfer are personal contact and bulk. 1c5

since amjority of bulk info transfer relates to the supply activity, and since most of the info is already in, or originated from electronic data, the distribution of the info will require less bulk if more terminals are avaailable 1c6

relating to a reference on prophecying by j. martin? they speak of two kinds of failure, failure of nerve and failure of imagination. in the first, the condition is ripe but the prophet does not make the necessary jump. in the second , the prophet fails to appreciate the full power of what he haolds in his hand. the cite a classical example in IBM's failure in 1948 to foresee a market for the computer beyond"only ten or a dozen very large corporations that will be able to take profitable advantage of the computer". considering the accelerating rate of electronic technological progress in the past 25 years it seems far wiser to risk errring on the side of the visionary rather than on that of the timid soul. 1c7

the computer can be expected to take over a majority of info processing functions, freeing the operator for high-level decisions. accordingly, a large proportion of comm traffic will be of the operator -computer and comp-comp type 1c8

the terminal couples the operator to his info processors. sic 1c9

electronic mail is currently entering r&d phases. it is reasonable to expect that in the 80/85 time frame at least partial implementation will be realized. 1c10

existing practises are followed in the laying and protection of the cable network against environmental damage. 1c11

termials - video(cameras and monitors/displays), video telephones, fax and crt terminals. 1c12

terminal oriented systems will provide much easier and faster accesss to needed info while removing much of the present effort of gathering, organizin and distributing information.pb.1c 1c13

their summary cost chart is very broad brush but is ablut 1.832k with a somewhat nebulous recurring cost of 666k. 1c14

human factors analysi demos the potential benefits attainable in an integrated comm system a s opposed to a uncontrolled patchwork growth. lots of words on things that seem to be self

notes on ma for base comm

evident - might be used as a checklist of goodies to compare with nls etc. 1c15

notes on ma for base comm

(J18479) 16-AUG-73 14:08; Title: Author(s): Edmund J. Kennedy/EJK;
Distribution: /JLM DLS; Sub-Collections: RADC; Clerk: EJK;
Origin: <KENNEDY>PITCH.NLS;1, 14-AUG-73 08:37 EJK ;

TNLS Availability, Courses in Southern Calif.

Putting T (or D...there is a plan afoot to make DNLS availabe on cheap terminals,see--journal,16800,4>) NLS on other TENEX's involves a lot of decisions by higherups. 1

Let me tell you what I know however. 2

There was talk some months ago out of the ARPA office about having TNLS run on all TENEX's on the net. Of course that means in effect a commitment of some hunk of ARPA's total core, memor, etc. I don't know how the opening of the utility in the fall affects such plans. So far it has only been talk to my knowledge. 2a

There is a further question in the minds of SRI administration and Doug of what proprietary rights SRI may have in TNLS and what use at other cites and under what terms would affect those rights. Yuk, as my children say. 2b

When Marilyn, Mike, and I taught TNLS in Boston in June TNLS was in fact moved to BBN throgh the net and run on their machine, <mjournal,17511,14> without the journal or ident system. I actually did not use it for the class because we could not send journal messages and because it was slower on their machine than through the tip to our machine. 2c

As you may know, BBN has a project in computer-aided instruction, SCHOLAR. The project people want to try to use SCHOLAR to teach NLS or some subset. <mjournal,17511,4> They have kept TNLS up as a tool for the SCHOLAR project. There have been some problems <journal,jrnl13,j18144:g>, but I think they are not serious. 2c1

In general <mjournal,17511,> is probably worth your reading. 2c2

As part of duplicating NLS on a second machine at the utility, we are facing in general the question of duplicate journals and ident systems. It is discussed in our August 9th quarterly report, which I will distribute to you when it's ready. 2d

Re courses in Southern California: 3

We are trying to get the new command language up around October 15th. 3a

You probably have a copy of <mjournal,18408,>. 3a1

In the meantime Marilyn has quit, Mike is tied up with reorganizing the NIC, and on vacation for three weeks at the moment, and I am tied up working on the documentation for the new comand language. 3b

About the beginning of October, Jim Bair, an experienced teacher and experienced NLS user from RADC, will come to work here as trainer for the utility. 3c

All these things being true, I have been trying to avoid a TNLS class befoe Bair is ready to teach the new language. 3d

We have put off numerous individuals and at least one group with a very good claim. 3e

I recall we discussed the possibility of your teaching your troops the basics and my or someone's coming in for a day to carry on. That might still be possible. 3f

DVN 16-AUG-73 16:17 18480

TNLS Availability, Courses in Southern Calif.

(J18480) 16-AUG-73 16:17; Title: Author(s): Dirk H. Van Nouhuys/DVN;
Distribution: /DHC RWW(fyi) JMB(so you will know what happened) JHB;
Sub-Collections: NIC SRI-ARC RADC; Clerk: DVN;
Origin: <VANNOUHUYS>CROCK.NLS;1, 16-AUG-73 16:12 DVN ;

DCE 16-AUG-73 16:25 18481

Slide and videotape showing and discussion of Generative Processes Graphics at ARC by Joseph Brunon, 17 Aug 73

He is an architect gone into group-meeting facilitation, leaning heavily upon dynamic (hand-drawn) wall graphics. PODAC-like stuff. Meeting in ARC Conference Room, 10:30 Friday, 17 Aug; see literature posted on bulletn board.

Slide and videotape showing and discussion of Generative Processes Graphics at ARC by Joseph Brunon, 17 Aug 73

Joe is referred to us by Hew Crane (SRI) -- see JCN's memo giving some background (18317,). He visited with me yesterday (Wed, 15 Aug) for an hour, and will be back with slides and videotape on Friday morning to give some visual description of his work to whomever in ARC wishes to attend.. 1

ALthough he began working as an architect (degree from MIT), and has taught in the architecture department at the University of Oregon, he has evolved professionally into full-time concern with developmment and practice of techniques for facilitating group conferencing via wall-sized graphics, which he does with a huge stock of color pens, and which evolve dynamically and via full involvement with the participants. He has been at UCLA this past year, and is now part of a project in the Department of Psychology that unfortunately has lost its NIMH funding -- he is, therefore, looking around for a new location. 1a

Our talk was a get-acquainted type with a main objective of filling him in enough about our activities and goals so that we could talk reasonably about the sort of possibilities there could be for him to become involved in our sort of things. As we evolved them, these possibilites are: 2

1) Setting up a project somewhere to develop computer augmentation for this sort of facilitation, and collaborate with us as being coordinated part of our AKW. 2a

Not particularly appropriate, for his background and "at this point in time," unless he is lucky enough to find a good computer-graphics group and an interested sponsor. 2a1

2) Helping us in the work meetings we have within our group, and in meetings with external clientele (which will occur in increasing number in the future). 2b

This would be interesting to us, and useful, but we can't afford now to hire a man just for this role. 2b1

3) Work for us in preparing heavily-illustrated (with drawn graphics) documntation for special training purposes. Perhaps also film-strip and voice-cassette type of audio-visual teaching programs (such as are used in schools) would be an appropriate medium (something I've been looking forward to our someday considering). 2c

This would seem rather limiting for his range of talent an interest, but could be highly valuable for us. 2c1

Slide and videotape showing and discussion of Generative Processes Graphics at ARC by Joseph Brunon, 17 Aug 73

We didn't settle anything. He'll tell a few ARC staff, and some other SRI, Hew Crane invitees, about his approach on Friday morning, 10:30, in ARC's conference room. 3

He left me with the following XDOC items: 4

(16608,) His Biography -- Eight pages, seven of which cite presentations he's given to different groups, and projects that he has participated in with his facilitation help. 4a

(16609,) A paper by him, "Group Dynamics and Visual Thinking", 1969. (Has a copy of a letter attached to it from Rudolf Arnheim, commenting on this paper -- Arnheim is author of "Visual Thinking", and is Professor of the Psychology of Art at Harvard. 4b

(16610,) A pre-publicaton copy of a paper by him, "The Generative Graphics Process: A Series of Hypotheses for Conference Leadership," July 73 4c

(16611,) A clipping from the Sunday Oregonian (Portland, Oregon newspaper), a staff-writeup on him when he was in the architecture departiment at the University of Oregon. 4d

(16612,) A Copy of a Picture and its caption, about his work, as published in Professor Robert McKim's book, "Experiences in Visual Thinking". (McKim is in the Design Department at Stanford, and is a long-time acquaintance of mine.) 4e

I gave him one copy each of: Dinosaur paper (5255,), Community Info Services (12445,), AKW from NCC (14724,), FJCC 68 reprint (3954,), and the 62 AFOSR report (3906,). 5

DCE 16-AUG-73 16:25 18481

Slide and videotape showing and discussion of Generative Processes Graphics at ARC by Joseph Brunon, 17 Aug 73

(J18481) 16-AUG-73 16:25; Title: Author(s): Douglas C. Engelbart/DCE ; Distribution: /jcn rww dvn chi hgl pr ndm kev ; Sub-Collections: SRI-ARC; Clerk: DCE ;

Hi again. The guy who wants to use Macsyma is Fouad Tobagi here at UCLA-NMC. He thinks it may help him in his thesis work but is not sure. I have given him a copy of the Macsyma manual I got foom Marc Cirlin at CCN. If I need more info, I'll send you a message. Thanks for your help.

1

(J18483) 16-AUG-73 20:11; Title: Author(s): Chuck S. Kline/CSK;
Distribution: /JPG; Sub-Collections: NIC; Clerk: CSK;

A proposal Matter that Needs Your Attention

In working through the editing of the proposal I have found a spot that needs yor attention: (documentation,iptprop,045) where it says "X%".

1

DVN 16-AUG-73 21:48 18484

A proposal Matter that Needs Your Attention

(J18484) 16-AUG-73 21:48; Title: Author(s): Dirk H. Van Nouhuys/DVN; Distribution: /RWW; Sub-Collections: SRI-ARC; Clerk: DVN;