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THE RADC INTERACTIVE LABORATORY FOR DESIGN OF PATTERN RECOGNITION SYSTEMS AND ITS APPLICATION

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Summary

This paper describes the Interactive Laboratory for Design of Pattern Recognition Systems which exists at the Rome Air Development Center (RADC) of the United States Air Force. A brief history of the research that led to the interactive approach is included, together with the philosophy of the interactive approach. Applications of the laboratory to some real problems are discussed, together with some comments on its use in a course in Pattern Recognition given at RADC. The paper is tutorial in the sense that most of the results have been previously published in fragments. The main contribution of this paper is a description of a real physical laboratory whose implementation is based on an interactive approach to pattern recognition which has evolved over the years.

1. Introduction

A classifier is a function C whose domain is the input measurement space and whose range is the set of classes or categories. If class conditional densities are defined over the measurement space together with the usual assumptions of classical decision theory, the function C can be found by invocation of Bayes Theorem. For this case, the function C, and the physical device which realizes C are optimum in the sense of minimum Bayes Risk.

In many important real world classification problems, the class conditional densities over the measurement space are not known. In this paper it is assumed that "representative" data samples in measurement space are available, however, and that

the samples are labeled by class or category. This is fundamentally a nonparametric approach. In this approach, there is the necessity that the classifier designer study the problem to learn about the data through experiments conducted on a large number of these representative samples, together with available a priori knowledge of the "phenomenology" of the problem. To improve the efficiency of this human learning process, an interactive approach has been chosen. The basic philosophy is to couple the man and the machine as a team so that each can contribute what it can do best. The man can contribute his intelligence,

and his knowledge, about the problem. The machine can contribute its ability to do bookkeeping, complicated calculations, and display results on a graphics terminal in forms readily interpretable by the man.

Though this paper focuses upon the particular interactive laboratory for the design of pattern recognition systems implemented at RADC, some other interactive systems for similar purposes are enumerated in Table 1.

SYSTEM NAME	DEVELOPER
SARF	General Motors Corp.
DX-1	AF Cambridge Res Lab
INTERSPACE	Purdue University
IFES	USAF (RADC)
Merlin System	Merlin Systems Corp.
IBM Interactive Sys	IBM Corp.

TABLE 1 - Other Interactive Pattern Recognition Systems

More details on these systems may be found in Kanal .

This paper consists of eight sections. The remainder of this section consists of a brief history of the pattern recognition research conducted at RADC during the past sixteen years, and the scope of the present laboratory. Section 2 discusses the philosophy of the interactive approach to the design of pattern recognition systems. Section 3 presents a functional overview of the Waveform Processing System (WPS) which is used for waveform data analysis and feature extraction. Section 4 gives a description of the On-Line Pattern Analysis and Recognition System (OLPARS) and contrasts the two different implementations of OLPARS at RADC. Section 5 documents additional elements of the Laboratory, and section 6 discusses various applications of the Laboratory. Some elements of the Laboratory have been used for laboratory experiments in a short course in Pattern Recognition. Section 7 comments on this experience. Finally, some comments on the number of data samples needed to design reliable classification logic are presented in section 8.

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To obtain some idea of the scope of the Laboratory and how the interactive approach was selected, the history of its development will be briefly reviewed. Contributions to this development were made by many individuals and organizations sponsored by RADC. The list of contributors and their specific contributions is too long to be mentioned here, but these contributions are acknowledged to be an integral part of the ideas which led to what is now the Laboratory.

Work in pattern recognition research at RADC began in 1959 with joint sponsorship of the PERCEPTRON with the Office of Naval Research. It ultimately became clear that the single layer PERCEPTRON could adaptively construct only linear boundaries. From the knowledge that linear separable problems formed only a small subset of the real problems, work was sponsored on the multi-layered PERCEPTRON due to its ability to construct piecewise linear boundaries. This research was directed to finding algorithms for the adaptive construction of an optimum piecewise linear boundary. This problem turned out to be untractable. Subsequently, the search for other structures and convergence algorithms was made using automata theory, computability theory, and a theory of self-organizing systems on the one hand, and parametric statistical ideas on the other. All of these concepts were considering the general idea of a universal adaptive or learning device which, when given a sufficiently large number of labeled data samples, would converge to the optimum classifier.

In 1966 the Mattson-Dammann algorithm for pattern classification was implemented on the CDC 1604 computer for use in an interactive mode with the Bunker Ramo BR-85 display console. This preliminary interactive pattern recognition system was called the DOCUS (Display Oriented Computer Usage System) Pattern Recognition Overlay.

By 1968, based on experience with DOCUS together with results from other research programs, three conclusions were apparent:

(1) The classification design procedure should be interactive with emphasis on the learning in the problem being done by man instead of the machine.

(2) The system should contain a menu of algorithms instead of relying on a single algorithm.

(3) Structure analysis of data should precede

classifier design.

Further experiments through 1970 tended to confirm the above hypotheses.

A system, OLPARS, was defined by Sammon in 1968 for the solution of pattern analysis and pattern classification problems using an interactive, graphics oriented computer system. Implementation of OLPARS began on the CDC 1604 computer and the BR-85 display console in 1968 and was completed in 1971. Subsequently, this system was used in the solution of several pattern recognition problems.

Some of these problems are described by Simmons, others are listed in section 6.

Also in 1968 the need for interactive feature definition and extraction systems was recognized. The elements of the current Laboratory were defined in 1970. In addition to OLPARS, it contains an interactive feature definition and extraction system for waveform data. It is these items upon which we will focus in this paper. The realization of this laboratory represents an investment on the order of 25 man years and over $700,000 in hardware.

2. The Interactive Approach to Pattern Recognition

Since the advent of the general purpose digital computer, there has been a growing interest in producing machines which are capable of duplicating the recognition and decision making functions previously reserved for humans. The relevant body of knowledge which has been generated as a result of this interest has been called pattern recognition theory. We may define pattern recognition as the automatic classification of the state of an environment based upon a set of measurements made on that environment. Hence, solutions to the general pattern recognition problem involve solutions to the problems of data collection and pattern classification, as depicted in Figure 1.

FIGURE 1 - General Pattern Recognition Problem

It is the usual procedure to design the classifier C by a cascade of two functions. The first of these functions is called a feature extractor. This feature extractor is a function F whose domain is measurement space, and whose range is a space called feature space. The second function C is a mapping whose domain is feature space and whose range is the set of classes. Figure 2 illustrates this concept.

FIGURE 2 - General Pattern Recognition Problem Illustrating Internal Structure of Pattern Classifier

It is observed that C and C' are both classifiers having different domains, but the same range,

$$C = C'(F) \qquad (1)$$

However, the representation of C in (1) is not unique, so that many realizations of this equation are possible.

The approach of Figure 2 is taken based on the following observations. For most pattern recognition problems:

a, At best only partial "a priori" information is available,

b, Data samples labeled by class are available,

c, When the measurement space represents images or waveforms, the dimensionality (the number of digital measurements) is large; e.g., > 100.

In the absence of sufficient "a priori"

information to specify the form of the optimum classifier, or even one whose performance approximates that of the best, we must take an empirical approach to the solution of pattern recognition problems. Hence, given a sufficient number of labeled data samples (see Section 8) one approach would be to design many different classifiers on an empirical basis, compare them, and choose the best. However, the number of potential classifiers under this approach is so large, that to define each, and compare them to select the best would not be computable. Somehow the additional information provided by the labeled

data samples must be used in an efficient manner, so that the number of potential candidate classifiers is not too large, and yet hopefully includes the best classifier or at least one that reasonably approximates it. Any method to generate "reasonable" candidates must be based on whatever "a priori" information is available coupled with any additional insight which can be gained by the designer during problem solution. Since this insight must be obtained from the labeled data samples, the designer must have the ability to observe properties of the data in measurement space. Interaction between the designer and the data, using the scientific method to gain this insight, shows high promise. In this case, it is the designer, rather than an adaptive classifier, who learns and obtains insight about the problem. The man embodies what he has learned into the classifier design. This is what we call the interactive approach. To successfully use it, one must iterate several aspects or pieces of the problem several times.

The concept of a vector space is fundamental in the solution of pattern recognition problems. The measurements made by the sensor on a given object in the environment can be represented as a vector in measurement space. If the sensor output is a string of digital numbers, this is clearly the case. When the measurements are either waveforms or images, it is a classical result that this is so. Similarly, the features obtained from the feature extractor define the basis of a vector space, and an object or an event is represented as a vector or point in this space. If we have extracted L features, then each object is represented as a point in L-dimensional feature space. Thus, feature extraction can be viewed as a transformation (in general, non-linear) from the measurement vector space to the feature vector space. Pattern classification defines the partitionment of a vector space (the measurement space or feature space) into regions associated with each of the states (classes) of the environment. In order to solve a pattern recognition problem, sample vectors for each state (class) must be collected and analyzed in order that a satisfactory pattern classifier be designed.

In many cases, however, the data collected is in the form of waveforms, two-dimensional imagery or a large number of digital measurements. The function of feature extraction then, is to map each object described by the raw data into a useful smaller set of discriminating features.

They are normally selected under the criterion that they possess only the essential information necessary for discrimination between classes, rather than a complete description of the characteristics of the given classes.

Once a candidate set of features has been extracted, we proceed to the pattern classification problem. Before proceeding to define the boundaries of the classification regions (i.e., designing the recognition logic), however, we first ask the question: Do the features selected adequately distinguish between

the classes to be recognized? Hence, we first determine whether the data points for each class tend to cluster or group together in the vector space defined by the features (pattern analysis). If they do, then we can proceed to design the classification logic; if they do not, then we must return to the feature extraction stage, and extract a better set of features before continuing.

In the preceding discussion, we have seen that the rationale for an interactive approach resulted from the lack of sufficient "a priori" information necessary to specify the form of the classifier in a straightforward manner for most real-world pattern recognition problems. Based on this fact, the desirability of an interactive, graphics oriented approach to the design of pattern recognition systems can be further substantiated as follows:

a. Feature extraction procedures are dependent upon the form and type of raw data, and the particular recognition problem at hand; on the other hand, no single algorithm or procedure exists which is capable of solving all pattern classification problems. Therefore, an organized collection of different techniques in the form of a menu seems appropriate. This organization should permit the addition of new techniques to the menu.

b. A wide variety of efficient and flexible techniques for data handling, visual inspection and numerical computation should be available to the operator/design engineer.

i) An efficient filing system for handling large amounts of sample data is necessary so that a sufficient sample size for both the design and test data sets can be achieved, thus improving the reliability of the resulting classification logic.

ii) Suitable graphics is necessary to exploit the human's ability to recognize data structure in high-dimensional vector data (e.g., clusters), and candidate features in waveform or image data.

iii) Not only should the choice of any technique within the system be under operator control, but also the choice of parameters for executing a particular technique once it has been chosen.

c. To aid and stimulate the human designer in

invoking the scientific method, the time delay between the initiation of a request and its completion should be compatible with the operators thought processes, or least be short enough that it will not interrupt his train of thought.

d. Finally, for completeness, we mention the point we stressed earlier. The boundaries between feature extraction and pattern classification are not sharp. An empirical solution to a pattern recognition problem invariably involves repeated iteration between both in a manner which cannot be predetermined.

Hence, the pattern recognition problem solver must be provided with an easy-to-use, flexible interactive computer system, which provides him with an efficient means for applying and evaluating a wide variety of algorithmic techniques for feature extraction and decision logic design to large quantities of data.

3. The Waveform Processing System (WPS)

WPS is an interactive, graphics oriented computer system for the extraction of features from waveform data and the analysis of a waveform data base. Its chief purpose is to provide the analyst with a library of mathematical algorithms and display options he can call upon from the display console, so that he can design and evaluate feature extraction techniques for waveform pattern recognition problems. Once a set of features have been extracted from each of the members of a waveform data base, the analyst can input them into the OLPARS system to begin the pattern classification logic design phase of the problem solution.

One idea which we believe will significantly contribute to the feature extraction problem is the direct invocation of the scientific method of observation, hypothesis formulation, and experimental verification of hypothesis.

WPS is the physical realization of a system to make this idea practical. WPS permits the man to observe waveform pictures of the data. The man forms hypotheses about features he proposes. WPS provides the man with a tool for rapidly testing these hypotheses. It is by the iteration of this process that suitable features will be found if they exist. A priori information may still be used; although trial and error procedures are not completely eliminated, it is believed that they will be considerably reduced by the human insight gained during the iterative process.

The Waveform Processing System (WPS) is currently being implemented on a DEC PDP-11/45 computer with a Vector General display and control console, and a Tektronix 4002A storage tube with a hardcopy unit for hardcopying selected Vector General displays. Implementation is expected to be completed in September 1975. The description given here is as it currently is conceived and, therefore, is not complete in details.

WPS has been designed in a modular fashion to provide a large degree of flexibility. It is comprised of four software modules: the WPS Executive, the WPS Filing System, the Waveform Display Modules, and the Applications Programs.

The first three modules are in core during normal operation of the system. The fourth module operates as a software overlay with specific applications programs being swapped into core upon request.

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The WPS Executive

The WPS Executive provides the basic interface for all the system modules and coordinates all system activities. The analyst, seated at the user console, makes his requests known to the system by keying in commands through the user console keyboard. After the executive receives a request, it interprets the request and then loads the necessary applications program or data from the appropriate modules.

The options available to the WPS user consist of a sequence of frames linked together in the form of a hierarchical control tree. Up to sixteen options are available on each frame. Figure 3 indicates how these frames are structured in the tree. Selection of any option on a given frame is accomplished by depressing the corresponding function key on the function keyboard. The system then performs the desired action, and makes available to the user all the options which are listed at the next level under the node selected. The user is also given the option of returning to any legal higher order node. Figure 3 gives a diagram of the systems organization.

The WPS Filing System

The user generally starts his analysis with a file of data containing many digital waveforms. In the course of analysis, (editing, transforming, etc.) of this data, he creates and modifies many new data files. To process all this data systematically requires the WPS to have a data filing system which can create, modify, delete, and retrieve mass storage data files. The WPS Filing System is the software which handles all accesses to the mass storage device. It has complete responsibility for data handling which includes the formation of the file tables, and the associated bookkeeping functions.

The filing system allows dynamic assignment of names to any definable data set, which then can be stored and recalled using only the assigned name. The user can partition or subdivide one data file into two or more files or, if he wishes, union or merge two or more data files into one file. The filing system also allows the user to build new files by the arbitrary selection of data from existing data files. In addition, the user can delete newly created files if the results of a particular transformation are not promising.

A provision is available which will enable the

user to choose a subset of the waveforms to be used in computing a preliminary set of transforms. If the results indicate that the transformation is useful, the system will return and process all of the waveforms; if not, the partial file will be deleted.

The filing system can record the sequence of promising user selected applications programs with the appropriate parameters so that the WPS can recreate any such sequence automatically on a new data set.

The filing system is also able to handle vector data files which are created as a result of a feature extraction process. All the features extracted from the source data set directly or through a series of transformations are placed in the same vector data file.

The WPS Graphics Software

The graphics software interfaces the user to the WPS via the on-line interactive display console. The user can analyze graphic representations of his source data and transformations of it, and direct the WPS to perform specified operations on his data via light gun and keyboard actions.

The graphics software provides the user with the capability to choose the most efficient presentation for a particular set of data. The display options included in this module augment the specific fixed format displays which present the results of the individual operations which are performed in the edit, transformation and feature definition modules. Approximately twenty options are provided, including both single and multiple waveform display formats. A complete listing of these options is given in Figure 3 under frames 09-00 and 09-01.

The Applications Programs

The Applications Programs are routines or algorithms which perform mathematical and statistical operations on the "current data set." These programs are not resident in core, but are stored in the Applications Program Library on a random access storage device. Each program in the library is divided into segments or overlays, the number of which is determined by the size of the program. Small programs can be stored in one segment. After an applications program has been selected by the user, the system will search the library directory for the program's location on the storage device. When located, the first segment of the program is loaded into core and control is transferred to its entry point. The remaining overlays will be loaded upon request by the overlay currently in core. After completion of the selected program, control is transferred back to the WPS Executive along with a pointer to the output data file.

The applications programs provided to the user by WPS can be functionally grouped into three main modules: editing procedures, transformations, and a feature definition language. Each of these

modules will be summarized below.

The editing procedures provide the user with the ability to edit digitized waveforms in order to accomplish event detection, artifact removal or segmentation of waveforms. Editing becomes very important in the case of long duration signals, but may also be relevant when processing short duration waveforms.

To accomplish these functions, the analyst is provided with algorithms for time alignment, deletion of intervals, and replacement of

intervals. He will have the ability to create his new data base by manual indication (via the graphics terminal) of the beginning and end segments of pertinent regions of waveform data, or by on-line thresholding using the following criteria (partial list) where parametric values can be specified by the user: amplitude levels, average value within a time window, and cross correlation or convolution with a prototype or reference digitized waveform. A complete listing of these options is given in Figure 3 under the Edit Frame 09-00-12 and the Segmentation Frame 09-03.

The set of transformations can be subdivided in many ways. One subdivision which is pertinent when considering the data management aspects of the WPS is to subdivide each of the various waveform transformation algorithms according to the form of the data resulting from the application of the transformation. This method of subdivision results in two classes: (1) waveform to waveform operations, and (2) waveform to vector operations (e.g., waveforms to digital features where a single scalar is a special case).

The following transformations are included:

Basis Function Expansions

Spectral Analysis

Calculus-Algebraic Type Operations

Digital Filtering

Basis function expansions can be used to map the waveforms being analyzed into a new domain where the discriminatory information may be more apparent, or a subset of the calculated coefficients could be used as features for discrimination. The eigenvectors and discrimination vectors transformation (options 07 and 08 of the Waveform to Waveform Transformation Frame 09-02 of Figure 3) are data dependent. All the expansions are "global" in the sense that any one coefficient depends upon the entire waveform. In problems where local information is significant, these transformations may only serve to make discrimination more difficult. Under the Algebraic/Calculus Frame 09-02-02 of Figure 3, the analyst will have the ability to form sequences of the operations listed, thereby giving him an extremely large transformational capability. For example, although the integral of the absolute value of the waveform is not explicitly listed,

the analyst will have the ability to calculate it by combining the operations of rectification and integration.

The system includes a language, called the On-Line Waveform Processing Language (OLWPL), which can be used by the analyst to construct his own algorithms for waveform processing and feature extraction.

A desirable property of the language is that it permits the user to both define what he observes to be a good feature, and then test his hypothesis

in a timely interactive manner. Hence, OLWPL has been designed to be a high-order language (a cross between FORTRAN and BASIC), thus eliminating lengthy and laborious programming on the part of the on-line user. On the other hand, it has enough low-level capability to allow the user to describe his hypothesis without the cumbersome manipulation of very high level operators. Thus, OLWPL will contain statements for normal arithmetic and logic operations, and facilities for handling waveforms and complete data trees without detailed input/output specifications from the user. Hence, it will be only necessary to identify a tree by name, or a waveform by its tree name, node name and identification number. The user will not have to supply parameters indicating the length of a waveform, how many waveforms are in a data tree, etc.

On the high level, many useful waveform processing operations will be available as subroutines that can be used as high level instructions. Initially, 36 built-in callable subroutines will be implemented. Provisions are included to allow the user to construct his own subroutine, name it, and enter it into the system such that it is then callable by name also.

4. The On-Line Pattern Analysis and Recognition System (OLPARS)

OLPARS is an interactive, graphics oriented, computer system for the solution of pattern analysis and pattern classification problems. The OLPARS system can be characterized as follows:

(1) It is a software system which allows a human operator to analyze digital preprocessed data (vector data) to determine the structure of the data and design pattern classification logic.

(2) It is implemented on a general purpose computer coupled to an interactive graphics display console.

(3) It requires that the input data consists of 100 or fewer digital measurements per sample.

It should be stressed that OLPARS is not a pattern classification system; rather it is a research tool which is used to design and evaluate pattern classification systems. The general purpose computer contains a library of pattern analysis

and pattern classification procedures. By means of the graphics display console, a human operator can analyze his data, and based on what he sees, coupled with any "a priori" knowledge he may possess, choose an appropriate pattern classification procedure, observe the results and continue to iterate in this manner. Eventually one of two things will happen: (1) he solves the particular pattern classification problem he is working on, whereby the output of the computer consists of the design parameters for an automatic classifier which can then be implemented in the form of special purpose hardware or software, or

(2) he cannot solve the problem. In this case, he has determined that his input data was inadequate to discriminate between the classes he wished to automatically identify, and he must return to the feature extraction or data collection phase.

As previously mentioned, OLPARS was initially implemented at RADC on a CDC 1604 computer coupled to a Bunker Ramo BR-85 display console. This vintage - 1957 computer equipment is no longer in operation at RADC. OLPARS is currently resident on two computer graphics systems at RADC. One version is on the PDP-11/45 computer under WPS, which uses the Vector General graphics terminal. The second version of OLPARS is implemented on the HIS 6180 computer under the MULTICS operating system. MULTICS is a time-sharing system that utilizes a virtual memory concept. Interactive graphics capability is provided by a Tektronix 4002A storage tube with alphanumeric keyboard, joystick and hardcopy unit. Since both systems are fundamentally the same with respect to the application software provided, we will first present a general functional overview of OLPARS which is implementation independent. Once this has been discussed, we will highlight the main differences between the PDP-11/45 OLPARS and MULTICS/OLPARS.

Functional Overview

OLPARS permits the system user to dynamically restructure the vector data files. The vector data structure is represented within OLPARS as a hierarchical tree where each node corresponds to a list of vectors. Partitionment of a list of vectors is represented by branches to lower order nodes emanating from the node corresponding to the original list, with each subnode being associated with a sublist. The OLPARS user can select for processing the data associated with any node(s) by designating that node(s). Throughout the entire system, the concept of a "current data set" is used. Thus, the system will continue to operate on the latest data that the on-line user has designated unless specifically told to do otherwise. The OLPARS filing structure will allow continued arbitrary partitioning.

In addition to the above operations, new data trees may be created when the current data set is operated on by a linear transformation, a different partitionment of the data is desired, or a new data tree may be created by performing logical operations on selected nodes of a specific tree. The operations of union, intersection,

complement of union, and complement of an intersection can be applied to the selected data sets. When a transformation is applied at the topmost node of a tree, the structure below the node is maintained, and the transformation is applied to all the data vectors. A transformation may be selectively applied to the data below a specified node in which case a new tree is generated, involving only the data corresponding to the selected node.

We can functionally group the current OLPARS options into the following categories: system

utility options, data management, data display, structure analysis, feature evaluation, data tree transformation and classification logic design and evaluation. Included among the system utility options are routines to print pertinent data characteristics (such as the selected data set vectors or the selected data set tree structure) and statistics (including data class ranges, measurement overlap between classes, covariance matrix for each class, etc.). The user can also create a random test data set from the current data tree, display a logic tree or the current data tree, and list the data trees in current active storage.

Data Management

The data management routines include options for data input/output, data tree modification, data storage and data printout. The options for data input/output and data storage will be discussed later, since many of them are implementation dependent. The data tree modification options automatically restructure the data into the modes defined by the on-line user. These include the ability to add a data class to the current data from other existing data trees, modify a tree name or data class name, combine data classes, create a data tree from existing data classes, and delete a data class from a data tree. In addition, options exist to remove a data tree from storage, delete a subnode structure, and remove data vectors from a data tree. Finally, a user can create subnode structure via partitionment of a data projection display or use of boolean (linguistic) statements.

Data Display

OLPARS provides the user with the capability to project a data set into a one or two space representation. Extensive facilities for manipulation and modification of these data projection displays are available. These include the ability to modify the bin size of a histogram, draw or remove a partition on a data projection, change the data class composition on a two space projection, identify selected data points, change scale, and draw a logic design boundary. There exist several other options available to the user when the current data set contains more vectors than can be displayed on the display screen for two space mappings.

Structure Analysis

As previously mentioned, the pattern analysis

problem arises as a prerequisite to solving pattern classification problems. The solution to the pattern analysis or structure analysis problem consists in the determination of the natural or inherent distribution of vector data in feature space via the identification of clusters, i.e., groups of vector data samples which are closely related by some metric. The basic use of structure analysis in OLPARS is to determine whether the data for a particular class is unimodal or multimodal. If it is determined to be multimodal, one can then subdivide the class according to its modes before proceeding to design

classification logic. One of the truly powerful capabilities of interactive systems such as OLPARS is the capability to take advantage of the human ability to visually investigate data structures, and interactively partition vector data sets.

All of the algorithms for structure analysis in OLPARS rely upon the human projecting the data onto a one or two spaces and visually observing the structure. He can then partition the data into subclasses (create subnode structure in the data tree) via use of boolean (linguistic) statements or piecewise linear boundaries drawn on the data projection display.

The user may perform a projection of data into a one or two space defined by the following projection axes: arbitrary vectors, coordinate vectors, eigenvectors or Fisher discriminant vectors. Arbitrary vectors are those chosen by the user. They may be manually input or retrieved from system files. Hence, they may be calculated within OLPARS or external to the system. The coordinate vectors are the axes defined by the features obtained from the feature extractor. The eigenvectors used for data projection in OLPARS are computed from the lumped data covariance matrix. The user chooses the eigenvector(s) he wants by choosing the corresponding eigenvalue(s).

By the Fisher discriminant vectors are meant the Fisher Linear Discriminant d_1, and a second vector d_2, where d_1 is that direction which maximizes the projected between-class scatter relative to the sum of the projected within-class scatter under the constraint that d_2 be orthogonal to d_1. If the one space option is chosen the data is projected onto d_1. Options exist for choosing the two classes upon which the projection is based. The two classes may consist of any two classes of the current data set, or they may be composed of any two arbitrary groups of classes which are lumped together, where each group is considered as one class for the purpose of the above calculation. These groupings need not comprise the entire data set. However, the entire data set is projected on the resulting Fisher discriminant(s).

In MULTICS/OLPARS an additional data projection display is available, which is called the Nonlinear Mapping (NLM) Algorithm. The NLM algorithm is based upon a point mapping of N L-dimensional vectors from L-space to a two-dimensional space such that the inherent structure of the data is approximately preserved

under the mapping. The approximate structure preservation is maintained by fitting N points in the two-dimensional space such that their interpoint distances approximate the corresponding interpoint distances in the L-space.

Feature Evaluation

In solving a pattern classification problem, the researcher will often be concerned with the discriminatory qualities of the extracted features. In general, it is desirable to use the minimum number of features to achieve a

satisfactory solution. To this end, OLPARS provides two methods for ranking the discriminatory power of a set of L features. An optimal method for ranking the L features must consider the decision logic criterion, such as the Bayes Risk or the probability of error. This, in turn, requires the estimation of the joint probability functions for all possible n-tuples. The obvious computational difficulties in obtaining an optimal ranking preclude this approach in all but the simplest problems. Therefore, two sub-optimal algorithms are provided as options to rank order the L features x_1, x_2, ..., x_L. Each algorithm provides three distinct types of rankings. The first uses a significance measure of a particular component, say x_k, for discriminating class i from class j. The second type of ranking uses a significance measure of x_k for discriminating class i from all other classes. The last type of ranking uses a measure of the overall significance of x_k for discriminating all classes.

The first measure is called the Discriminant Measure. It is particularly useful for ranking the L features when the class conditional probability distributions are approximately unimodal. It essentially measures the ratio of the squared difference between the estimated class means to the sum of the estimated class variances along the feature being evaluated for a user specified pair of classes.

The second measure is the Probability of Confusion Measure which is based on a histogram estimation of class conditional probabilities. The values produced are measures of the overlap of these probabilities. Hence, the smaller the value, the better the measurement. User interaction is designed to allow selection of the interval range and number of histogram bins which will represent the data distribution. Computationally, it is much more complex than the previous measure. It is recommended for use when the unimodal assumption cannot be justified.

Data Tree Transformation

There are three options available in OLPARS for data tree transformation. Upon execution of any of the transformations, the system applies the transformation to every data vector in the current data set and creates a new data tree within the filing system. However, the structure of the old data tree is preserved under the transformation so that the new data tree looks exactly like the old

one, the difference being that the data represented by the new tree has been transformed.

The three data transformations provided are eigenvector projections, a normalization transformation, and measurement reduction. When the eigenvector option is selected, the system computes the eigenvectors of the estimated lumped covariance matrix. The user then has the option to project the current data onto an M-dimensional eigenvector subspace by selecting the M eigenvectors corresponding to the M largest eigenvalues. The resulting M-dimensional subspace

provides a least squares fit to the current data set. The normalization transformation creates a new tree whose features correspond to those of the current data set divided by the standard deviation of that feature. Hence, each feature of the new data tree will have unit variance. By means of the measurement reduction option, the user can project the current data set onto a coordinate subspace. His choice of subspace is based on the results of the two feature evaluation procedures discussed previously. Based on the feature rankings of either of these algorithms, the user can select a subset of the original features to define a coordinate subspace, and hence, the desired linear transformation.

A fourth method for data transformation is available in MULTICS/OLPARS. This additional option is a feature compiler which makes use of the MULTICS PL/1 compiler. This feature compiler allows the analyst to define a new data tree whose features are arbitrary arithmetic combinations of the features of the current data set. The user accomplishes this by constructing a PL/1 program on-line which defines the features of the new data tree in terms of the features of the current data set. The OLPARS routine then calls the MULTICS PL/1 compiler to compile the user defined transformation, and then executes this code to create the new data tree.

Logic Design and Evaluation

The OLPARS logic design facilities provide extensive mathematical/graphical procedures for allowing the user to tailor classification logic design to the structure of the class data. As previously mentioned, the general philosophy of OLPARS is that pattern classification operations are preceded by structure analysis to insure that each class is unimodal. Although not always required, the unimodal property is highly desirable in order to insure an effective logic design. When multimodal class data has been subdivided into unimodal subclasses using structure analysis options, OLPARS provides the capability to reidentify the decision regions for each of these subclasses with the original multimodal class label upon completion of the classification logic design.

Upon selection of a logic design option, a logic tree is initialized by the system with a single node consisting of all the lowest order data classes of the current data set. The system keeps a record of the decision logic as it is created.

The actual form of the logic constructed is that of a hierarchical tree where each node corresponds to a partial decision. The logic design facilities provide the capability to create/display a logic tree, modify a logic design and evaluate a logic design.

OLPARS provides three basic techniques for designing classification logic: nearest mean vector logic, Fisher pairwise discriminant logic, and between group logic. Nearest mean vector logic is a K class classification technique which classifies an unknown vector in the feature space

according to a metric computed from the unknown vector to the mean vectors of the K classes of a design set. The decision is for the class which produces the minimum value of the metric. In OLPARS the user has the choice of three metrics plus the capability of specifying a reject strategy under each. The three metrics provided are the Euclidean distance, weighted vector distance, and the Mahalanobis distance. For the weighted vector distance, the Euclidean distance along each feature is weighted by the inverse of the variance along that feature. For the Mahalanobis distance, the Euclidean distance is weighted by the inverse of the covariance matrix. The optional reject strategy allows the user to reject an unknown vector if its distance from each class mean is greater than some specified value. A separate reject distance may be specified for each class.

Fisher pairwise discriminant logic is constructed by computing the Fisher linear discriminant with appropriate thresholds to distinguish between every pair of classes (subclasses) within a designated group. Once the within group pairwise classification is complete, the pairwise decisions are combined to produce a final decision. The group of classes (subclasses) might be the original K classes (subclasses) of the current data set, or the group might be composed of a subset of K. In the case where the user does not subdivide the K classes (subclasses) he would compute $K(K-1)/2$ pairwise discriminants. The output from each pairwise discriminator consists of a vote for one of the two classes being discriminated (or a vote to reject the unknown vector if the user desires to establish a reject region). The vote count for each class (and the reject region, if it exists) is collected, and the final decision is for the class (including the reject class) which received the maximum vote count, provided this maximum is greater than or equal to a user specified value. If the maximum vote count is less than this specified value, the unknown vector is rejected. As implied above, the user can select any one of four different threshold options to be used in each pairwise discriminator. These allow the existence of various reject strategies or none at all.

Once a Fisher pairwise discriminant logic has been constructed, OLPARS provides the user with the capability of individually modifying each of the class pair logics. The possible changes that can be made to each logic "box" are to modify the Fisher logic, or to replace the existing logic.

Allowable modifications of the Fisher logic include changing the number of thresholds (change threshold option), moving the threshold(s), eliminating features from the calculation of a specified discriminant, or inserting a user defined boundary in the Fisher discriminant plane. The existing logic of each box can be replaced by an arbitrary one-space discriminator, by drawing a boundary in an arbitrary two-space discriminant plane, or by means of a Boolean (linguistic) partition.

An obvious drawback to computing all K(K-1)/2

pairwise discriminants is the potentially large number of combinations. In most problems of interest some of the classes are statistically disjoint and quite easily separated from one another. If these disjoint class groups can be identified and logic designed to discriminate the groups, then the pairwise discrimination need only be computed for the statistically overlapped classes within the group. Since the OLPARS user will not generally know "a priori" how the classes are distributed in feature space, an option is provided (between group logic design) to allow the user to detect nonoverlapping groups of classes, and draw a separating piecewise linear boundary on the display to partition the feature space.

Under between group logic design, the analyst actually participates in the logic design process. He has the capability to interactively construct his own classification logic tree. He is not constrained to choose a preprogrammed classification procedure, or to follow any predetermined logic structure. At any given node in the logic tree, the user can partition the data present at that node by defining his own boundaries in an arbitrary one or two space projection, or by means of a Boolean defined partition. However, at any subnode of the logic tree, the user may also call upon the nearest mean vector or Fisher pairwise logic, which were previously discussed, to perform a complete within group classification for that subnode.

All of the one and two space projection options available for structure analysis are also available to the user for group logic design. Hence, the user can project class data onto the Fisher discriminant plane(s), eigenvector plane(s), coordinate plane(s), and arbitrary plane(s). For one space logic, the vector to be classified is projected onto a user specified vector direction, and the value of this scalar (dot product) is compared to the value of the user defined threshold (boundary). For two space logic, the user has the capability of defining the two space onto which the data is to be projected, and then drawing up to two piecewise linear convex boundaries having up to five linear segments each as a means of defining the decision boundary. In addition, OLPARS provides for the implementation of a user defined linguistic logic partition. In MULTICS/OLPARS, the user can write any Boolean statement (one that can be evaluated as true or false) provided it is a legal PL/I statement, and then use this statement to define a partition.

Under the classification logic design and evaluation facilities, temporary logic evaluation results are displayed following any logic implementation. Upon completing the logic design, the user can next evaluate the design against any data set (test set) and review the results of that evaluation by means of a confusion matrix format. Adequate logic may be output to the system printer or stored within OLPARS. Logic which does not provide adequate discrimination may be supplemented, modified or deleted. This completes the functional overview of OLPARS.

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Comparison of two Implementations

We will now briefly contrast the two implementations of OLPARS which exist at RADC. The version on the PDP-11/45 computer is a subsystem under WPS. It is a single user (dedicated) system employing high performance CRT interactive graphics (Vector General graphics terminal with three dimensional rotation, translation and scaling of the display image, light pen, data tablet, alphanumeric keyboard, function keys and intensity modulation). As a module under WPS, PDP-11/45 OLPARS provides for ease of interaction between the feature extraction mode conducted under WPS, and rapid testing of these hypotheses under OLPARS. However, since this system is built on a mini-computer, there are core limitations in terms of the size of the data base which can be processed. It is written in assembly language. The options available to the OLPARS user are set up in a hierarchical tree control structure (see Figure 4). At any point in the system operation, the current options available to a user are represented by a menu which is displayed on the lefthand side of the CRT display. The user can select an option by depressing the corresponding function key on the function keyboard. The system then performs the required action and makes available all the options which are listed at the next level under the node selected. The user is also given the option of returning to any legal higher node.

Since the PDP-11/45 OLPARS is a module under WPS, data storage is provided by the WPS filing system. The WPS filing system has facilities for handling both waveform and vector data files. OLPARS can store and retrieve data from the vector data files only. Vector data for OLPARS processing can be input into the filing system from magnetic tape, or created by feature extraction algorithms in WPS. In the latter case, waveform to vector data transformations in WPS create a vector data file in the WPS filing system, thus providing a direct communication link between the two systems. Data and programs are overlaid and stored on a ten million word disc. Data swapping is handled in software as opposed to hardware as is the case in MULTICS/OLPARS. There is no limit to the number of trees which can be stored, other than the physical limitation of the size of the disc.

The WPS system software provides a background/foreground processing capability. Hence, a PDP-11/45 OLPARS user can execute a time consuming non-interactive job in background and

continue to interactively work in the foreground mode. Data and logic trees can be output on magnetic tape. New options can be readily added to the system; however, they must be written in assembly language, and a program overlay built and added to the system by one knowledgeable of the WPS system software.

MULTICS/OLPARS has a distinct advantage over the PDP-11/45 OLPARS in terms of storage capacity (virtual memory), ease of data access, multi-user environment, and data base sharing among users. Besides providing more advanced pattern classifier

logic design capability, the system will be available to other government agencies and their defense industry contractors by remote access through the ARPA computer network. It is written in PL/1. Interactive graphics is provided by means of a storage tube (Tektronix 4002A with alphanumeric keyboard, joystick and hardcopy unit). There is no control tree structure for user options. The MULTICS/OLPARS user is free to select any option at any time by typing a 4 to 8 character option label. Through MULTICS the user can make use of an absentee (batch) job capability. Thus, a sequence of OLPARS options which are lengthy computationally and require no interaction can be submitted for execution at a later time.

For data storage MULTICS/OLPARS makes use of the existing file facilities contained in MULTICS. Each user is provided with a temporary data storage area as well as a set of more permanent data files. The temporary area contains his current system description and his current data tree. His permanently assigned area provides file entries for data which may be utilized on a day-to-day basis as well as a hardcopy dump area for delayed printout. In addition to the permanent user area, the central system contains the object programs available under MULTICS/OLPARS and a data storage area from which data may be transferred into any user's temporary data area. Under the MULTICS structure, each user has access to the programs in the central system directory for operations upon data in his own temporary storage area. Source programs for MULTICS/OLPARS are also stored in the central system directory. System programmers may add to and/or modify programs in MULTICS/OLPARS in PL/1 by means of MULTICS system functions to produce new or revised object versions within that directory.

Data may be brought into current storage and formatted for MULTICS/OLPARS usage in a variety of ways. Currently, procedures have been implemented which will accept data from cards, magnetic tapes and other MULTICS files. Permanent storage files may be maintained either for the exclusive access of a particular user or for common access by a number of analysts. Data trees may be outputted to either type of storage area, retrieved and deleted. In addition, classification logic and projection vectors may be stored, retrieved and deleted from exclusive user storage. Current data storage facilities provide for immediate access to any of up to 20 data trees. Once in current storage, a data tree can be modified by any of the

data modification options previously described. Data trees from current data storage can be permanently stored on magnetic tape.

The major differences between the two systems with respect to algorithms for structure analysis and pattern classification have resulted because of storage limitations on the PDP-11/45 system and the power of the MULTICS operating system. Options only available on MULTICS/OLPARS include the nonlinear mapping algorithm for structure analysis, the use of Boolean (linguistic) logic statements for partitioning data trees in

structure analysis and as a feature compiler for data transformations, and the ability to eliminate measurements for selected Fisher pairwise logic "boxes." In addition, MULTICS/OLPARS allows the creation of independent reject strategies. Any final classification node of the logic tree may be appended with a Boolean reject strategy. A vector classified at a node and evaluated as false by the strategy will be rejected.

5. The Other Elements of the Laboratory

The major elements of the RADC Interactive Laboratory for the Design of Pattern Recognition Systems are WPS and OLPARS which were previously described. In addition, it contains an analog data processing capability, a feature extraction software system, and a long waveform analysis system. Each of these remaining elements will be briefly described in this section.

The Laboratory has an Analog Data Processing configuration to complement its digital processing capability resident in the PDP-11/45 computer system. The nucleus of the analog configuration is an Applied Dynamics A/D-5 analog computer. This unit provides a 100 amplifier system, together with function generators, logic, analog to digital converters, digital to analog converters and numerous other options all under digital control. The A/D-5 has been interfaced to the PDP-11/45 digital computer to provide a hybrid processing capability. To further enhance the system, analog tape units, a spectrum analyzer, correlation and probability analyzer, switchable filters and various other analog instrumentation units have been integrated to make this a complete, cohesive and extremely powerful, yet versatile system. The combined A/D-5 - PDP-11/45 system provides the capability to begin with raw analog data, particularly for pattern recognition problems, pre-process it in analog form, convert it to digital data, process it digitally and present it to the user via a high performance interactive graphics system.

The Hybrid Feature Extraction Software System (FESS) is implemented on a hybrid system consisting of the PDP-11/45 central processor, the A/D-5 analog computer, the Tektronix 4002A display and other peripherals. The main purpose of FESS is to generate a large data base of features from analog data after the features have been defined

on WPS. This large data base can then be used in designing the classifier on OLPARS. Part of this data is used as an independent test set for testing the designed classifier.

Fifteen feature extraction algorithms are currently included in the system. The use of these algorithms is interactive in the sense that parameters must be specified by typing them in at the Tektronix keyboard at the request of the system. The parameters are known by the user as a result of the feature definitions as defined by use of WPS. The actual extraction of the features

by FESS is accomplished by analog processing. The menu of features is at present limited to those which have been chosen by experience on previous problems. Some examples of these operations include: spectrum analysis, filtering, Laguerre and Legendre expansions, peak locations and zero crossings, auto and cross correlations, and nonlinear functions approximated out of piecewise linear functions of the waveform which can be constructed by a diode array.

The Long Waveform Analysis system is an interactive software system designed to digitize and display analog data. It is implemented on a PDP-11/45 computer with an analog to digital converter, tape units, a time code reader, a disk and a Tektronix 4002A display with hard copy.

The main purpose of the Long Waveform Analysis system is to be able to observe very long waveforms, and perform spectral analysis upon them. Data from up to 99 lines of a time domain waveform with up to a 2048 data point window per line can be displayed on the storage tube without the objectionable flicker rates of the Vector General display. Typically only up to 20 lines of data are used. In spectral analysis, the proper Nyquist sampling rate can be interactively determined.

This expandable system currently consists of two interactive programs. The first program requests the user to type in a number of parameters which are used to search one of the analog tape units for a designated starting time code. After finding the data with designated starting time, the system digitizes the data at a rate determined by the user and stores this data on a disk. The data can be analog filtered prior to digitization by one of several filter transfer functions. The second program contains display options and has access to the data which has been stored on the disk. The data can be displayed either as a time waveform or as a power spectrum on the Tektronix 4002A. Various scaling and blanking options enable the user to examine details of power spectrum and time domain waveforms.

6. Applications

Elements of the current laboratory have been used on several data sets representing various problems to design classifiers. For the applications

described below, the Waveform Processing System was not available so that features were determined and defined by observing a hard copy library of waveforms and their Fourier transforms obtained from a storage tube. The classification based upon these features was then interactively obtained using OLPARS. Table 2 shows empirical results obtained on a number of selected problems of this type.

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ORG REF	SENSOR	OBJECTS	C	F	S	P(C)
RADC 14	Geophone	Vehicles	5	44	1322	.85
RADC 14	Geophone	vehicles	5	33	1322	.85
RADC 14	Geophone	Vehicles	5	16	1322	.85
PAR* 15	Microphone	Vehicles	4	36	1328	1.00
RADC	photometer	Space Objects	3	13	252	.96
RADC	Electro-cardiac probe		2	10	2222	.97
PAR* 16	Image Scanner	Hand Print Characters	15	45	100,000	.99
NASA	Multi-spectral scanner	Crop Types	7	12	847	.97
RPI**	Medical Analysis Application					

* Pattern Analysis and Recognition Corp., Rome NY

** Rensselaer Polytechnic Institute, Troy NY

Table 2 - Selected Applications of the RADC Laboratory

A legend of the abbreviations used in Table 2 follows: ORG is the organization who obtained the results, C is the number of classes, F is the number of features, S is the total number of data samples, P(C) is the estimated probability of correct classification, and REF is the reference publication for the given results.

In addition to designing classifiers, OLPARS has been used to test the usefulness of a proposed set of features generated external to the laboratory. This is done by designing in software a classifier on OLPARS using the proposed features and observing its performance. If the performance is low, it is assumed that new features are needed. In other applications, elements of the laboratory have been used for data analysis where classification is not the final objective. Examples of this type of application include analysis of medical data dealing with shock trauma to construct procedures for screening patients who would most profitably benefit from treatment under conditions of limited medical personnel.

It has been proposed that features useful for speech classification could be transmitted in speech communication problems, to obtain bandwidth compression in vocoders. Only preliminary results

on this application are available thus far.

A copy of an earlier CDC 1604 version of OLPARS exists in the Department of the Navy and has been used by them and some of their contractors.

7. Educational and Training Aspects

Widespread usage of the RADC Interactive Laboratory for the design of Pattern Recognition

Systems is advocated and encouraged. To date, numerous individuals and organizations which include universities, industries and Government laboratories (Air Force, NASA, Army, etc.), have successfully used the system to aid in the solution of their diversified problems ranging from medical diagnosis to crop classification. In such cases, the individuals usually obtain copies of the relevant reports describing the system and its software first. They then arrive at the Laboratory a day earlier to become acquainted with the system prior to actual operation on their problem. In most cases, this has worked satisfactorily with the time spent averaging about three days. Usage of the equipment by other Divisions within RADC continues on a regular basis. Support and assistance is provided by personnel of the Information Sciences Division of RADC.

For more general exposure to the field of Pattern Recognition and the relationship of the Laboratory to this field, short 1/2 day seminars were offered in earlier years. More recently, a formal in-house course was offered by one of the authors (Prof Gerhardt) during the Fall of 1973. The first portion of the course, attended by RADC personnel, stressed the different approaches to Feature Extraction and Pattern Classification. The text, "Introduction to Statistical Pattern Recognition", by K. Fukanaga was used. Assigned problems and individual projects primarily involved the use of OLPARS. In this way, the participant gained a working knowledge of not only the basic tools and the hardware and software, but of the application of the system to areas related to his specific field of interest. Data sets from the text were used and imbedded in a variety of different problems. As examples, some of the results obtained by each participant included the plotting of the data in coordinate, principle eigenvector, and Fisher Discriminant space, linear classifier design, and piecewise linear classifier design among others. Applications included radar classification, speech recognition and communications.

More recently, in April 1975, two, two-day workshops directed to industry and other Government agencies were offered by RADC personnel. These provided a broad overview, and discussions of usage and applications. It is intended to follow this with a course similar to the one mentioned above to provide others outside RADC with a similar working knowledge of the Laboratory system.

Hundreds of groups and individuals have visited RADC's Interactive Laboratory. These have included visitors from as far away as Europe and Japan, as well as graduate students from local universities interested in the field of Pattern Recognition and Signal and Image Processing. It is hoped that these workshops and courses involving the laboratory will continue to encourage more widespread use of the Laboratory. Anyone interested may contact the authors directly for more detailed information.

8, Sample Size in the Empirical Approach

One point that is frequently overlooked when taking an empirical approach to classifier design is insuring an adequate data base of class representative samples, It is clear that if class conditional densities exist for all classes, the probability of exact equality of any two samples is zero, if computer roundoff error is neglected, Hence, under the above assumption, given a finite set of samples, any subset can be separated from any other subset, There is nothing but patience, ingenuity, and complexity of the classifier that limits one's ability to do this, Thus, one can construct a statistical trap if he is not careful, by thinking he has obtained better results than he has, If indeed the design is "tuned up" for one set of samples of the population, it is likely to do worse on another finite test set of samples,

Foley has shown that in a two class classification problem under the hypotheses of Gaussian class conditional densities of equal known covariance matrices, the use of estimated sample means and Fisher's linear discriminant as the classifier, that a good rule of thumb is that the ratio of the number of vector samples to the number of features in the design set should exceed 3,5 per class, If the number of data samples used for testing the classifier is equal to the number of data samples used in classifier design, the total number of data samples M needed under Foley's hypotheses is $M > 7LN$ where L is the number of features and N is the number of classes, It is surprising to note results in the literature where the amount of data does not satisfy either criterion, There is not yet a general definitive answer to this problem when Foley's assumptions are weakened, Some results under some weaker hypotheses have been obtained by Mehrotra,

Acknowledgement

It would have been impossible for the authors to have written this paper without the help of the data provided by many individuals of the Information Sciences Division of the Rome Air Development Center and many of its sponsored contractors in this field, and a debt of gratitude is owed to them, Since the thrust of this conference is on interactive use of computers, graphics and pattern recognition, it was decided

that the actual preparation of the written version of this paper would be done by interactive means. The authors acknowledge the help of Mr. Edward LaForge and Miss Roberta Carrier of RADC who prepared the manuscript using the SRI developed oN-Line System (NLS) via the ARPA Network.

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RJC 23-APR-75 10:23 32367

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(J32367) 23-APR-75 10:23;;;; Title: Author(s): Roberta J, Carrier/RJC; Distribution: /RJC([INFO-ONLY]) ; Sub-Collections: NIC; Clerk: RJC; Origin: < CARRIER, IEEEPAPER.NLS;6, >, 16-APR-75 07:59 RJC ;;;; ####;

JP6 23-APR-75 11:50 32368

Another Ident Request

In requesting idents last Monday, we missed one guy as follows:
Charles H. Thurber, same phone, organization, and directory as hec
and others. Would appreciate your assistance in getting ident
established. 1

Another Ident Request

(J32368) 23-APR-75 11:50;;;; Title: Author(s): Jon Peterson/JP6;
Distribution: /MLK([ACTION]) FEEDBACK([INFO-ONLY]) ;
Sub-Collections: NIC FEEDBACK; Clerk: JP6;

Status of IBM Effort

It is difficult to believe that almost a year has past since contact was first made with IBM to have them analyze NLS for us and we are still not on contract, and do not expect to be for some time. It might be interesting to determine and examine the reasons for putting us in this fix but that is not the intent of this memo.

Right now I want to just show where we are on this effort and what problems lie ahead. First, the revised statement of work has been written, coordinated, signed and is now in reproduction where it has been since APR 14. It does not appear likely that we will be on contract during this fiscal year.

One problem that faces us is that there are no NLS slots to be had, and if IBM is to have one, we must give up one of ours. This is not too bad but... Realizing that SRI cannot supply us with a slot makes me wonder if they will be capable of supplying the rest of the things necessary for this contract, NLS training, L10 training, equipment (terminals, line processors, mouse & keyset, modems, communiation lines, etc). There is no way we can go on contract with IBM until we have guarantees that this stuff will be available. The most important thing to recognize about this is that it requires a great deal of coordination and time to be on top of the many items that must coincide.

For whatever reasons, I have had little success getting the appropriate assurances from SRI on their ability to support us on this project due to heavy commitments elsewhere. I have talked to

Status of IBM effort

Norton and while he seems interested in helping us, his hands are tied in many respects and this effort is not critical for him since they are selling more NLS than they have machines for. I get the feeling that we need SRI more than they need us and, frankly, I'm worried about being caught in the middle with this contract. 5

The future ahead of us is going to involve arranging access to the NET through NBS, providing IBM with the equipment, getting the phone comapany to put in lines, having IBM trained in TNLS & DNLS & L10, arranging with AF/DSDC to test the preprocessor on their machine, etc. Slip-ups on any one of these could have severe consequences on the whole contract. 6

Some of these tasks are not too difficult to solve, like training in NLS, since we can transfer some of the trainng due us to IBM as we give them our slot. Communication lines might be another story (details of which I have no idea of). And L10 training is crucial for getting the pre-processor written and we must depend heavily on Watson's group which means they must be finished with NSW. 7

I am thinking along the lines of letting IBM have some extra money and give them the responsiblity of procuring their own equipment and lines, as well as making their own arrangements for L10 training. They will be more likely to have the time to devote to this and we will be absolved from blame when all these things don't come off as smoothly as we would like. But it might be helpful for us to have a meeting on this before I do anything, so that we can decide just what

it will cost us in terms of money and manpower to finish this job.

I'd like to see this arranged ASAP. 8

JPC 23-APR-75 12:14 32369

Status of IBM effort

(J32369) 23-APR-75 12:14;;;; Title: Author(s): Joe P. Cavano/JPC;
Distribution: /JLM([ACTION]) DFB([ACTION]) EJK([ACTION])
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;;;;####;

NDM 23-APR-75 14:56 32371

PROPOSAL FOR NEW SYNTAX FOR OUTPUT COMMANDS

revises 32326

PROPOSAL FOR NEW SYNTAX FOR OUTPUT COMMANDS 1

revises 32326 1a

Motivation for Discussion 2

With the move to ELF, we are forced to be aware of the different requirements for lineprinters attached to TENEX systems vs. lineprinters running elsewhere. (The sequential files must be coded differently.) We use both types of devices (Office-1 printer and ELF printer), and our network users have any even greater diversity of printing configurations and requirements. 2a

The present command syntax has long been felt confusing by those who work closely with it. For example, "Output Remote" means format a file via the output processor, code the sequential image for non-TENEX printers, and then send the result over the network to a wild TIP port. In other words, the choice of using a TIP port implicitly involves the decision to use the Output Processor (vs. Quickprint, etc.) and that there is a lineprinter attached to that port (vs. terminal or COM device). 2b

The current software lacks generality in a few key places... It must be changed to allow Quickprints and COM-tests to be coded for non-TENEX as well as TENEX printers. These changes either have or must be done in order to use the ELF printer. The discussion of these changes did point out the lack of generality in the current syntax and the difficulty of sorting out what we do currently have. 2c

To access these new features, we should either add commands such as "Output Elf Quickprint" (adding to the confusion), or reconsider the output command syntax. 2d

Specification of Desired Output 3

To print a file, the user must specify three independent pieces of information: 3a

1) the format of the hard copy desired (quickprint, journal quickprint, comtest, of fully formatted output processor), 3a1

2) the type of device the resulting sequential file should be coded for (terminal, lineprinter, TENEX lineprinter, COM device), and 3a2

3) the destination of the resulting sequential file (the device itself, a disk file, a wild TIP port). 3a3

[Note: this last field may be defaulted to the device according to certain assumptions. For example, future development may allow user-specific defaults, e.g. all RADC people using a printer attached to a TIP port as their default printer.] 3a3a

I propose the command syntax should be changed to reflect these three decisions. Such a change would replace the following commands: 3b

Output Printer 3b1

Output Printer File 3b2

Output Printer Append 3b3

Output Printer Copies 3b4

Output Remote 3b5

Output Terminal 3b6

Output Terminal File 3b7

Output COM 3b8

Output COM File 3b9

Output COM Test 3b10

Output COM Test File 3b11

Output COM Test Append 3b12

Output Quickprint 3b13

Output Quickprint File 3b14

Output Quickprint File 3b15

Output Quickprint Copies 3b16

Output Journal (Quickprint) 3b17

Output Journal (Quickprint) File 3b18

Output Journal (Quickprint) Append 3b19

Output Journal (Quickprint) Copies 3b20

It could avoid the addition of commands with the following intent: 3c

Output Elf Printer 3c1

Output Elf Printer File 3c2

Output Elf Printer Append 3c3

Output Elf Printer Copies 3c4

Output Elf Quickprint 3c5

Output Elf Quickprint File 3c6

Output Elf Quickprint File 3c7

Output Elf Quickprint Copies 3c8

Output Elf Journal (Quickprint) 3c9

Output Elf Journal (Quickprint) File 3c10

Output Elf Journal (Quickprint) Append 3c11

Output Elf Journal (Quickprint) Copies 3c12

Output Elf COM Test 3c13

Output Elf COM Test File 3c14

Output Elf COM Test Append 3c15

Changing the command syntax to seperate these fields should have the following advantages: 3d

- allows required additions in logical way (avoiding new confusing command syntax) 3d1

  [Note: Adding commands specific to ARC's need does nothing for our network users, yet ARC's needs may be typical of the desires of other applications. A general format should be found. This may be a chance for us to learn from the experience of working via the ARPANET.] 3d1a

- facilitates learning, and simplifies explanations in documentation 3d2

  [Susan Roetter agrees with my feeling here.] 3d2a

- allows additional generality with CURRENT software (e.g. syntax is only reason why we can't now do Output Quickprint to TIP port) 3d3

[The execution routine offered below allows some things not currently available, but prohibits other things not currently supportable.] 3d3a

- points out places where generality is lacking in current software (e.g. Output COM Test to Terminal) 3d4

- allows logical place for additional features (e.g. new COM vendors, user-specific default printers...) 3d5

[With George Litho a potential COM vendor (pending some small amount of work on our end) this need may soon be relevant.] 3d5a

Proposal for Command Syntax 4

I propose the following CML: 4a

```
DECLARE VARIABLE device, type ;                                  4a1
DECLARE COMMAND WORD                                             4a2
   "ARC" = 209 ,                                                 4a2a
   "COPIES" = 210 ,                                              4a2b
   "FORMATTED" = 211 ;                                           4a2c
COMMAND  zoutput =  "OUTPUT"                                     4a3
   xoutsapf(FALSE)                                               4a3a
   ff _ TRUE      sim _ FALSE      pb _ FALSE                    4a3b
   param _ FALSE    port _ FALSE                                  4a3c
   dest _ FALSE                                                  4a3d
   device _ #"PRINTER"                                           4a3e
   <"type">                                                      4a3f
      ( "QUICKPRINT"                                             4a3f1
         type _ #"QUICKPRINT"                                    4a3f1a
```

```
    <"For device">  device _                                        4a3f1b
       ( "PRINTER" / "TENEX" <"Printer">)                           4a3f1b1
    (fdest xoutsnhf(FALSE) / "NO" <"Headers"> fdest
    xoutsnhf(TRUE))                                                 4a3f1c
  / "JOURNAL" <"Quickprint">                                        4a3f2
    type _ #"JOURNAL"                                               4a3f2a
    <"For device">  device _                                        4a3f2b
       ( "PRINTER" / "TENEX" <"Printer"> )                          4a3f2b1
    fdest                                                           4a3f2c
  / "TEST" <"COM">                                                  4a3f3
    type _ #"TEST"                                                  4a3f3a
    <"For device">  device _                                        4a3f3b
       ( "PRINTER" / "TENEX" <"Printer"> )                          4a3f3b1
    fdest                                                           4a3f3c
  / "FORMATTED"                                                     4a3f4
    type _ #"FORMATTED"                                             4a3f4a
    <"For device">  device _                                        4a3f4b
       ( ( "TERMINAL"                                               4a3f4b1
          CLEAR <"Send Form Feeds?">                                4a3f4b1a
             ( answ()        ff _ TRUE  sim _ FALSE                 4a3f4b1a1
             / <"Simulate?"> ff _ FALSE sim _ answer() )
                                                                    4a3f4b1a2
          <"Wait at page break?">                                   4a3f4b1b
             pb _ answer()                                          4a3f4b1b1
          )                                                         4a3f4b1c
       / "PRINTER" / "TENEX"¡L2¡ <"Printer"> / "COM" )              4a3f4b2
```

```
            fdest                                                    4a3f4c
          )                                                          4a3f5
        CONFIRM                                                      4a3g
        xout3opf (ff,sim,pb)                                         4a3h
        xout3 (type,device,dest,param,port) ;                        4a3i
      fdest =                                                        4a4
        ( ( lookconfirm()                                            4a4a
          dest _ FALSE                                               4a4a1
          param _ FALSE                                              4a4a2
          port _ FALSE )                                             4a4a3
        / ( dest _ "COPIES"                                          4a4b
          param _ LSEL (#"NUMBER")                                   4a4b1
          port _ FALSE )                                             4a4b2
        / ( dest _ "FILE"                                            4a4c
          param _ LSEL (#"NEWFILELINK")                              4a4c1
          port _ FALSE )                                             4a4c2
        / ( dest _ "APPEND"!L2! <"to file">                          4a4d
          xoutsapf(IRUE)                                             4a4d1
          param _ LSEL (#"OLDFILELINK")                              4a4d2
          port _ FALSE )                                             4a4d3
        / ( dest _ "REMOTE"                                          4a4e
          <"printer == TIP"> param _ LSEL(#"VISIBLE")                4a4e1
          <"port #"> port _ LSEL(#"NUMBER") )                        4a4e2
        / ( dest _ "ARC" <"printer">                                 4a4f
          param _ FALSE                                              4a4f1
```

```
        port _ FALSE )                                                  4a4f2
    ) ;                                                                 4a4g
```

The following execution routines should accompany the above CML, replacing the procedures "xout1" and "xout2":

```
(xout3opf) % setup flags record (to be passed to OP) %                  4b1
    PROCEDURE                                                           4b1a
      %FORMALS%                                                         4b1a1
        (result,        %result record%                                 4b1a1a
        parsemode,      %parsing, backup, cleanup%                      4b1a1b
        formfeed,       %TRUE: send FF, FALSE: see simff%               4b1a1c
        simff,          %TRUE: simulate FF%                             4b1a1d
        waitpb);        %TRUE: wait at page breaks%                     4b1a1e
      REF result, formfeed, simff, waitpb;                              4b1a2
    %--------------------%                                              4b1b
    CASE parsemode OF                                                   4b1c
      = parsing:                                                        4b1c1
        BEGIN                                                           4b1c1a
        opflags _ 0;                                                    4b1c1b
        CASE formfeed OF                                                4b1c1c
          = 1:                                                          4b1c1c1
            BEGIN                                                       4b1c1c1a
            opflags.opform _ TRUE;                                      4b1c1c1b
            opflags.opsimff _ FALSE;                                    4b1c1c1c
            END;                                                        4b1c1c1d
          = 2, = 0:                                                     4b1c1c2
```

```
                BEGIN                                                   4b1c1c2a
                opflags.opform _ FALSE;                                 4b1c1c2b
                CASE simff OF                                           4b1c1c2c
                   = 1:  opflags.opsimff _ TRUE;                        4b1c1c2c1
                   = 2, = 0:     opflags.opsimff _ FALSE;               4b1c1c2c2
                   ENDCASE err(s"invalid response");                    4b1c1c2c3
                END;                                                    4b1c1c2d
              ENDCASE err(s"invalid response");                         4b1c1c3
            CASE waitpb OF                                              4b1c1d
              = 1:          opflags.opwtpb _ TRUE;                      4b1c1d1
              = 2, = 0:     opflags.opwtpb _ FALSE;                     4b1c1d2
              ENDCASE err(s"invalid response");                         4b1c1d3
            result _ opflags ;                                          4b1c1e
            END;                                                        4b1c1f
         ENDCASE;                                                       4b1c2
      RETURN(&result);                                                  4b1d
      END.
                                                                        4b1e
   (xout3) %Output Command%                                             4b2
      PROCEDURE                                                         4b2a
         %FORMALS%                                                      4b2a1
            (result,        %result record%                             4b2a1a
            parsemode,      %parsing, backup, cleanup%                  4b2a1b
            format,         %format type%                               4b2a1c
            device,         %device type%                               4b2a1d
```

```
        destination,            %destination type%                  4b2a1e
        tip,            %tip name or filename%                      4b2a1f
        tipport);       %tip port%                                  4b2a1g
    LOCAL devtype, tp;                                              4b2a2
    LOCAL TEXT POINTER tp1, tp2 ;                                   4b2a3
    LOCAL STRING tipstr[10], trmstr[10], outfile[30];               4b2a4
    REF result, device, destination, format, tip, tipport,
    tp;                                                             4b2a5
%----------------------%                                            4b2b
CASE parsemode OF                                                   4b2c
  = parsing;                                                        4b2c1
    BEGIN                                                           4b2c1a
    % output code format for device type %                          4b2c1b
      devtype _ CASE device OF                                      4b2c1b1
        = 106 % terminal %: optydv;                                 4b2c1b1a
        = 104 % printer %: oprmdv;                                  4b2c1b1b
        = 117 % tenex printer %: opprdv;                            4b2c1b1c
        = 105 % com %: opcmdv;                                      4b2c1b1d
        ENDCASE err($"Unknown device type");                        4b2c1b1e
    % destination file %                                            4b2c1c
      %put file name into a string%                                 4b2c1c1
        *outfile* _ NULL;                                           4b2c1c1a
        filnam ([lda()],dacsp,stfile, soutfile);                    4b2c1c1b
      % check and edit it %                                         4b2c1c2
        IF NOT (FIND SF(*outfile*) [",] SSP "tp1 [",] <
        CH "tp2) THEN                                               4b2c1c2a
```

```
        err ($"System error -- bad file name");          4b2c1c2a1
      *outfile* _ '(, *initsr*, '), tp1 tp2, ';          4b2c1c2b
      IF destination = 210 %COPIES%                      4b2c1c2c
        THEN                                             4b2c1c2c1
          BEGIN                                          4b2c1c2c1a
          destination _ FALSE ;                          4b2c1c2c1b
          *outfile* _ *outfile*, *tip* ;                 4b2c1c2c1c
          END                                            4b2c1c2c1d
        ELSE CASE device OF                              4b2c1c2c2
          = 104 % printer %:                             4b2c1c2c2a
            *outfile* _ *outfile*, "PRINT" ;             4b2c1c2c2a1
          = 117 % tenex printer %:                       4b2c1c2c2b
            *outfile* _ *outfile*, "LPT" ;               4b2c1c2c2b1
          = 105 % com %:                                 4b2c1c2c2c
            *outfile* _ *outfile*, "COM" ;               4b2c1c2c2c1
          ENDCASE ;                                      4b2c1c2c2d
    CASE destination OF                                  4b2c1c3
      = FALSE %- default -%:                             4b2c1c3a
        CASE device OF                                   4b2c1c3a1
          = 106 % terminal %:                            4b2c1c3a1a
            BEGIN                                        4b2c1c3a1a1
            IF nlmode = fulldisplay THEN err
            (notyet) ;                                   4b2c1c3a1a2
            *outfile* _ "TTY:" ;                         4b2c1c3a1a3
            END;                                         4b2c1c3a1a4
```

```
            = 104 % printer %:                                  4b2c1c3a1b

               %this is where you'd want to look up
               default in user profile%                         4b2c1c3a1b1

               REPEAT CASE 2 (209) ;                            4b2c1c3a1b2

            = 117 % tenex printer %:                            4b2c1c3a1c

               *outfile* _ "<PRINTER>", *outfile*;
                                                                4b2c1c3a1c1
            = 105 % com %:                                      4b2c1c3a1d

               *outfile* _ "<COM>", *outfile*;                  4b2c1c3a1d1

            ENDCASE err(notyet);                                4b2c1c3a1e

         = 15  %- file -%:                                      4b2c1c3b

           BEGIN                                                4b2c1c3b1

           CASE lnbfls( &tip, 0, soutfile) OF                   4b2c1c3b2

              = lhostn: NULL;                                   4b2c1c3b2a

              ENDCASE                                           4b2c1c3b2b

                 err($"Remote File Manipulations Not
                 Implemented Yet");                             4b2c1c3b2b1

           IF NOT FIND SF(*outfile*) [",] THEN                  4b2c1c3b3

              CASE device OF                                    4b2c1c3b3a

                 = 106 % terminal %:                            4b2c1c3b3a1

                    *outfile* _ *outfile*, ",TXT" ;
                                                                4b2c1c3b3a1a
                 = 104 % printer %:                             4b2c1c3b3a2

                    *outfile* _ *outfile*, ",PRINT" ;
                                                                4b2c1c3b3a2a
                 = 117 % tenex printer %:                       4b2c1c3b3a3

                    *outfile* _ *outfile*, ",LPT" ;
                                                                4b2c1c3b3a3a
                 = 105 % com %:                                 4b2c1c3b3a4

                    *outfile* _ *outfile*, ",COM" ;
                                                                4b2c1c3b3a4a
```

```
                ENDCASE ;                                   4b2c1c3b3a5
            END;                                            4b2c1c3b4
          = 107 %- remote TIP -%: %printer/terminal%        4b2c1c3c
            BEGIN                                           4b2c1c3c1
            &tp _ &tip + d2sel;                             4b2c1c3c2
            *tipstr* _ tip tp;                              4b2c1c3c3
            &tp _ &tipport + d2sel;                         4b2c1c3c4
            *trmstr* _ tipport tp;                          4b2c1c3c5
            *outfile* _ "NET:0,",                           4b2c1c3c6
               STRING(VALUE(stipstr), 8), '-,
                STRING((VALUE(strmstr)* 65536 + 2), 8);
                                                            4b2c1c3c6a
            END;                                            4b2c1c3c7
          = 209 % arc printer %:                            4b2c1c3d
            BEGIN                                           4b2c1c3d1
            *outfile* _ "<ARCPRINTER>", *outfile*;          4b2c1c3d2
            END;                                            4b2c1c3d3
        ENDCASE err(s"Unknown destination type");           4b2c1c3e
% format of file %                                          4b2c1d
    CASE format OF                                          4b2c1d1
        = 102 % quickprint %:                               4b2c1d1a
          coutqui(soutfile, lda());                         4b2c1d1a1
        = 103 % journal quickprint %:                       4b2c1d1b
          coutjouqui(soutfile, lda());                      4b2c1d1b1
        = 211 % formatted %:                                4b2c1d1c
          coutproc(soutfile, lda(), devtype, opflags);
                                                            4b2c1d1c1
```

```
                = 204 % comtest %;                                  4b2c1d1d

                  coutproc($outfile, lda(), opxpdv, opflags);
                                                                    4b2c1d1d1
                ENDCASE err(s"Unknown print format");               4b2c1d1e

            END;                                                    4b2c1e

          ENDCASE;                                                  4b2c2

        RETURN(&result);                                            4b2d

        END.
                                                                    4b2e
```

Effort Involved in Changeover 5

The CML and execution routine have already been written (above) and tested to some degree. They can be used as such for the initial implementation. Harvey must do a half day's work to add capabilities to Quickprint and COM test. This work must be done no matter what the syntax looks like (to make the ELF printer operational). RWW and EKM have authorized the work if Applications approves intends to accept some syntax to access those capabilities. 5a

A brief changeover document (on how to use the new commands) might take a half day. The Output Processor Users' Guide can be changed quickly; this syntax would make the description there much simpler and clearer. User services must then inform our users. Other documentation (command summary, etc.) may be affected. 5b

Interested parties may try the syntax (although execution is not guaranteed) by trying the Output command in the user-attachable subsystem (meyer, format,subsys,). 5c

Potential Growth 6

A field might be added which allows output of a File/Statement/Branch/Group/Plex. 6a

The default printer might be stored in the user profile, allowing each user to directly access the appropriate hardware. 6b

Output Test COM, Quickprint and journal quickprint might be modified to allow coding for a terminal (as well as Printer and Tenex printer). 6c

Output Sequential might be made simply another output format, with all the device and destination options. 6d

PROPOSAL FOR NEW SYNTAX FOR OUTPUT COMMANDS

(J32371) 23-APR-75 14:56;;;; Title: Author(s): N, Dean Meyer/NDM;
Distribution: /JCN([ACTION]) RLL([ACTION]) JHB([ACTION])
RA3Y([ACTION]) EKM([ACTION]) SRI-ARC([INFO-ONLY]) ;
Sub-Collections: NIC SRI-ARC; Clerk: NDM; Origin: < MEYER,
OUTPUTCOM.NLS;2, >, 23-APR-75 14:53 NDM ;;;;####;

DLS 24-APR-75 06:57 32372

Network Performance messages for APR 75

Tom, I have the reference to March network trouble shooting efforts if you want it. I believe Walden will be summarizing the findings and fixes. When I get it I will pass it along to you.

Network Performance messages for APR 75

21-APR-75 1313-PDT LYNCH at SRI-AI: Tymshare TIP Performance is much better Distribution: NET PERFORMANCE TECHNICAL GROUP
[BBN]<MCKENZIE>NPTG.TXT: Received at: 21-APR-75 13:15:19 1

All of the efforts of those who have contributed are greatly appreciated by me, at least. I use the Tymshare TIP for access to the ARPANET and the performance has greatly improved recently. There is absolutely no stuttering/pausing as there used to be. Thanks, Dan Lynch 1a

17-APR-75 0813-EDT BARKER at BBN-TENEX: TYMSHARE TIP Problem Distribution: NET PERFORMANCE TECHNICAL GROUP
[BBN]<MCKENZIE>NPTG.TXT: Received at: 17-APR-75 05:14:09 2

A hardware problem has been found and fixed in the TYMSHARE TIP which could have accounted for some performance degradation. The problem was a bad IC which caused the TIP timeout interrupt to be generated too frequently. 2a

As part of our effort to understand the performance of the subnet last month, we built a tool into the IMPs and TIPs which reported their relative idleness to NCC. This tool showed that the TYMSHARE TIP was running slow. This was then explained in terms of supporting a VDH, a very busy host, and a lot of terminal bandwidth. While it was running more slowly than most other machines in the net, it never appeared to be critically short of computational power. It always appeared to be idle a substantial amount of the time. 2b

It was observed that after the VDH was removed, and even in the dead of night, TYMSHARE was still not as idle as most machines. This prompted a review of Host, TIP, and store-and-forward traffic on an hour by hour basis. This review revealed that even when there was not substantial traffic from any of these sources, the machine was unusually slow. A quick check showed that the IMPs clock was running at the correct frequency. This lead to the hypothesis that the only remaining hardware interrupting device, the TIP clock, might be running too fast. 2c

We generated a patch to the TIP, which we installed temporarily at TYMSHARE to measure the frequency of this interrupt, and found that it was indeed happening a factor of 2 too frequently. 2d

Honeywell was called to work on the problem, and with the direction of Hiscox (BBN) found the bad chip which was causing the problem. After the chip was replaced (1800 EDT 4/16) the frequency was again measured from NCC and found to be now correct. 2e

In view of the fact that we never did see the TYMSHARE TIP "run

Out of bandwidth", it would be little surprising if no visible effect were observed from this change. It is quite possible, however, that fundamental changes will be observed - and if so, we would like to hear about them. 2f

Having found the patch to measure the interrupt frequency a useful tool, we have incorporated the patch into the normal operational TIP system. The patched system will be broadcast to all TIPs tonight, and we will be able to start universal measurements tomorrow. Of the other machines we have measured, none display any error in the interrupt frequency. 2g

There is no guess as to how long this problem may have existed. Any observation of a return to a previous behaviour pattern in TYMSHARE might give a hint that at least there was a day when it didn't exist. Again - observations, please? Hopefully with the patched system, we will soon have regular checking procedures to prevent this from going unnoticed again. 2h

/Ben 2i

12-APR-75 1258-EDT MCKENZIE at BBN-TENEX: Address File is Updated Distribution: NET PERFORMANCE TECHNICAL GROUP [BBN]<MCKENZIE>NPTG.TXT: Received at: 12-APR-75 09:59:34 3

The address file NPTG is updated as specified by Irby in his message of 11 April. Alex McKenzie 3a

11-APR-75 1803-EDT IRBY at BBN-TENEXB: New names for NPTG: Irby, Victor, White, Andrews, Postel back to NSW Distribution: NET PERFORMANCE TECHNICAL GROUP [BBN]<MCKENZIE>NPTG.TXT:, hopper Received at: 11-APR-75 15:05:29 4

Alex (and anyone else with an NPTG distribution list), please add KREMERS@SRI-AIC and HOPPER@BBNB to your distribution list. 4a

Although ARC is very interested in the NPTG work, we have contracts to do other work. Consequently, Jan Kremers and Dave Hopper will become the NPTG contacts for ARC. The rest of us will be returning to our other commitment. We would like to remain on the distribution list and will return our attention to NPTG matters on an as-needed basis. 4b

-- Charles. 4c

10-APR-75 1158-EDT BURCHFIEL at BBN-TENEXA: BBN SYSTEM B UNAVAILABILITY DURING MARCH Distribution: INET PERFORMANCE TECHNICAL GROUP [BBN]<MCKENZIE>NPTG.TXT:, nickerson, chipman, calleva Received at: 10-APR-75 10:17:21 5

Network Performance messages for APR 75

ATTENTION: DICK WATSON 5a

Enclosed are the System B March unavailability logs of both our computer center and the Network Control Center. As you will note, the correlation between the two is high but not perfect, I hope these are helpful in comparisons with your own logs. 5b

Also included is a brief report on our activities this month to reduce System B unavailability. Thanks, Jerry 5c

TENEX MONTHLY UNAVAILABILITY REPORT 5d

SYSTEM B FOR THE MONTH OF MARCH 5e

RELOADS			INTERRUPTIONS		
	DATE	TIME		DATE	TIME	DURATION
SCHEDULED P.M.	3/4	04:00	4:00	3/11	04:00	3:45
	3/18	04:00	4:02	3/26	04:00	6:45
SCHEDULED SOFTWARE	3/4	08:00	1:25	3/4	18:00	:15
	3/25	02:45	9:00	3/27	08:56	:15
POWER OUTAGE	3/5	02:00	6:40	3/20	02:10	3:45
NETWORK-TIP-IMP	3/17	03:50	6:20	3/21	17:00	:05
	3/22	04:53	7:54	3/28	12:10	:10
	3/30	20:46	:01	3/31	03:44	:01
MEMORY(AMPEX)	3/10	19:23	:24	3/10	20:02	:13
	3/20	06:11	:13	3/22	19:00	:18
	3/24	17:15	:22	3/27	14:55	1:12
	3/31	10:30	:20			
DISKS(CALCOMP)	3/6	16:20	1:55	3/31	11:35	:30
OPERATION OVERDUE				3/4	15:33	:01
	3/31	11:17	:01			
SOFTWARE- PAGER TRAP			3/26	19:43	:22	
PAGER TRAP	3/28	08:10	:14			
SPT FULL	3/28	21:42	:21			
SPT FULL	3/29	11:40	:20			
SPT FULL	3/29	15:35	:17			
PAGE FAULT	3/30	17:25	:20			
HUMAN ERROR SOFTWARE					3/27	
		12:12	:02			

5f 5g 5h 5i 5j 5k 5l 5m 5n 5o

Network Performance messages for APR 75

```
UNKNOWN                                                    3/3    17:55
:27 3/19   10:20      :06 3/21   10:46      :44                          5p

RELOADS=29 FOR 62:17   INTERRUPTIONS=8 FOR :48                           5q

          TOTAL=37 FOR 63:05                                            5r

      NETWORK CONTROL CENTER - SYSTEM B     UNAVAILABILITY LOG          5s

                  MARCH 1975                                            5t

DATE                TIME    DURATION                COMMENT ----
----        -------                                                     5u

MAR 3               17:58      10           CAUSE UNKNOWN 4
4:02     5:24               PREVENTATIVE MAINTENANCE 18:02     11
SCHEDULED SOFTWARE DOWN 6          12:14       1            NOT
LOGGED BY RCC OPERATOR 16:37      2:38            DISC HARDWARE
FAILURE 7           11:36       1           NOT LOGGED BY RCC
OPERATOR 9          10:46       ?           NOT LOGGED BY RCC
OPERATOR 10                   19:22      27            MEMORY HARDWARE
FAILURE 19:58          17           MEMORY HARDWARE FAILURE 11
4:02         3:55          PREVENTATIVE MAINTENANCE 14
12:42          1           NOT LOGGED BY RCC OPERATOR 17
6:35         4:34          TIP/IMP FAILURE 18                  4:01
4:01               PREVENTATIVE MAINTENANCE 19                 10:17
19         CAUSE UNKNOWN 20                  6:06       16
MEMORY HARDWARE FAILURE 21          10:45      ?            CAUSE
UNKNOWN 22          4:03     8:20          TIP/IMP FAILURE 19:05
17         MEMORY HARDWARE FAILURE 24              17:13       22
MEMORY HARDWARE FAILURE 25           2:40    11:45
SCHEDULED HARDWARE 13:09       1           NOT LOGGED BY RCC
OPERATOR 13:26       5          NOT LOGGED BY RCC OPERATOR 26
4:00         6:44          PREVENTATIVE MAINTENANCE 19:42       20
TENEX SOFTWARE FAILURE 27           3:59      3:15
SCHEDULED HARDWARE 8:56       14           SCHEDULED SOFTWARE
12:11          2           HUMAN ERROR 14:50           1:13
MEMORY HARDWARE FAILURE 28           8:05      22           TENEX
SOFTWARE FAILURE 21:40        22           TENEX SOFTWARE FAILURE
29          11:39      19           TENEX SOFTWARE FAILURE 15:31
20         TENEX SOFTWARE FAILURE 31                3:29      13
TIP/IMP FAILURE 10:24         1:42          MEMORY HARDWARE FAILURE     5v

            RELIABILITY IMPROVEMENT PROGRESS                            5w

1. The SPI has been expanded from 5 to 8 pages to prevent "SPT
FULL" crashes.                                                          5x
```

2. The scheduled PM on 3/26 included the installation of a 1 millisecond clock. 5y

3. The extended outage on 3/25 was an attempt to dump and reload the disc with a "virtual drum" twice as large. 5z

4. The X-Y currents in sector 3 of the AMPEX memory have been adjusted to bring them back into spec, and a vibration-sensitive module was replaced in sector 1. 5a@

5. Disc problems were traced to an intermittent I/O bus which has been replaced. 5aa

6. Defective module in scanner which flooded system with spurious interrupts has been replaced. 5ab

10-APR-75 1127-EDT TOMLINSON at BBN-TENEXA: Progress Report, TENEX NCP Delays Distribution: NET PERFORMANCE TECHNICAL GROUP
[BBN]<MCKENZIE>NPTG.TXT; Received at: 10-APR-75 10:14:07 6

The source of the delays indicated in the statistics reported earlier has been found. Basically, there were two problems. First, the NCP was being blocked due to an interlock being set by some other process which subsequently ceased running due to lack of priority. The mechanism whereby such lockers were to obtain high priority had been left out of the NCP interlocks. 6a

Second, the mechanism whereby the NCP itself was given high priority was shared by a large number of other processes (e.g. all processes waking up from terminal input) thus defeating its purpose. This mechanism was also deficient in that the duration of the process's high priority was not coupled to the duration of the task being performed while the lock was set. This could result in either the high priority terminating too soon which would cause a situation like that described above, or it could last too long resulting in the process competing for high priority service when it did not require it. 6b

A new monitor is being assembled which will correct these problems. Its performance will be reported in a subsequent note. 6c

10-APR-75 0516-PDT WALKER at USC-ISI: OFFICE-1 PROBLEM 9 APR 1430 TO 1630 Distribution: NET PERFORMANCE TECHNICAL GROUP
[BBN]<MCKENZIE>NPTG.TXT; Received at: 10-APR-75 05:15:40 7

ALEX, THANKS FOR YOUR HELP AND COMMENTS. ITS MY UNDERSTANDING THAI A VERSION OF 1.33 TENEX IS COMING UP AT OFFICE VERY SOON (THIS WEEKEND?). THE PROBLEMS I HAD (AND I BELIEVE THAT A LOT OF OTHERS HAVE RECENTLY HAD) APPEAR TO BE TRACABLE TO 1.31 PROBLEMS WHICH

HAVE BEEN FIXED IN 1.32 OR 1.33, IF OFFICE-1 REALLY IS GOING TO RUN THE NEW TENEX SOON I SEE NO REASON TO DWELL ON MY PROBLEM OF YESTERDAY, AS I DISCUSSED WITH STEVE BUTTERFIELD YESTERDAY, THE PROBLEM OF CLOSING CONNECTIONS RIGHT AFTER OPENING THEM APPEARS TO REQUIRE A BIT OF WORK IN THE TENEX NCP (COMMENTS?). 7a

I WANT TO THANK ALL WHO HAVE BEEN INVOLVED IN THIS PAST MONTH'S EXERCISE. WE HAVE LEARNED AND ARE STILL LEARNING A LOT. THE PROBLEM NOW IS TO SUMMARIZE THE RESULTS AND MAKE POSITIVE RECOMMENDATIONS FOR ACTION (MANY OF YOU HAVE ALREADY DONE AN EXCELLENT JOB AT THIS). AS FOR ARPA'S PART, I AM PREPARED TO FIGHT VERY HARD FOR MORE NETWORK LINES, AND MORE RESOURCES TO HELP CORRECT THE THE MANY PROBLEMS THAT WERE UNCOVERED THIS LAST MONTH. (I CAN'T PREDICT HOW SUCCESSFUL I WILL BE BUT I WILL TRY VERY HARD.) 7b

THANKS FOR ALL YOUR EFFORTS, LET'S PRESS ON, 7c

STEVE 7d

9-APR-75 1748-EDT MCKENZIE at BBN-TENEX: Today's problem
Distribution: NET PERFORMANCE TECHNICAL GROUP
[BBN]<MCKENZIE>NPTG.TXT; Received at: 10-APR-75 05:45:14 8

Steve, This is a summary of what we believe were the causes of your problems in trying to use OFFICE-1 from the ARPA TIP at about 1430 (ET) today. 8a

1) With the exception of the continuing absence of the Moffett IMP, the network seemed to us to be in good shape. 8b

2) OFFICE-1 was pretty heavily loaded. A SYSTAT at 1450 (ET) said: ... 26! JOBS LOAD AV 8.39 10.01 10.86 8c

3) OFFICE-1 was quite confused about the state of its connections to port 27 (octal) at the ARPA TIP. The evidence available to our group suggests a bug in the routines which hash into the connection tables; this bug was found at BBN in TENEX 1.31 and the fix was incorporated in the code for TENEX 1.32 (and 1.33). 8d

4) We speculate that the sequence of events leading to the sequence: @o 43 [typed by you] Trying... [typed by your TIP] <very long wait> Open [typed by your TIP] Closed [typed immediately afterwards by your TIP] was caused by the following sequence of events. The TIP started the initial exchange of protocol commands to open the pair of TELNET connections, signifying this by typing "Trying..." The OFFICE-1 NCP generated the initial (positive) answer to this request. However, for some unknown reason, perhaps related to traffic load

and perhaps related to the connection table problems, this message did not get delivered to the ARPA TIP until TENEX'S timer ran out on the attempted open, causing TENEX to generate a "spontaneous close"to the connection. These two messages were delivered to the TIP in the same order they were generated, so the TIP first told you that the connection was open and then that it was closed (just what happened). You do not see this problem with TIP version 322, even if it occurs, because the TIP waits a (shorter) period and then types "Timeout", suppressing all subsequent interchanges. 8e

We do not believe that you are expecting us to pursue this particular incident further; please correct me if I'm wrong. 8f

Regards, Alex 8g

8-APR-75 0940-EDT MCKENZIE at BBN-TENEX: MOVE OF SUMEX "VDH"
Distribution: NET PERFORMANCE TECHNICAL GROUP
[BBN]<MCKENZIE>NPTG.TXT; Received at: 8-APR-75 07:04:43 9

THIS IS TO BELATEDLY NOTIFY EVERYONE IN THIS GROUP THAT AN IMP WAS INSTALLED AT SUMEX OVER THE WEEKEND, THE SUMEX HOST WAS ATTACHED TO THIS IMP AS A LOCAL HOST (DECIMAL ADDRESS 56), AND THE VDH CODE WAS PERMANENTLY REMOVED FROM THE TYMSHARE TIP. AT THE MOMENT THE SUMEX IMP IS CONNECTED TO THE REST OF THE NETWORK AS A "SPUR" ON THE TYMSHARE TIP (USING THE CIRCUIT FORMERLY USED FOR THE VDH CONNECTION) BUT THERE IS A STRONG POSSIBILITY THAT THE SU-DSL VDH WILL BECOME ATTACHED TO THE SUMEX IMP AND THAT THE STANFORD/SU-DSL CIRCUIT WILL BECOME AN IMP/IMP CIRCUIT FROM STANFORD TO SUMEX. THIS COULD BE OF GREAT BENEFIT, SINCE IT WOULD BREAK THE LONG CHAIN OF IMPS FROM UCLA TO SRI, AND WOULD MAKE THE TYMSHARE-TO-ARPA PATH CONSIDERABLY SHORTER. REGARDS, ALEX 9a

4-APR-75 2149-EDT WALDEN at BBN-TENEX: irby's log Distribution:
MCKENZIE, MALMAN, net performance technical group
[bbn]<mckenzie>nptg.txt; Received at: 4-APR-75 18:58:29 10

joel, will you please check over the autodialler logs for the past several weeks to see if any trouble with 964-8997 at the ames tip has been apparent, data-set hang-up has been reported on this port. 10a

alex, would it be possible for one of the ncc operators (for instance) to check back over the ncc log for the times mentioned in irby's log of connection breaks to see what can be learned? 10b

dave 10c

4-APR-75 2130-EDT WALDEN at BBN-TENEX: borken connections

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Distribution: IRBY AT BBNB, net performance technical group
[bbn]<mckenzie>nptg.txt: Received at: 4-APR-75 18:35:34 11

charles, 11a

it seems to me that your informal log shows several different problems and they should be treated separately, 11b

1, tip/data-set hanging up on you, the ncc staff can help try to track this one down if it reoccurs, 11c

2, net trouble or bbn imp dead, no fancy isolation diagnosis needed here, just have to keep trying to improve imp reliability, we recently got one bug out of the tip which was crashing the bbn tip about once per day, and we are continuing to look for such bugs, we postmortem every crash carefully, 11d

3, tenex crash, same story as with the tip crashes, the tenex guys try very hard to get the bugs out of tenex and i am sure will continue to try, 11e

4, tenex bug hit's, the tenex guys argued very convincingly in an rfc some time ago that some bug hits are unavoidable and the best that could be done is to have the tip and tenex try to put the connection back together to minimize the users pain, we have had some trouble in the past making this reconnection mechanism work, both on the tenex side and the tip side, and if you consistantly see the tip fail to restore suspended connections, please let us know so we can debug the mechanism some more, of course, in some cases tenex gives up and restarts rather than continuing and the connection can not get restored for this reason, there is nothing to debug in this situation, if there is any confusion over this mechanism, i will be glad to point you to documentation or to try to write better documentation, we do encourage elf to adopt the tip/tenex connection restoration mechanism and will be glad to supply documentaiion on the protocols, 5, there can be another kind of connection breakage which your mesage does not lead me to believe is happening but which you should be aware of all the same, if tenex doesn't take traffic from the imp fast enough, the imp will declare it tardy, we have not been seeing this much at all with tenex 1,33 at bbn of late, another, problem which your message does not indicate is happening but which we should be notified of if it begins to happen is tenex just closeing (not breaking) the connection out of the blue, if you see any of this, we want to know as will the tenex guys i am sure, this would undoubtedly require joint diagnositc efforts, 11f

while the number of broken connections or dead systems is, i am sure , a pain for you, i am encourage by your message as it

doesn't indicate anything mysterious happening, just system crashes. we can all understand the latter and try to make them happen less. this would not be true if you were seeing many mysterious "hung connections", for instance. 11g

regards, dave 11h

4-APR-75 2049-EDT IRBY at BBN-TENEXB: Broken connections
Distribution: WALDEN, MCKENZIE, net performance technical group
[bbn]<mckenzie>nptg.txt: Received at: 4-APR-75 17:56:59 12

1) auto data set hangups: I have been getting this on Ames TIP 964-8997. Am using same terminal/coupler I have used for a long time with no similar problems before I started using Ames TIP. Hasn't happened this week at all. About once per day before. 12a

2) disconnects:These seem to originate from several sources. TIne TIP can sometimes resore the connection (ELF doesn't even try). BBNB usually does not crash, since the jobs are usually detached when we re-connect. "host not responding" is very common TIP message. We understand that Ray Tomlinson was trying things yesterday and inadverantly caused sveral breaks in about one hour's time. However, it does seem to happennearly every morning around 10:00 or 11:00 PDT and one, two, or three other times each day. Following is an informal log kept att ARC (we do not pretend hat it is complete) 12b

DATE	TIME DOWN	TIME UP	COMMENTS	REPORTER
(I jus lostt my connection -- TIP resttored 10:15 our time) 3/27				
12:15	13:05	Host Rejecting (BBNB)		Hopper 3/28
09:08	?	BBN IMP DEAD		Postel I just
lost my connection twice entering the above line -- time above				
should be 9:45 not 10:15, 3/28		18:45	?	Host
not responding (BBNB)	Postel 3/30	13:00	1440	net
down then BBNB down	Hopper 3/31	0735		0800
host not responding (BBNB)	Hopper 3/31	08:40		?
Host dead	Ehard 4/1	1400	?	BBNB
down	Postel 4/1	2049	?	BBNB
down Postel 4/2	10:10	?	BBN imp down	
then BBNB down	Maynard 4/2	11:55	12:08	BBN imp
down Postel 4/2	12:52	13:05	BBN imp down	
Postel 4/3 08:30	08:35	host not responding (BBN)		
Posttel 4/3	08:50	9:00	BBNB down	
watson 4/3 10:08	10:14	host dead	Hopper 4/3	
10:22	?	host dead	Lieberman 4/3	
10:30	10:31	Bug halt at bbnb	Maynard 4/3	
13:58	13:59	host dead	Posttel 4/4	

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9:45 9:50 host not responding (BBNB) Postel 4/4
10:00 10:01 host not responding (BBNB) Postel 4/4
10:01 10:03 host not responding (BBNB) Postel (TIP resored on last three, ELF users had to reconnect) 4/4 10:22
10:30 host not responding(BBNB) Irby 4/4 10:55
10:57 Host not responding(BBNB) postel 4/4 11:10
? Host not responding (BBNB) Postel 4/4 14:05
? Host not responding (BBNB) Postel 4/4 14:35
14:38 Net trouble Lieberman 12c

-- Charles, 12d

4-APR-75 1904-EDT VICTOR at BBN-TENEXB: a tenex measurement package Distribution: NET PERFORMANCE TECHNICAL GROUP
[BBN]<MCKENZIE>NPTG.TXT: Received at: 4-APR-75 16:05:17 13

< ANDREWS, MEASURE133.NLS;6, >, 4-APR-75 18:52 KEV ;;;; This is a list of measurement capabilities that we at SRI-ARC would like to see added to the current capabilities in TENEX 1.33. Part of these capabilities existed in SRI-ARC's 131 system, we may install part or all of these capabilities in SRI-AI TENEX 1.33. Motivation Experiences with SRI-ARC and OFFICE-1 measurement system (monitor changes plus superwatch user program) have shown us that such a system is very desirable. An instance of superwatch running at a low frequency provides a complete record of all up-time performance and is valuable. Recent experiences of network performance problems coupled with host performance problems indicate to us that performance records as well as high frequency probing capabilities are important now to identify problem areas. But such tools will be CRUTIAL in beating the performance problems out of the NSW complex. Definitions A COUNTER is a word in monitor memory that is incremented every time an event (which it is counting) occurs. Example: number of clock ticks. A COUNT is a word in monitor memory that contains an integer of some particular meaning, and it is correct at any instant. Example: number of user pages available in system. A METER is a word in monitor memory that contains a sum or integral. Strictly speaking, a counter is a meter. Example: integral of balances set jobs dt. Example: Sold time since system was started. A PARAMETER is a significant variable that is computed by a user program from COUNTERS, COUNTS and METERS, all lifted from the monitor space in a sufficiently short period of time. Example: per cent of sold time for the last minute of real tme. Clock interrupt sampling 13a

Some of the meters we would like to have available are best maintained by clock-driven sampling. The SRI-ARC 1.31 monitor did its sampling every 50 ms., when the two clocks were syncronized. The sampling operation is fast enough that it does not introduce any appreciable overhead. Swapping/memory management measurements

REAL drum measurements (may be omitted when no physical drum) drum queue length This is a count of the number of entries in the physical drum queue (0=empty), drum busy meter This records the number of 50ms samples for which the drum queue length was non-zero, drum queue sum This is a meter containing the sum of the non-zero drum queue samples (yeilds average drum queue length given number of samples), drum transfer counter This counts all reads and writes to the physical drum, VIRTUAL drum measurements (may be omitted when virtual drum = real drum) NOTE: There may be both real and Virtual drums, as in the case of OFFICE-1, In that case the real drum is a subset of the vitual drum, V-drum queue length V-drum busy meter V-drum queue sum V-drum transfer counter REAL disk measurements NOTE: Virtual drum transfers going to/from the disk are included here, disk queue length disk busy meter disk queue sum disk transfer counter Virtual drum cleanup activity A counter recording the number of page transfers from virtual drum to disk, Pages regained without writing on the disk are not counted, Drum usage counts count of free pages on virtual drum (exists but not generally acessable) 13b

count of free pages on physical drum (" ") Core cleanup activity number of transfers from core to (virtual) drum (counter) number of transfers from core to disk (counter) Working set management activity NOTE: We have a poor understanding of the TENEX memory management and would like to see these measurements to aid our understanding but also to find out how TENEX treats an NLS working set under different conditions. In the long term, these may not be valuable things to have in he measurement package,

number of calls to routine XGC (counter) number of pages 'removed' by XGC (counter) number of times routine GCPC is called (counter) Balance Set measurements number of balance set jobs A meter containing the sum of number of BS jobs for each 50 ms, sample, (somewhat redundant but necessary to compute parameters from following meters), number of balance set jobs runnable A meter containing the sum of number of BS jobs that are not in page wait state (for each 50 ms, sample) number of pages held for balance set jobs A meter containing the sum of FKNR for each BS job (for each 50 ms, sample) number of pages held for other reasons A meter similar to above, Maintained every 50 ms, sample, Scheduler/system measurements These are super as of TENEX 1,33, One simple addition give an important statistic: time in system mode A counter of the number of 50 ms, samples taken with the user bit off in the interrupt word (i,e, it was in system mode when interrupted), Subsystem measurements We would like the monitor to collect more information on 13c

subsystem operation and the most reasonable thing seems to be to provide it with a subsystem name and have it collect extra

information for forks running that subsystem. Here is what we would like to see: time spent executing on each queue A meter for each queue, containing the sum of execute time, average working set size NOTE: current WS size numbers are size at blocking time. We would like a distribution of WS size obtained from a 50 ms sample of processes running the given subsystem and in the balance set. Perhaps a reasonable way to do this is to have two user-specified values that would define three regions (ws < p1, p1 <= ws < p2, ws >= p2). The monitor would maintain three meters counting the occurrences of forks with working set in each region. In general the monitor could maintain N regions, where N is determined at assembly time (?). The previous meters would necessitate another containing the sum of the number of balance set forks running the given subsystem, for each 50 ms. sample. Integral of CAPT dt This is a meter containing the sum of CAPT dt for each fork running the given subsystem. CAPT dt is added to it every time CAPT is changed for a fork. The previous meter necessitates a meter containing the sum of the dt factors every time the previous meter is changed. This will allow computation of the average cutoff age for the given subsystem. Alternatively, this could be estimated by a meter controlled by the 50 ms. sampling code. If CAPT for every balance set process were in a monitor table, the sampling code could sum the CAPTs for each process running the subsystem in question

13d

and accumulate the sums in the meter. Integral of IFAV dt Similar to the CAPT integral. Will allow computation of the average IFAV for a subsystem. This could be estimated by the 50 ms. sampling code as for CAPT.

NCP measurements With respect to measuring the NCP it seems appropriate to have two (and possibly three) modes of operation. The first mode is to measure all network traffic; the second mode would be to measure only traffic on specific host-link pairs (for input and output) or for a specific NVT. (The third mode is to turn off all measurement due to the overhead associated with collecting information at interrupt time.) These measurements should be resettable so that when it is desired to start measuring a specific host-link pair (as opposed to all or no network traffic), the measurements will be consistent. In addition to the time meters mentioned below, when the measurements are tracing a specific host-link pair, the discrete times of state changes (e.g. message moved to connection queue, etc.) should also be available to user programs analyzing the data. Some of the measurements listed below may already be collected, however, they are listed anyway for the sake of completeness. Counts: number of input buffers available for receiving messages from the imp

length of the imp output queue Counters: number of times ncp fork is run number of times ncp fork is run because impflg was raised number of messages sent/received number of impbugs received

number of high priority messages sent/received number of messages sent/received on link 0 number of multi-packet messages sent/received on link 0 13e

length (in bits) of non multi-packet messages sent/received on link 0
length (in bits) of multi-packet messages sent/received on link 0
number of non link 0 regular messages the following counters only apply to non link 0 regular messages
number of multi-packet messages sent/received length (in bits) of multi-packet messages sent/received length (in bits) of non multi-packet messages sent/received Meters: time to send/receive single/multi- packet link 0 messages to/from imp time to send/receive single/multi- packet non link 0 regular messages to/from imp time a single/multi- packet message spends on the input/output queues
rfnm wait times for single/multi- packet non link 0 regular / link 0 messages time a message spends on the connection queues time to move a message from/to the connection queue to/from its destination/source (tty buffers or file windows or imp i/o queues)
time between invocations of the ncp fork time between invocations of the ncp fork for when the ncp fork is run due to the raising of impflg Access to measurements by user programs All the above counts and meters, and also the "tasktb" meters should be available to a user program of non-wheel status. The execution time required to get them should be very small. THE SYSGT-GETAB method is not fast enough. PEEK would be satisfactory if (1) there were a way to get an address given a symbol describing what the program wanted and (2) PEEK were not privledged. A JSYS similar to GETAB would be satisfactory if it would BLT a whole table into user space rather than return one 13f

word at a time. The user program should be able to make probes at a high frequency (every one or two seconds) without presenting much load to the system. We recognize that most every one of these "hooks" has been put into some TENEX somewhere at sometime by a proficient hacker. But a standard TENEX measurement package would be invaluable in comparing configurations, different kinds of loads, KA vs. KI etc., as well as in identifying bottlenecks, evaluating changes in subsystems, monitors, and hardware. 13g

4-APR-75 0932-EDT MCKENZIE at BBN-TENEX: Broken Connections
Distribution: WALDEN, net performance technical group
[bbn]<mckenzie>nptg.txt;,, irby Received at: 4-APR-75 06:40:52 14

Dave, I think another possibility to be investigated is that

Irby's terminal and/or modem is failing to maintain the signal that tells the modem at the TIP end that the terminal is still there. It seems to me we once saw this type of result with an accoustically-coupled terminal, although I can't remember where or when. Perhaps Charles can tell us if he knows that lots of people are seeing this problem or only himself; whether he sees it at both the AMES TIP and the Tymshare TIP or only one of them; whether he works with any service Host other than BBNB and if connections get lost there as well as at BBNB, etc. Since we have had no noticable complaints about this problem before, I am inclined to suspect the terminal a bit more than I suspect other parts of the system. Regards, Alex 14a

4-APR-75 0749-EDT WALDEN at BBN-TENEX: LOST CONNECTIONS
Distribution: IRBY, net performance technical group
[bbn]<mckenzie>nptg.txt: Received at: 4-APR-75 04:59:48 15

IN YOUR SUMMARY OF YESTERDAY, YOU MENTION THAT YOUR CONNECTION IS GETTING BROKEN OR THE TIP IS HANGING UP YOUR DATA SET OR SOMETHING SEVERAL TIMES A SESSION. CAN YOU EXPAND ON WHAT YOU THINK IS HAPPENING. WE HAVEN'T BEEN WORKING VERY MUCH ON THIS PROBLEM NOT KNOWING THAT IS WAS A SERIOUS PROBLEM. IS IT A SERIOUS PROBLEM, DO YOU THINK WE ARE WORKING ON IT. 15a

IF THE PROBLEM IS YOU LOCAL TIP HANGING UP ITS DATASET, WE SHOULD LOOK INTO THAT. IF THE PROBLEM IS THAT TENEX IS JUST CLOSING THE CONNECTION EVERY NOW AND THEN, THEN THE TENEX GUYS MUST LOOK INTO THE REASONS WHY TENEX CLOSES A CONNECTION WHICH IS OPEN; I'D ENCOURAGE TENEX BEING FIXED TO LOG EVERY CONNECTION CLOSE AND THE REASON FOR CLOSING WITH A TIME STAMP AS THE WAY TO TRACK THIS DOWN. IF IT IS SOMETHING IN BETWEEN, THEN I SUPPOSE WE WILL ALL HAVE TO LOOK. ONCE AGAIN, IT WILL HELP IF YOU KNOW EXACTS TIMES AS THESE CAN BE CORRELATED WITH THE NCC AND TENEX LOGS. DAVE 15b

4-APR-75 0741-EDT WALDEN at BBN-TENEX: DIFFERENCES BETWEEN TOMLINSON AND WHITE/VICTOR WORK Distribution: VICTOR AT BBNB, net performance technical group [bbn]<mckenzie>nptg.txt: Received at: 4-APR-75 04:41:20 16

IF I UNDERSTAND CORRECTLY WHICH FIGURES YOU ARE TALKING ABOUT WHEN YOU CONSIDER THE WHITE/VICTOR FIGURES, THEN I THINK THE FACT THAT THEY LUMP NCP+TENEX TIMES TOGETHER SO ONE CAN'T SEE WHICH IS CONTRIBUTING WHAT IS NOT ALL THAT USEFUL. I FOUND RAY'S FIGURES VERY USEFUL BECAUSE OF THE CAREFUL BREAKDOWN ON DELAY CONTRIBUTIONS. I THINK IT WOULD BE WONDERFUL IF RAY'S PROGRAM WAS EXPANDED TO INCLUDE NET DELAY, BUT ONLY IF DONE IN A WAY WHICH CAREFULLY SEPARATES THE CONTRIBUTORS. 16a

3-APR-75 1926-EDT VICTOR at BBN-TENEXB: differences between ray

tomlinsons work and tthat of jim white and ken victor Distribution:
NET PERFORMANCE TECHNICAL GROUP (BBN)<MCKENZIE>NPTG.TXT; Received at:
3-APR-75 20:50:08 17

ray tomlinsons work traced an nvt charcter from its arrival at the tenex imp interrupt routine to a user program and then back out to the imp interrupt routine (as an echoed character), this work provided a good meassure of the ncp fork inside tenex and pointed up some possible delays at the host-imp interface. The measurements made by j. white and me traced a character that started in a user program and went through the ncp (without the overhead of going through an nvt terminal) and out through the imp into the subnet to a tip that then looped back the character which was then traced in its path back to a user program. this work also provided a measure of tenex handling of the ncp (although not as detailed as rays work), however, this work also provided a measure of subnet times and showed that at times the subnet was experiencing imp hop times of as large as 200ms. the modifications i made to the ai tenex also provide for metering the number and sizes of messages sent to and from tenex and the imp. as yet, we have no user programs to analyze this additional information (specifically delays associated with multi-packet messages). we (arc) currently have no plans to write such a program as we beleive it belongs as an integral part of a generalized measurement package in tenex. we are intne process of puting togetner a document describing in detail what we feel this general measurement package should contain. until such a package is implemented, i would suggest that rays work be upgraded to be able to measure sub-net times in addition to what it currently measures. 17a

3-APR-75 1736-PDT ENGELBART: To Steve Walker re plans to improve network Distribution: NETWORK PERFORMANCE GROUP
[OFFICE-1]<ENGELBART>NPG.TXT; Received at: 3-APR-75 17:36:33 18

Steve: We at ARC must make decisions soon regarding NLS-service computers to support ARC workers and new Utility clients. The intense studies over the past month reveal quite clearly some problems in the Network that prevent bandwidth that is adequate to support DNLS. Reconfiguring to reduce the IMP-hop distances, and improving host-host and Host-Imp protocols to avoid blocking problems and if possible to allow message streaming without RFNM waits, seem critical. Effective bandwidths otherwise appear ludicrously low in view of sub-net capability. 18a

We need to know what commitments we can count on regarding ARPA or DCA improving network performance. I would appreciate your informing us about what you now know or intend. We soon have to commit ourselves to two TENEXs worth of resources for next summer,

and Net performance is a serious issue. (Note: We are also intensely involved in a parallel assessment of TENEX's part of the NLS-service problems.) 18b

I would like to point out that the NSW and VLDB programs most certainly will be in trouble if the network performance isn't brought up to par. 18c

Regards, Doug 18d

P. S. We notice that a local (SF Bay Area) change in Net connections could put Office-1 just one hop from ISI -- reducing from 13 to 7 the hops from ARPA, and increasing no other O-1 user's "distance." Does that interest you? 18e

3-APR-75 1719-EDT MCKENZIE at BBN-TENEX: Your Recent Summary
Distribution: IRBY AT BBNB, net performance technical group
[bbn]<mckenzie>nptg.txt: Received at: 3-APR-75 20:45:25 19

Charles, Somehow or other some wires seem to have gotten crossed. I am refering specifically to the portion of your recent summary which refers to the "BREAK CHARACTERS TO TIP" problem. The following note, which I thought went to everyone on 21 March, describes the status of this particular problem. In fact, NOTHING has been done to the TIP since that time, so both your statement that the reason was "unknown" and your statement that "the TIP has been modified to prevent it" are probably incorrect. Regards, Alex
Previous message follows: 19a

There has been much discussion recently about the problems which the Tymshare TIP (and perhaps other TIPs) has been having with the 4800 baud modems used by the "lineprocessors". This is an attempt to clear up a few misconceptions about what does and does not happen. 19b

The modem/lineprocessor combination, as currently implemented, does not use any "data terminal ready" signal to tell the TIP when to listen to the terminal. Apparently the modem could convey this signal to the TIP, but the lineprocessor was not implemented with this in mind; therefore the modem at the terminal end has the "data terminal ready" signal wired on. We have asked the SRI people to correct this design, and we believe they are in the process of beginning to do so. 19c

The Tymshare TIP was recently fixed (as part of a general TIP retrofit program) to ignore a steady steam of "breaks" coming from a terminal. This fix, however, was designed under the assumption that "externally clocked" devices would only send constant "breaks" if they really meant them. Unfortunately, the modems

used with the lineprocessor fall into the category of "externally clocked" devices. We are now reviewing our design to try to find a way of discarding (in hardware) breaks from such devices. 19d

Even in the current case, with a somewhat deficient design of the TIP hardware to discard multiple breaks, and a somewhat deficient design of the lineprocessor to not generate "data terminal ready", we believe that essentially no TIP bandwidth is consumed by the breaks IFF there is no open network connection (to a Host) from such a device. We believe that a significant fraction of TIP bandwidth IS consumed in the case where the user fails to close (@c <cr>) his TIP connection before turning off his lineprocessor. We suspect that this was happening frequently at Tymshare, since the reason this problem first came to light was Postel's observation that traffic generated by the Tymshare TIP seemed abnormally high. 19e

It appears that the lineprocessor(s) connected to the ARPA TIP are not using modems and do provide a "data terminal ready" signal to the TIP. The TIP examines this signal every few seconds. Thus, when a lineprocessor is turned off, the TIP sees a constant stream of breaks (the lineprocessor is still an "externally clocked" device) until the next time the TIP probes the "ready" signal, at which point further input is ignored. This is consistant with the findings Hardy reported in his message of 20 March 1946-EDT. 19f

3-APR-75 1545-EDT CLEMENTS at BBN-TENEXA: OPEN SCANNER LINES - REF IRBY'S REPORT OF TODAY, Distribution: NET PERFORMANCE TECHNICAL GROUP [BBN]<MCKENZIE>NPIG.TXT; Received at: 3-APR-75 13:12:19 20

OPEN SCANNER LINES ON A DC10 SCANNER SHOULD NOT BE A PROBLEM (BUT CAN BE), THE FIX IS DOCUMENTED IN BOTH DEC'S FIELD SERVICE TECH TIPS AND IN THE MAINTENANCE MANUAL FOR THE DC10. THERE IS A JUMPERING ARRANGEMENT ON THE W706 TTY RECEIVER CARD WHICH CAUSES AN OPEN LINE TO GENERATE ONE AND ONLY ONE NULL CHARACTER, UNLESS TRANSITIONS FROM SPACE BACK TO MARK ARE OCCURRING. WHEN A LINE BECOMES OPEN, IT CHANGES FROM MARKING (IDLE) TO SPACING. THIS GENERATES ONE NULL, UNTIL A TRANSITION BACK TO MARK, I.E., UNTIL THE LINE IS POWERED BACK UP OR PLUGGED BACK IN, NO FURTHER INTERRUPTS ARE GENERATED. /RCC 20a

3-APR-75 1350-EDT IRBY at BBN-TENEXB: Summary of findings of ARC Network Performance task force Distribution: NET PERFORMANCE TECHNICAL GROUP [BBN]<MCKENZIE>NPIG.TXT;, [bbnb]<postel>nsw-steering-committee.list; Received at: 4-APR-75 01:03:28 21

This document attempts to summarize the findings of the ARC Network Performance task force. Recommendations are also made

where appropriate. In addition time estimatees are given for length of time until a problem is fixed. As I learn more about the problems, I will update this file. 21a

BREAK CHARACTER TO TIP 21b

The 208 modems connected to Line Processors were sending continuous breaks to the TIP whenever the Line Processor was powered down. This was because the Line Processor-modem connection had the "data ready" bit wire to true all the time, since the Line Processor did not provide such a signal. The TIP had been modified to detect this sort of thing and disable it. The TIP modification did not work for some unknown reasons. 21c

This is supposedly not happening anymore. The TIP has been modified to prevent it and the Line Processor is being changed to prevent it. Martin Hardy should make sure this is not happening to any other TIPs we are associated with. 21d

This caused a very significant degradation of service to users using local host if TIP connect was to the local host and was not closed. 21e

BREAK CHARACTERS TO PDP-10 21f

An open line to the PDP-10's Data Line Scanner was found and fixed. May have accounted for a 1% to 2% load on system (this guess is based on our experience that an open line at 9600 baud caused a 20% load on our local PDP-10). The open line at Office-1 was at 1200 baud. 21g

VDH interference 21h

The Very Distant Host interface code and buffers now being installed in the TYMSHARE TIP is highly suspect but no conclusive proof as yet. It appears to be causing IMP crashes and strange behavior. 21i

I expect this will get fixed within a month. I would recommend moving the VDH to another IMP since it eats up 50% of the IMP's buffer space and seems flacky. 21j

HOST blocking imp-host interface 21k

It was discovered that TENEX is blocking IMp from inputting on 1,31 TENEX. Office-1 is moving to 1,33 to fix this and other network problems. I expect this will be up within three weeks. This may not entirely eleviate the problem and we should continue to watch it. 21l

imp blocking host-imp interface 21m

This seems to be happening quite a lot and probably accounts for the 15 second periods users have observed when there is no interaction with the servicing host. There are two causes known to me to date. Hopefully the bbn-network people will clarify this area for us. 21n

multi-packet messages 21o

Can cause the interface to be blocked for at least the round trip time to the receiving imp, this causes the host to be unable to send data to any other host for a period of at least 1/2 second for the ARPA-IIP -- Office-1 and ARC-ELF -- BBNB situations. Fixing this requires a change to host-imp protocol which I recommend ARPA should support. This will require many months to implement for all hosts but could be fixed in all TENEX's more quickly. 21p

receiving host slow in taking data 21q

This may account for long (15 second) pauses where a host does not respond. The subnet blocks a host from sending too much data to a receiver host that is not taking data quickly enough. If the host is going down or faultering, the delay in taking data becomes the timeout period or 15 (or is it 40) seconds. 21r

Hopefully the bbn-network people will clarify this one for us shortly. The fix here is also a change in imp-host protocol or perhaps a change to sending hosts to monitor their outstanding messages more closely and to anticipate the imp blockage before it occurs. 21s

general tenex overhead -- NCP and scheduler 21t

Initial measurements from Jim White's and Ken Victor's work as well as Ray Tomlinson's recent memo indicate that general TENEX NCP/scheduler overhead often exceeds network transmission times for single charcter interactions. It is perhaps posible to tune TENEX so that this overhead is reduced. BBN-TENEX people are currenly looking into these problems and hopefully will come up with some answers. 21u

It almost goes without saying that TENEX load has a significant effect on responsiveness. However, the pie slice scheduler does provide some insulation from this. 21v

subnet performance 21w

The subnet performance seems about according to specs (about 50 MS per hop). However we have observed times when it appeared to be more like 200 MS per hop. Long network paths seem to cause some problems because the net was designed assuming a max of 6 hops and the average length is now more like 10 hops. This is very serious and requires either changes in network topology or network design and protocols to accomodate this deviation from initial design assumptions. 21x

The difference in performance of printers and high speed terminals when zero and one or three hops away is still unexplained. We have experienced differences of a factor of two in throughput to these devices depending on whether they were zero or more hops away (going from zero to one hop for the printer and zero to three for the terminal -- we ran two terminals side by side, one zero hops and one three). 21y

ELF problems 21z

ELF crashes, hangs, and character dropping has been a very serious problem for us. There are now three people working on various of the problems. My guess is that most of our serious elf problems will be solved within a week if Dave Retz pays attention to them. Otherwise, I would guess three weeks. 21aa

Mouse keyset handling 21ab

The reliability of mouse/keyset usage has dropped considerabley. It was decided that this would be corrected within NLS rather than changing the Line Processor (which we now consider to be frozen except for bug fixes). 21ac

I expect the fixes will be in the running BBNB NLS within a few days 21ad

suspended connections 21ae

This continues to be a problem for me. My connection tends to be broken to BBNB about four times a day. I have never been able to type in the daily status report without at least 2 breaks in my work, some of which are auto hangup of the data set at the ames tip. 21af

single vs multi-packet messages

It was learned that sending multi-packet messages to tip terminals over long network paths did not win. We have changed tip/elf buffers to be smaller than a packet to avoid this.

However, file transfers and other network uses can still cause problems. 21ag

-- Charles. 21ah

3-APR-75 1339-EDT IRBY at BBN-TENEXB: Summary of Findings of ARC Network Performance task force Distribution: NET PERFORMANCE TECHNICAL GROUP [BBN]<MCKENZIE>NPTG.TXT;, [bbnb]<postel>nsw-steering-committee.list; Received at: 3-APR-75 20:57:44 22

This document attempts to summarize the findings of the ARC Network Performance task force. Recommendations are also made where appropriate. In addition time estimatees are given for length of time until a problem is fixed. As I learn more about the problems, I will update this file. 22a

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3-APR-75 1102-EDT MILLSTEIN at BBN-TENEXB: revised document Distribution: BAGGIANO AT ISI, BALZER AT ISIB, BTHOMAS AT BBN,, BURCHFIEL AT BBN, CARLSON AT ISI, CARLSTROM AT ISI,, CRAIN AT ISI, CROCKER AT ISIB, IRBY AT BBNB, JACOBS AT BBN,, LAWRENCE AT OFFICE-1, LEHTMAN AT BBNB, LLOYD AT ISI,, MAYHAN AT ISI, MICHAEL AT BBNB, MILLSTEIN AT BBNB,, POSTEL AT BBNB, RETZ AT ISI, RIDDLE AT OFFICE-1,, SCHAFFNER AT BBNB, SCHANTZ AT BBN, STONE AT OFFICE-1,, STUBBS AT BBN, TRIOLO AT BBNB, UHLIG AT OFFICE-1,, WAAL AT BBNB, WALKER AT BBNB, WARSHALL AT BBNB,, WATSON AT BBNB, WEEKS AT OFFICE-1, WHITE AT BBNB,, WINGFIELD AT OFFICE-1, HOLG AT ISIB, BRADEN AT CCN,, POGRAN AT MIT-MULTICS, BCLDUC AT BBNB, SATTLEY AT BBNB Received at: 3-APR-75 13:12:44 23

there is a new version of <MILLSTEIN>WM-PROCEDURES.TXT at BBNB containing the definitions of two new variables maxitem and maxlist and a new paragraph at the end of section 1. 23a

we invite your comments. 23b

steve warshall/bob millstein 23c

2-APR-75 1933-EDT IRBY at BBN-TENEXB: Some round trip character times under low load conditions at Office-1 Distribution: NET PERFORMANCE TECHNICAL GROUP (BBN)<MCKENZIE>NPTG.TXT: Received at: 2-APR-75 16:33:29 24

We have been periodically running Jim White's two-terminal watchdog program at Office-1 to try to detect low load -- high round trip character times. The program sends characters (5 per minute) to both a local and a TIP looped-back terminal and records the average round trip time for the two. In this case, the TIP is

Network Performance messages for APR 75

TYMSHARE TIP (thus, 0 hops). The following are some interesting sample numbers we have been observing. Times are in milliseconds.

Monday 3/31/75 TIME	LOAD	LOCAL	REMOTE
16:13:35	0,72	50	
220 16:14:35	0,78	60	300 16:15:36 0,78
30	420 16:16:36	0,80	30 390 16:17:37
0,81	50	480 16:18:37	0,80 50 300 16:19:38
0,86	40	250 16:20:39	0,90 90 380 Tuesday
4/1/75 TIME	LOAD	LOCAL	REMOTE
08:57:11	1,64	90	
350 08:58:12	1,56	90	1000 08:59:13 1,50
80	800 09:00:16	1,44	70 920 09:01:17
1,33	110	700 09:02:17	1,21 50 870 09:03:19
1,29	60	860 09:04:20	1,19 80 710 09:05:22
1,29	120	920 09:06:23	1,20 70 630 09:07:23
1,50	120	750 09:08:24	2,24 200 1260 09:09:26
2,27	130	430 09:10:28	2,54 170 590 09:11:30
2,82	170	440 09:12:30	2,69 70 490 09:13:31
2,29	70	660 09:14:32	2,25 190 560 09:15:32
2,16	110	490 09:16:33	2,06 90 320 09:17:34
1,89	60	320	

24a

10:11:01	1,72	110	740 10:12:03 1,69 80
1760 10:13:05	1,67	190	1110 10:14:06 2,43
200	470 10:15:08	2,52	180 430 10:16:08
2,29	100	300 10:17:09	1,98 40 310 10:18:10
1,82	60	400 10:19:10	1,63 60 370 10:20:10
1,47	60	290 10:21:11	1,38 60 310 10:22:11
1,29	70	280 10:23:12	1,40 170 490 10:24:13
1,56	170	510 10:25:15	1,85 380 880 10:26:15
1,69	40	610 10:27:16	1,66 140 710 10:28:17
1,59	100	410 10:29:17	1,59 110 300 10:30:18
1,52	70	390 10:31:20	2,13 330 600 10:32:23
3,24	530	1130 10:33:24	3,45 310 520 10:34:27
3,69	340	1130 10:35:28	3,44 160 500 10:36:29
3,53	280	590 10:37:31	4,18 240 550 10:38:33
4,57	320	370 10:39:34	4,27 410 510 10:40:36
4,26	280	460	

24b

-- Charles,

24c

2-APR-75 1023-EDT TOMLINSON at BBN-TENEXA: Delay measurements on BBNB, Distribution: NET PERFORMANCE TECHNICAL GROUP
[BBN]<MCKENZIE>NPTG.TXT; Received at: 2-APR-75 08:26:03

25

As part of our effort to identify and correct the causes of poor performance that has been experienced using TENEX via the network, we have installed patches in the BBNB monitor to record the progress of NVT characters through the NCP. Below are the results

of these measurements for the period from 1330 EDT to 1600 edt on Monday 31 March, 25a

The patches permit the time at which certain critical events occur to be recorded and for a user program to retrieve these times. The probing interval was 10 seconds unless delays required a longer period to permit the completion of one probe before the next was initiated. The times recorded are: 1) Time of arrival of 36-th bit of a message on the monitored host/link, 2) Time of arrival of the last bit of the same message, 3) Time at which the message was removed from the network input queue, 4) Time at which the character in the message was placed in the terminal input buffer (and its echo placed in the terminal output buffer), 5) Time at which the message containing the echo was generated, 6) Time at which that message was placed on the connection output queue, 7) Time at which the message was placed on the network output queue. This is different from the above only if there is an outstanding RFNM. No instances of this being different from the above actuallly occurred, 8) Time the message was removed from the output queue, 9) Time at which the 36-th bit of the message had been transferred to the IMP, 10) Time at which the last bit of the message was transferred to the IMP. 25b

The user program additionally recorded the time of day at which the BIN it was executing on that connection completed and the current 1 min load average. These times and other data were written on a file in raw form. The data presented below have been processed to extract the minimum, maximum, and average delays encountered between each of the points listed above plus the overall echo time and the overall response time. The overall echo time is just the difference between the time the last bit of the echo message was transferred to the IMP and the time the first 36 bits of the received message arrived from the IMP. The response time measurement is inferred by adding the interval from placing the input character in the terminal buffer to user program activation to the echo time. 25c

No conclusions have been drawn from this data yet, but the following observations are worth making. There are occasions when incoming messages spend an exceedingly long time on the network input queue (4.5 sec in one instance). Since the process handling this queue has top priority in the system, this is difficult to understand. The delay in transmitting the echo following its being placed in the terminal buffers is also long on occasion (3.7 sec). The reason here may be the same as the reason for the preceding problem since the same process has this responsibility as well. There are also occasions when messages spend a long time on the network output queue. This can only be due to either the IMP blocking the host interface or an exceedingly large amount of

output traffic. Since the IMP has been observed to block the interface for relatively long times, that is probably the reason for this large delay. Program activation delays are also fairly long on occasion, but this is mainly a function of program priorities and system loading which was clearly high during the experiment. 25d

The labels on the data below are a bit cryptic and are expanded here: 25e

RL-RI Interval from arrival of 36-th bit to arrival of last bit, (Time to transfer the message into TENEX from the IMP.) ING Time the message spends on the input queue. CHI Time required to dispatch the character into the terminal input buffer. ECH-CHI Delay before the NCP fork notices the echo in the terminal buffer and generates the message containing the echo. CONQ Time the message spends on the connection queue. This is typically negative due the fact that the message never really spends any time there and that the points of measurement are actually reversed. OUTQ Time spent on the output queue. This reflects queueing delay due to prior traffic plus delay due to blocking of the interface on prior traffic. SNDI Time required to transfer the first word of the message to the IMP. SNDRST Time required to transfer the rest of the message into the IMP. PRGWAK Time required for the program to be activated from point of placing the character in the terminal input buffer until the program can execute a TIME JSYS. ECHO Time required to echo a character when no program activation is required. RESP Time required for a response character to be transmitted from the moment of arrival of an input character from the IMP to completion of transmission of the response character. LDAVG The 1 minute load average rounded to the nearest integer. 25f

The raw data may be found in the file [BBNB]<TOMLINSON>NET-DELAY-STATISTICS.BIN, several files with this name exist for various periods. The write date should be referred to in order to determine which is the correct version. 25g

The file consists of a series of 13-word entries. Each entry contains: 0/ Time and date of the sample (GTAD format). 1/ Count of missed events (should be zero) 2-10/ The 9 times listed above (TIME format). 11/ Time of program wakeup in TIME format. 12/ Load average. 25h

The program for processing the data in the form below is [BBNB]<TOMLINSON>XXNCPD.SAV. It should be gotten and reentered. The source for XXNCPD.SAV is XXNCPD.MAC. It contains both the data taker program and the processor. When reentered, it processes the current version of NET-DELAY-STATISTICS.BIN, when

started, it starts probing the NCP and generates a new version of NET-DELAY-STATISTICS.BIN. If not detached, it also processes the data at 10 minute intervals. 25i

NCP DELAY STATISTICS FOR PERIOD FROM 31-MAR-75 13:26:28 TO 31-MAR-75 13:38:37, 60 SAMPLES. 25j

NAME	MIN	MAX	AVG	RL-R1		0		2	0 INQ
8 359	50 CHI	3	20	4	ECH-CHI		7		1089
66 CONG	-21	0	-1	OUTQ 0		5793		97 SND1	0
29 2 SNDRST		0	2	0	PRGWAK		52		1098
503 ECHO	25	5889	221	RESP		99		6330	725
LDAVG	6	15	10						25k

NCP DELAY STATISTICS FOR PERIOD FROM 31-MAR-75 13:38:48 TO 31-MAR-75 13:50:21, 60 SAMPLES. 25l

NAME	MIN	MAX	AVG	RL-R1		0		1	0 INQ
6 985	76 CHI	3	12	4	ECH-CHI		6		1803
108 CONG	-2	0	0	OUTQ 0		219		10 SND1	0
298	20 SNDRST		0	2		0 PRGWAK			62
952	403 ECHO		26	2167		221 RESP			151
2708	624 LDAVG		6	15		8			25m

NCP DELAY STATISTICS FOR PERIOD FROM 31-MAR-75 13:50:32 TO 31-MAR-75 14:02:38, 60 SAMPLES. 25n

NAME	MIN	MAX	AVG	RL-R1		0		2	0 INQ
9 2810	169 CHI	3	24	4	ECH-CHI		8		479
59 CONG	-22	0	-1	OUTQ 0		510		15 SND1	0
648	21 SNDRST		0	2		0 PRGWAK			82
1277	542 ECHO		29	2903		269 RESP			117
3212	812 LDAVG		7	19		13			25o

NCP DELAY STATISTICS FOR PERIOD FROM 31-MAR-75 14:02:50 TO 31-MAR-75 14:13:43, 60 SAMPLES. 25p

NAME	MIN	MAX	AVG	RL-R1		0		1	0 INQ
6 434	50 CHI	3	8	4	ECH-CHI		6		1700
81 CONG	-2	0	0	OUTQ 0		277		10 SND1	0
124	6 SNDRST		0	2		0 PRGWAK			21
1227	433 ECHO		33	1730		153 RESP			186
2461	586 LDAVG		3	18		8			25q

NCP DELAY STATISTICS FOR PERIOD FROM 31-MAR-75 14:13:54 TO 31-MAR-75 14:25:05, 60 SAMPLES. 25r

NAME	MIN	MAX	AVG	RL-R1		0		2	0 INQ
6 1231	65 CHI	3	647	16	ECH-CHI		15		2083

Network Performance messages for APR 75

```
84 CONQ     -3      0       0 OUTQ  0       196     6 SND1  0
319         10 SNDRST       0       1       0 PRGWAK        41
1283        452 ECHO        34      2742    184 RESP        176
2928        636 LDAVG       3       16      8                                25s

NCP DELAY STATISTICS FOR PERIOD FROM 31-MAR-75 14:25:18 TO
31-MAR-75 14:36:31,  60 SAMPLES,                                             25t

NAME        MIN     MAX     AVG RL-R1       0       1       0 INQ
4  371      48 CHI  3       54      5 ECH-CHI       14      705
54 CONQ     -5      0       -1 OUTQ 0       139     4 SND1  0
720         19 SNDRST       0       1       0 PRGWAK        63
992         462 ECHO        36      914     134 RESP        117
1719        597 LDAVG       7       14      9                                25u

NCP DELAY STATISTICS FOR PERIOD FROM 31-MAR-75 14:36:42 TO
31-MAR-75 14:48:39,  60 SAMPLES,                                             25v

NAME        MIN     MAX     AVG RL-R1       0       3       0 INQ
7  4557     207 CHI 3       40      4 ECH-CHI       11      965
74 CONQ     -4      0       0 OUTQ  0       2       0 SND1  0
263         6 SNDRST        0       1       0 PRGWAK        46
934         466 ECHO        34      4594    293 RESP        119
5456        760 LDAVG       9       20      15                               25w

NCP DELAY STATISTICS FOR PERIOD FROM 31-MAR-75 14:48:50 TO
31-MAR-75 14:59:51,  60 SAMPLES,                                             25x

NAME        MIN     MAX     AVG RL-R1       0       1       0 INQ
7  225      49 CHI  3       6       4 ECH-CHI       7       423
54 CONQ     -3      0       0 OUTQ  0       217     6 SND1  0
176         15 SNDRST       0       2       0 PRGWAK        51
1149        465 ECHO        39      492     130 RESP        113
1360        596 LDAVG       4       17      9                                25y

NCP DELAY STATISTICS FOR PERIOD FROM 31-MAR-75 15:00:02 TO
31-MAR-75 15:11:28,  60 SAMPLES,                                             25z

NAME        MIN     MAX     AVG RL-R1       0       2       0 INQ
7  1757     138 CHI 3       8       4 ECH-CHI       7       1729
104 CONQ    -5      0       0 OUTQ  0       155     6 SND1  0
701         30 SNDRST       0       1       0 PRGWAK        62
2175        499 ECHO        37      3544    284 RESP        135
3849        784 LDAVG       4       14      9                                25a@

NCP DELAY STATISTICS FOR PERIOD FROM 31-MAR-75 15:11:39 TO
31-MAR-75 15:23:19,  60 SAMPLES,                                             25aa

NAME        MIN     MAX     AVG RL-R1       0       1       0 INQ
```

Network Performance messages for APR 75

```
0  732      94 CHI  3        975      20 ECH-CHI       13       3707
148 CONQ    -19     0        -1 OUTQ  0        12      0 SND1   0
19 1 SNDRST         0        1        0 PRGWAK         56       1044
516 ECHO    36      4446     266 RESP          126     5092     783
LDAVG       10      16       13                                          25ab

NCP DELAY STATISTICS FOR PERIOD FROM 31-MAR-75 15:23:30 TO
31-MAR-75 15:34:36,  60 SAMPLES,                                        25ac

NAME        MIN     MAX      AVG RL-R1        0        2        0 INQ
7  333      52 CHI  3        23       4 ECH-CHI       6        390
36 CONQ     -19     0        -1 OUTQ  0        3       0 SND1   0
43 2 SNDRST         0        2        0 PRGWAK         34       932
421 ECHO    34      452      96 RESP  71      1035     518 LDAVG
4  12       7                                                           25ad

NCP DELAY STATISTICS FOR PERIOD FROM 31-MAR-75 15:34:48 TO
31-MAR-75 15:45:29,  60 SAMPLES,                                        25ae

NAME        MIN     MAX      AVG RL-R1        0        1        0 INQ
6  1103     56 CHI  3        62       6 ECH-CHI       6        233
36 CONQ     -11     0        -1 OUTQ  0        39      1 SND1   0
544         11 SNDRST        0        2        0 PRGWAK         21
1105        300 ECHO         28       1758     112 RESP         81
2099        412 LDAVG        2        9        5                          25af

NCP DELAY STATISTICS FOR PERIOD FROM 31-MAR-75 15:45:39 TO
31-MAR-75 15:56:17,  60 SAMPLES,                                        25ag

NAME        MIN     MAX      AVG RL-R1        0        1        0 INQ
9  240      59 CHI  3        7        4 ECH-CHI       9        127
29 CONQ     -6      0        0 OUTQ   0        2       0 SND1   0
15 1 SNDRST         0        1        0 PRGWAK         59       860
405 ECHO    33      324      96 RESP  134     1042     501 LDAVG
4  5        4                                                           25ah

NCP DELAY STATISTICS FOR PERIOD FROM 31-MAR-75 15:56:27 TO
31-MAR-75 16:07:04,  60 SAMPLES,                                        25ai

NAME        MIN     MAX      AVG RL-R1        0        1        0 INQ
6  283      53 CHI  3        19       4 ECH-CHI       9        350
32 CONQ     -1      0        0 OUTQ   0        1       0 SND1   0
63 3 SNDRST         0        1        0 PRGWAK         48       1019
357 ECHO    30      383      94 RESP  80      1174     451 LDAVG
3  6        4                                                           25aj

NCP DELAY STATISTICS FOR PERIOD FROM 31-MAR-75 16:07:16 TO
31-MAR-75 16:14:10,  40 SAMPLES,                                        25ak
```

Network Performance messages for APR 75

```
NAME        MIN      MAX      AVG RL-R1        0        2        0 ING
6  235      48 CHI   3        7        4 ECH-CHI        6        324
60 CONQ     -4       0        0 OUTQ   0        955      28 SND1  1
103         10 SNDRST         0        1        0 PRGWAK         66
867         443 ECHO          35       1097     151 RESP         123
1268        594 LDAVG         2        4        3                          25al

END OF FILE REACHED.                                                      25am
```

DLS 24-APR-75 06:57 32372

Network Performance messages for APR 75

(J32372) 24-APR-75 06:57;;;; Title: Author(s): Duane L. Stone/DLS; Distribution: /TFL([INFO-ONLY]) ; Sub-Collections: RADC; Clerk: DLS;

DLS 24-APR-75 08:36 32373

March User Statistics for Office-1

sorted by connect hours

DLS 24-APR-75 08:36 32373

March User Statistics for Office-1

	Time Period	CPU (hrs)	Connect (hrs)	
				1
(WWMMCS)	1thru29-MAR-75	.00	.00	2
(BUCCIERO)	1thru29-MAR-75	.00	.07	3
(KESSELMAN)	1thru29-MAR-75	.00	.13	4
(CALICCHIA)	1thru29-MAR-75	.02	.27	5
(VANALSTINE)	1thru29-MAR-75	.01	.30	6
(LORETO)	1thru29-MAR-75	.08	1.26	7
(STINSON)	1thru29-MAR-75	.07	1.76	8
(RWALKER)	1thru29-MAR-75	.07	2.08	9
(BARNUM)	1thru29-MAR-75	.05	2.26	10
(SLIWA)	1thru29-MAR-75	.05	2.41	11
(RZEPKA)	1thru29-MAR-75	.10	2.95	12
(DIMAGGIO)	1thru29-MAR-75	.12	4.76	13
(PATTERSON)	1thru29-MAR-75	.25	12.29	14
(NELSON)	1thru29-MAR-75	1.03	14.88	15
(LIUZZI)	1thru29-MAR-75	.21	17.27	16
(PETELL)	1thru29-MAR-75	.47	18.47	17
(HILBING)	1thru29-MAR-75	.43	19.08	18
(WINGFIELD)	1thru29-MAR-75	.49	21.35	19
(LAFORGE)	1thru29-MAR-75	.66	28.32	20
(MCNAMARA)	1thru29-MAR-75	.63	29.01	21
(LAWRENCE)	1thru29-MAR-75	1.14	38.09	22
(CAVANO)	1thru29-MAR-75	1.67	45.50	23
(TOMAINI)	1thru29-MAR-75	1.47	57.43	24

March User Statistics for Office-1

(BERGSTROM)	1thru29-MAR-75	2.33	68.46	25
(KRUTZ)	1thru29-MAR-75	1.17	69.87	26
(CARRIER)	1thru29-MAR-75	1.99	87.05	27
(KENNEDY)	1thru29-MAR-75	4.20	100.88	28
(STONE)	1thru29-MAR-75	4.81	112.78	29
(PANARA)	1thru29-MAR-75	4.05	120.65	30
		------	------	31
(RADC)	1thru29-MAR-75	27.99	898.08	32

March User Statistics for Office-1

(WWMMCS)	1thru29-MAR-75	,00	,00	33
(BUCCIERO)	1thru29-MAR-75	,00	,07	34
BUCCIERO	8-MAR-75	,00	,07	34a
(KESSELMAN)	1thru29-MAR-75	,00	,13	35
KESSELMAN	1-MAR-75	,00	,13	35a
(CALICCHIA)	1thru29-MAR-75	,02	,27	36
CALICCHIA	8-MAR-75	,02	,24	36a
CALICCHIA	1-MAR-75	,00	,03	36b
(VANALSTINE)	1thru29-MAR-75	,01	,30	37
VANALSTINE	22-MAR-75	,01	,25	37a
VANALSTINE	8-MAR-75	,00	,01	37b
VANALSTINE	1-MAR-75	,00	,04	37c
(LORETO)	1thru29-MAR-75	,08	1,26	38
LORETO	29-MAR-75	,01	,22	38a
LORETO	22-MAR-75	,02	,38	38b
LORETO	15-MAR-75	,02	,30	38c
LORETO	8-MAR-75	,02	,23	38d
LORETO	1-MAR-75	,01	,13	38e
(STINSON)	1thru29-MAR-75	,07	1,76	39
STINSON	29-MAR-75	,00	,10	39a
STINSON	22-MAR-75	,02	,49	39b
STINSON	15-MAR-75	,02	,38	39c
STINSON	8-MAR-75	,02	,37	39d
STINSON	1-MAR-75	,01	,42	39e
(RWALKER)	1thru29-MAR-75	,07	2,08	40

RWALKER	22-MAR-75	.01	.37	40a
RWALKER	8-MAR-75	.06	1.71	40b
(BARNUM)	1thru29-MAR-75	.05	2.26	41
BARNUM	29-MAR-75	.00	.18	41a
BARNUM	22-MAR-75	.02	1.00	41b
BARNUM	15-MAR-75	.01	.59	41c
BARNUM	8-MAR-75	.01	.33	41d
BARNUM	1-MAR-75	.01	.16	41e
(SLIWA)	1thru29-MAR-75	.05	2.41	42
SLIWA	22-MAR-75	.05	2.22	42a
SLIWA	15-MAR-75	.00	.11	42b
SLIWA	8-MAR-75	.00	.08	42c
(RZEPKA)	1thru29-MAR-75	.10	2.95	43
RZEPKA	22-MAR-75	.01	.29	43a
RZEPKA	15-MAR-75	.09	2.47	43b
RZEPKA	8-MAR-75	.00	.19	43c
(DIMAGGIO)	1thru29-MAR-75	.12	4.76	44
DIMAGGIO	22-MAR-75	.00	.02	44a
DIMAGGIO	15-MAR-75	.11	3.93	44b
DIMAGGIO	8-MAR-75	.01	.81	44c
(PATTERSON)	1thru29-MAR-75	.25	12.29	45
PATTERSON	29-MAR-75	.02	1.19	45a
PATTERSON	22-MAR-75	.01	.61	45b
PATTERSON	15-MAR-75	.00	.15	45c
PATTERSON	8-MAR-75	.08	3.72	45d

PATTERSON	1-MAR-75	.14	6.62	45e
(NELSON)	1thru29-MAR-75	1.03	14.88	46
NELSON	22-MAR-75	.01	.13	46a
NELSON	15-MAR-75	.99	11.54	46b
NELSON	8-MAR-75	.01	.14	46c
NELSON	1-MAR-75	.02	3.07	46d
(LIUZZI)	1thru29-MAR-75	.21	17.27	47
LIUZZI	29-MAR-75	.09	5.51	47a
LIUZZI	22-MAR-75	.08	8.84	47b
LIUZZI	15-MAR-75	.03	1.79	47c
LIUZZI	8-MAR-75	.00	.13	47d
LIUZZI	1-MAR-75	.01	1.00	47e
(PETELL)	1thru29-MAR-75	.47	18.47	48
PETELL	29-MAR-75	.10	3.75	48a
PETELL	22-MAR-75	.11	4.59	48b
PETELL	8-MAR-75	.04	1.61	48c
PETELL	1-MAR-75	.22	8.52	48d
(HILBING)	1thru29-MAR-75	.43	19.08	49
HILBING	29-MAR-75	.04	1.22	49a
HILBING	22-MAR-75	.05	1.43	49b
HILBING	15-MAR-75	.11	6.23	49c
HILBING	8-MAR-75	.16	5.89	49d
HILBING	1-MAR-75	.07	4.31	49e
(WINGFIELD)	1thru29-MAR-75	.49	21.35	50
WINGFIELD	29-MAR-75	.01	.27	50a

WINGFIELD	22-MAR-75	,08	2,75	50b
WINGFIELD	15-MAR-75	,10	4,28	50c
WINGFIELD	8-MAR-75	,18	7,48	50d
WINGFIELD	1-MAR-75	,12	6,57	50e
(LAFORGE)	1thru29-MAR-75	,66	28,32	51
LAFORGE	29-MAR-75	,28	11,40	51a
LAFORGE	22-MAR-75	,27	8,10	51b
LAFORGE	15-MAR-75	,03	3,30	51c
LAFORGE	8-MAR-75	,02	1,96	51d
LAFORGE	1-MAR-75	,06	3,56	51e
(MCNAMARA)	1thru29-MAR-75	,63	29,01	52
MCNAMARA	29-MAR-75	,03	2,06	52a
MCNAMARA	22-MAR-75	,11	6,38	52b
MCNAMARA	15-MAR-75	,06	2,35	52c
MCNAMARA	8-MAR-75	,38	14,66	52d
MCNAMARA	1-MAR-75	,05	3,56	52e
(LAWRENCE)	1thru29-MAR-75	1,14	38,09	53
LAWRENCE	29-MAR-75	,26	4,94	53a
LAWRENCE	22-MAR-75	,26	10,64	53b
LAWRENCE	15-MAR-75	,20	6,62	53c
LAWRENCE	8-MAR-75	,18	6,93	53d
LAWRENCE	1-MAR-75	,24	8,96	53e
(CAVANO)	1thru29-MAR-75	1,67	45,50	54
CAVANO	29-MAR-75	,24	8,42	54a
CAVANO	22-MAR-75	,44	10,90	54b

CAVANO	15-MAR-75	.32	7.15	54c
CAVANO	8-MAR-75	.55	13.85	54d
CAVANO	1-MAR-75	.12	5.18	54e
(TOMAINI)	1thru29-MAR-75	1.47	57.43	55
TOMAINI	29-MAR-75	.21	10.57	55a
TOMAINI	22-MAR-75	.15	6.42	55b
TOMAINI	15-MAR-75	.04	1.75	55c
TOMAINI	8-MAR-75	.34	12.09	55d
TOMAINI	1-MAR-75	.73	26.60	55e
(BERGSTROM)	1thru29-MAR-75	2.33	68.46	56
BERGSTROM	29-MAR-75	1.17	30.75	56a
BERGSTROM	22-MAR-75	.14	3.60	56b
BERGSTROM	15-MAR-75	.48	15.48	56c
BERGSTROM	8-MAR-75	.27	7.70	56d
BERGSTROM	1-MAR-75	.27	10.93	56e
(KRUTZ)	1thru29-MAR-75	1.17	69.87	57
KRUTZ	29-MAR-75	.22	14.73	57a
KRUTZ	22-MAR-75	.14	7.09	57b
KRUTZ	15-MAR-75	.39	16.17	57c
KRUTZ	8-MAR-75	.25	18.67	57d
KRUTZ	1-MAR-75	.17	13.21	57e
(CARRIER)	1thru29-MAR-75	1.99	87.05	58
CARRIER	29-MAR-75	.72	26.82	58a
CARRIER	22-MAR-75	.40	13.70	58b
CARRIER	15-MAR-75	.26	9.06	58c

CARRIER	8-MAR-75	,29	24,40	58d
CARRIER	1-MAR-75	,32	13,07	58e
(KENNEDY)	1thru29-MAR-75	4,20	100,88	59
KENNEDY	29-MAR-75	,85	18,66	59a
KENNEDY	22-MAR-75	,71	18,20	59b
KENNEDY	15-MAR-75	,71	19,33	59c
KENNEDY	8-MAR-75	1,14	24,24	59d
KENNEDY	1-MAR-75	,79	20,45	59e
(STONE)	1thru29-MAR-75	4,81	112,78	60
STONE	29-MAR-75	,73	18,12	60a
STONE	22-MAR-75	1,43	27,20	60b
STONE	15-MAR-75	1,33	30,05	60c
STONE	8-MAR-75	,88	25,52	60d
STONE	1-MAR-75	,44	11,89	60e
(PANARA)	1thru29-MAR-75	4,05	120,65	61
PANARA	29-MAR-75	1,10	24,51	61a
PANARA	22-MAR-75	1,06	28,02	61b
PANARA	15-MAR-75	,90	28,53	61c
PANARA	8-MAR-75	,73	30,26	61d
PANARA	1-MAR-75	,26	9,33	61e
		------	------	62
(RADC)	1thru29-MAR-75	27,99	898,08	63
RADC	29-MAR-75	6,30	196,10	63a
RADC	22-MAR-75	5,64	165,12	63b
RADC	15-MAR-75	6,23	172,73	63c

March User Statistics for Office-1

RADC	8-MAR-75	5.68	204.33	63d
RADC	1-MAR-75	4.14	159.80	63e

DLS 24-APR-75 08:36 32373

March User Statistics for Office-1

(J32373) 24-APR-75 08:36;;;; Title: Author(s): Duane L. Stone/DLS; Distribution: /RADC([INFO-ONLY]) ; Sub-Collections: RADC; Clerk: DLS;

SRI UTILITY DISK SUMMARY

Author of Journal documents
<:xbryng>

1

GAS2 22-APR-75 18:00 32360
TELECONFERENCING
Location: (GJOURNAL, 32360, 1:W)
*****Note: Author Copy*****

1a

GAS2 21-APR-75 18:35 32351
SRI UTILITY DISK SUMMARY
Location: (GJOURNAL, 32351, 1:W)
*****Note: Author Copy*****

1b

GAS2 18-APR-75 15:07 32327
TEST MESSAGE
Location: (JJOURNAL, 32327, 1:W)
*****Note: Author Copy*****

1c

GAS2 17-APR-75 10:52 32315
test
Message: test
*****Note: Author Copy*****

1d

GAS2 26-MAR-75 17:35 32197
Directory Request
Location: (JJOURNAL, 32197, 1:W)
*****Note: Author Copy*****

1e

GAS2 19-MAR-75 16:46 32153

Message: I have received your test message and all looks well,
Thanks ...Glenn

*****Note: Author Copy*****

1f

GAS2 18-MAR-75 19:16 32122
Missing GAS2 in KWAC group Ident
Message: Please include my Ident in the group ident KWAC...KWAC
NEEDS GAS2!!!
*****Note: Author Copy*****

1g

SRI UTILITY DISK SUMMARY

Journal documents
<:xbryn>

2

DVN 7-MAR-75 12:54 25530
Limited Facilities for User Interaction With Command Branches
Message: Facilities exist for users interacting with command branches only in a very limited way. A procedure replacement exists in my directory at BBN or in Pat Whitting-Okeefe's directory at office-1 that makes commands branches stop and wait for input from users. To use it you Goto Program and load the program by its name (auxchr,). To use it you insert percent signs (%) in the place in your command branch where you want the stream to stop. Each % in the branch waits for the user to enter one character. That is the catch. You must either know how many characters the user is going to need to put in, or put in a lot of %'s and have a way for her to put in harmless characters after her significant input is over. We see that it would be very useful to add more flexible user input and IF constructions to commands branches. It is merely a matter of shaking loose programming time to do it.
*****Note: [INFO-ONLY]
(Secondary Distribution Copy from PWO)*****

2a

Comments: This responds to a sendmessage from Jeanne Beck to me expressing Connie McLindon's interest in more powerful commands branches.

2a1

JHB 21-APR-75 17:51 32350
TNLS Course No. 3 -- Intermediate
Location: (JJOURNAL, 32350, 1:W)
*****Note: [INFO-ONLY] *****

2b

Comments: The third of 5 TNLS graduated courses produced by filtering the Courses File. Printed copies available upon request.

2b1

SGR 18-APR-75 18:10 32330
Training of SRI, SRI-APP, and SRI-DEV - March 27 - April 16
Location: (JJOURNAL, 32330, 1:W)
*****Note: [INFO-ONLY] *****

2c

KLM 11-APR-75 10:17 32283
DIRECTORY REQUEST
Location: (JJOURNAL, 32283, 1:W)
*****Note: [INFO-ONLY] *****

2d

SRI UTILITY DISK SUMMARY

JML 10-APR-75 17:04 32280
Knowledge Workshop Architects' Meeting, 18-21 February, 1975: A Transcription of Notes
Location: (JJOURNAL, 32280, 1:W)
*****Note: [INFO-ONLY] *****

2e

Comments: I hope that reading these long-awaited KWAC Meeting notes will be fruitful, and not just an exercise in nostalgia. Statements preceded by idents in parentheses are rough paraphrases, not direct quotes; this is not meant to be a transcript, but the most complete version we have of the notes taken at the meeting. If you feel that interpretations were at all fuzzy or hazy, be sure to let me know. 2e1

DSM 9-APR-75 17:03 25703
NLS'izing PDG Files
Location: (JJOURNAL, 25703, 1:W)
*****Note: [INFO-ONLY] *****

2f

RA3Y 9-APR-75 15:23 32274
February "febstat" use stats
Location: (JJOURNAL, 32274, 1:W)
*****Note: [INFO-ONLY] *****

2g

RA3Y 9-APR-75 15:23 32274 "Febstat"
February use stats
Location: (JJOURNAL, 32274, 1:W)
*****Note: [INFO-ONLY] *****

2h

JHB JCP 8-APR-75 20:33 32272
Summary of the Changes in the New Version of Tenex -- 1.33
Location: (JJOURNAL, 32272, 1:W)
*****Note: [INFO-ONLY] *****

2i

Comments: Advance notice for Architects 2i1

DSM 7-APR-75 11:45 25681
MTACPY Problems Dialog
Location: (JJOURNAL, 25681, 1:W)
*****Note: [INFO-ONLY] *****

2j

RA3Y 7-APR-75 16:41 32268 "Marstat"

Location: (JJOURNAL, 32268, 1:w)
*****Note: [ACTION] *****

2k

RA3Y *19-MAR-75 08:19 32126
8-MAR-75
Location: (IJOURNAL, 32126, 1:w)
*****Note: [INFO-ONLY] *****

21

DLS 14-MAR-75 08:33 32094
Dealing with 'LARGER' Plots
Location: (IJOURNAL, 32094, 1:w)
*****Note: [INFO-ONLY] Welcome aboard*****

2m

MAP2 13-MAR-75 11:10 32081
New SRI Workshop Architect
Message: Glenn Sherwood (GAS2) has recently assumed the role of SRI Workshop Architect. He is a staff member of the Office of Computer Planning at SRI and will be working closely with individuals from the Information Sciences and Engineering Division, Kathey Mabrey (KLM), from the Information Systems Group, will be acting as Glenn's assistant.

I'll be a "semi-active-retiring architect" for the next couple of months while Glenn gets up to speed in NLS-ness. Best of luck to the Architects -- it's been fun (a rewarding experience, challenge, etc.). I hope to witness an increase in the interaction between Architects during the next year -- there's the potential for real payoffs for the community. Since I'll be an NLS user as a part of the Packet Radio project I'm sure to be interacting with most of you in the future.
-- Mike
*****Note: [INFO-ONLY] *****

2n

RA3Y JCN 12-MAR-75 15:35 32059
Office-1 Use by SRI in February 1975
Location: (IJOURNAL, 32059, 1:w)
*****Note: [INFO-ONLY] *****

2o

MAP2 11-MAR-75 21:28 32053 "Janstat"
IDENT Request for Special Interest Group on TeleConferencing
Message: Please set up an IDENT "TELECON" for a special interest group on Teleconferencing. It should initially include the following:

SRI UTILITY DISK SUMMARY

MIKE,FGB,JAKE,RAH,RLL,IMM,CKM,RA3Y,MAP2,DAP,SDP,RLR,RMS2,GAS2,DLS,
SMT,RPU
*****Note: Author Copy*****

2p

RA3Y *JCN 11-MAR-75 18:14 32041
Office-1 Use by SRI in January 1975
Location: (IJOURNAL, 32041, 1:W)
*****Note: [INFO-ONLY] *****

2q

FGB 11-MAR-75 17:52 32038
A Request for Comments
Location: (IJOURNAL, 32038, 1:W)
*****Note: [ACTION] *****

2r

FGB 5-MAR-75 18:06 31982
The FIRSTAID Ident
Location: (IJOURNAL, 31982, 1:W)
*****Note: [ACTION] *****

2s

MAP2 5-MAR-75 13:41 31981
SRI Utility Slot User Group (#10)
Message: I have transferred a file which describes the current SRI Utility slot user community to the SHERWOOD directory. Glenn Sherwood, the new SRI Utility Architect, will be keeping this file up to date in the future. Note also the list of important phone numbers. Feel free to access this file using the following link and let Glenn know if any information is in error. Given the new slot allocation algorithim and our expanded use of the system you will undoubtedly need to get in touch with other users from time to time...

Link to SRI Slot users file: <SHERWOOD,SRIUSERS,1:xbn>

-- Mike
*****Note: Author Copy*****

2t

DLS 4-MAR-75 11:18 31974
'FIRSTAID',,,Subset of KWAC
Location: (HJOURNAL, 31974, 1:W)
*****Note: [INFO-ONLY] *****

2u

JMB 3-MAR-75 14:24 31963
Placko's message re NLS training of PDG Personnel in Washington

SRI UTILITY DISK SUMMARY

Location: (HJOURNAL, 31963, 1:w)
*****Note: [ACTION] *****

2v

message
<:xbn>

3

24-APR-75 1300-EDT HARDY at BBN-TENEXB: YOUR BROKEN MOUSE KEYSET
Distribution: SHERWOOD AT OFFICE-1, hardy, feedback at office-1
Received at: 24-APR-75 10:01:44

3a

GLENN:
ROD, OR RENE CAN EXCHANGE YOUR BROKEN MOUSE AND KEYSET, WE WILL REPAIR AND CHARGE YOUR PROJECT--BE SURE TO GIVE NUMBER TO ONE OF WHEN REPAIRED WE WILL RETURN..
/MARTIN.. HARDY@BBNB

3a1

24-APR-75 0950-PDT SHERWOOD: ICE SERVICE
Distribution: O'KEEFE, SCOTT, mabrey, sherwood
Received at: 24-APR-75 09:50:09

3b

Pat & Maria, I talked with Tom Little about future servicing of the
leased equipment (to include T.I. Terminal & ICE 300 printer/terminal)
The fastest easiest way to handle this is to call Tom Little directly
at SRI (Menlo Park) at ext. 4511 about servicing needs. He will then
authorize and coordinate the needed service. Maria, please advise
Howard Peters and anyone else at the washington office who should
know...Thanks Glenn

3b1

24-APR-75 0923-PDT MABREY: TNLS COURSE 3 DOCUMENTATION
Distribution: SHERWOOD, mabrey
Received at: 24-APR-75 0924:13-PDT

3c

Glenn: As usual, copies of this course are unavailable--they asked us to make our own (so I will make up some copies today, I made up 4 more user binders (and gave copies to Reddy and Pam),
Kath

3c1

24-APR-75 0612-PDT SCOTT: Hurra the ICE man,
Distribution: O'KEEFE, scott, sherwood
Received at: 24-APR-75 06:12:36

3d

Paat: The terminal was installed yesterday, I had already gone home but Howard Peters was here and he supervised the installation, Apparently he is the man that Rubenson volunteered for Bertrand's replacement, I have not talked to F.Greehan on this, I will let you know what happens. I just did something wrong because I ws sending you a message and typed a control t (got all mixed up) and then I could nt g back so I am repeating themessage, Sorry I was not logged in yesterday but I tried sev
al times in the afternoon and the line ws always busy; the other phone that you game me when you were here has been disconnected, so I am limited to one and I guess the traffic is very heavy sometimes, I am going to try what you told me inyour message and then let you knowhow I come ut, Is it true you are coming this way nex week? That would be great, I hope you do, I feel that now I am ready to work with you not the last time yyou were here, See you later, Maria 3d1

23-APR-75 1501-PDT JONES at SRI-AI: Your Account
Distribution: HARRIS AT I4-TENEX, HASSELBLAD AT I4-TENEX,, HFREEMAN AT I4-TENEX, JEFFREY AT I4-TENEX,, MANTIPLY AT I4-TENEX, MURRAY AT I4-TENEX, PETE AT I4-TENEX,, WEAVER AT I4-TENEX, brandin, plack0 at office-1, sherwood at office-1
Received at: 23-APR-75 15:05:06 3e

Dear Sir, 3e1

Your bank account was mistakenly credited with $3,287,450,00 by the (hopefully) mistaken action of an irreverent computer. Please be kind enough to return this amount to us by delivering it to the addressor in small unmarked non-sequential bills. 3e2

Thank you in advance. 3e3

Sincerely,
Ralph M. Jones
------- 3e4

23-APR-75 1442-PDT MABREY: PR
Distribution: SHERWOOD, mabrey
Received at: 23-APR-75 14:42:57 3f

Glenn: The PR was signed by D. Brown and is currently at division office.
Kath 3f1

23-APR-75 1122-PDT FEEDBACK: FeedResponse
Distribution: SHERWOOD, FEEDBACK, PETERS, HARDWARE, HARDY AT BBNB
Received at: 23-APR-75 11:22:36 3g

04839 In reply to your message of 22-APR-75 1832-PDT SHERWOOD
Subject: Keyset trouble 3g1

04848 Glenn--sorry you're having hardware problems, I will speak
to the appropriate people (bondurant and hardy) and see if they can
come take a look, Sandy Johnson 3g2

23-APR-75 0840-PDT PLACKO: Teleconferencing Paper
Distribution: PANKO, placko, sherwood, norton
Received at: 23-APR-75 08:40:45 3h

I just finished reading the journal item that Glenn issued about teleconferencing. It's just what I hoped would be generated to get the special interest group going! Special thanks to you for providing the paper on teleconferencing systems. Now all you can hope for is an active KWAC community, I'm optimistic,,, -- Mike 3h1

22-APR-75 1846-PDT SHERWOOD: MY ABSENCE
Distribution: MABREY, sherwood
Received at: 22-APR-75 18:46:06 3i

KATHY, I won't be in Wednesday, will you Please insure (unless Dave B, has questions) that the Vadic PR moves along its appointed route? Please call
me collect [408] 338-2601 if there are any problems or questions .
Thanks,,,Glenn 3i1

22-APR-75 1832-PDT SHERWOOD: Keyset trouble
Distribution: FEEDBACK, sherwood, peters
Received at: 22-APR-75 18:32:49 3j

In the middle of a session my keyset suddenly stop functioning, is there some way to reset it ? while I'm addressing hardware I might mention that our mouse has a sticky wheel and does not work
well at all,,,would appreciate suggestions/help,,,Thanks Glenn, 3j1

22-APR-75 1646-PDT PETERS: IDENT FOR REDDY DIVELY
Distribution: FEEDBACK, KRUZIC, SHERWOOD
Received at: 22-APR-75 16:47:00 3k

THE RED IDENT IS NOW SET UP FOR USE UNDER THE <KRUZIC>
USERNAME. - JEFF 3k1

22-APR-75 1418-PDT O'KEEFE: couplers and subscriptions
Distribution: SCOTT, o'keefe, sherwood
Received at: 22-APR-75 14:18:26 31

Maria, sorry I got in so late today, by the time I looked at my mail, the day was over for you. Tom Little in purchasing felt that we should operate through the LA office and give ICE another chance so as to get you set up as soon as possible with a terminal. Therefore, they mailed out via air freight a coupler to the office there. Then the people from the west coast were to call out there and verify that it had arrived and then they would contact the people there who are to install it and
ve them come out. By all means when you hear from them direct them to Hal. However when the guy installs the terminal he should then instruct you on the use of it. Give Hal a copy of this message so he will be aware of how Tom Little wants to work it. On the other hand we have informed the people out here that the coupler is there, so next thing that should happen is that someone should arrive there to install it.
With reference to you problem with substituting that long text, the substitution command has a limit to the number of characters it will accept - like one or two lines, I don't recall exactly. When - flash I just got the information - the answer is that in any one substitution, the limit is 200 characters total - both old and new, and in the total substitution the limit altogether is 600 characters - both old and new. So the way to get around this problem is to do only part of the substitution 311

in any one substitute command,, i.e. when it asks for old text and new text, instead of doing all of the brranch, when you get half way through, say that you are finished, and then enter the command again the same as before except start substituting from the middle. Also if in any one substitution (i.e. one old and one new text), if you get an error message, break the substitution into into sections , that is say New Text: Ray has recently moved into this position(carriage return) , Old text: Topics covered(carriage return)n
new text: position. He is to initiate
advanced.....(etc.)(carriage return), Old Text:
position(carriage return)
Thus after the first correction is made, replace part of that correction with the same thing plus the rest of the text. See if that doesn't work. Also let me know if it is unclear.

I will be in early tomorrow and will try to be on the system,
See you then, Pat 312

18-APR-75 0933-PDT PETERS: DIRECTORIES AND IDENTS
Distribution: SHERWOOD, KEENEY, FEEDBACK
Received at: 18-APR-75 09:33:07 3m

GLENN - I HAVE REMOVED USERNAMES <RIPPLE> AND <BERTRAND> FROM
THE
SYSTEM AT OFFICE-1.
MARCIA - COULD YOU DO THE OTHER PART WHICH IS TO REMOVE IDENTS
HEB
AND BJR FROM THE IDENTFILE?? THANX - JEFF 3m1

18-APR-75 0917-PDT PETERS: IDENT
Distribution: KEENEY, feedback, sherwood
Received at: 18-APR-75 09:17:06 3n

MARCIA - COULD YOU REHASH JEANE NORTH'S OLD IDENT TO BE REDDY
DIVELY
IDENT RED, IF POSSIBLE. IT'S BEING REACTIVATED SINCE SHE'S
DOING SOME
WORK FOR THE PEOPLE IN THE SRI SLOT AT OFFICE-1. - JEFF 3n1

18-APR-75 0913-PDT PETERS: SENDMAIL
Distribution: SHERWOOD, FEEDBACK
Received at: 18-APR-75 09:13:30 3o

I THINK I'VE FIXED UP THINGS SO YOUR SEND-MAIL WILL WORK NOW,
PLEASE
BE SURE TO TELL ME IF IT STILL DOESN'T WORK FOR SOME REASON, -
JEFF 3o1

18-APR-75 0903-PDT PETERS: ARCHIVED FILES
Distribution: PLACKO, FEEDBACK, SHERWOOD
Received at: 18-APR-75 09:03:35 3p

THE ANSWER TO YOUR QUESTION IS THAT YES, THE USER CAN DELETE
HIS FILE
RESTORED FROM ARCHIVE WHEN HE'S DONE WITH IT, THE ARCHIVED
FILES ARE
KEPT ON TAPE AND RETRIEVAL IS A NON-DESTRUCTIVE PROCESS, ALSO,
THE
SYSTEM IS CLEVER ENOUGH TO NOT ARCHIVE THAT FILE AGAIN, IF YOU
TRY
TO MARK THAT FILE FOR ARCHIVE IN THE EXEC, YOU'LL BE TOLD THAT
THE
FILE HAS ALREADY BEEN ARCHIVED. IF THE FILE REMAINS UNACCESSED
FOR

21 DAYS, THE SYSTEM DOESN'T RE-ARCHIVE IT, BUT RATHER NOTICES THAT IT
HAS ALREADY BEEN ARCHIVED, AND SIMPLY DELETES IT. - JEFF 3p1

17-APR-75 2001-PDT SHERWOOD: Directories to be deleted
Distribution: FEEDBACK, PETERS, MARTINEZ, mabrey, sherwood
Received at: 17-APR-75 20:01:05 3q

I realize there is quite a bit of shuffling going on right now but
please bare (?) with me, I'm in the process of aligning Directories,
and Idents with Utility use and needs, I hope to be able to summarize all this madness and soon as things are stabilized,
Now then,
Please remove the Idents HEB and BJR and the Directories Ripple and Bertrand from the SRI Utility slot, account (#700),and Group
Ident SRIUU,..Thanks Glenn 3q1

17-APR-75 1950-PDT SHERWOOD: Meeting with Port & Grimm
Distribution: NORTON, sherwood
Received at: 17-APR-75 19:50:49 3r

Jim, after leaving you today I talked with Port & Grimm about their grips
and possibly meeting with you,..They are very busy on a Proposal and won't
be able to meet until after Tuesday, I did the pep talk bit, and got some
more specific requests and better feel for what bugs them,..They seem
to be mellowing some which is encouraging, They will be using the system
for at leastanother 2 months in a production way (you were right), I shan't
belabor the details now more coming later...Thanks Glenn 3r1

17-APR-75 1937-PDT SHERWOOD: Ident request (RED) for Reddy Dively
Distribution: FEEDBACK, MARTINEZ, PETERS, sherwood, mabrey, Kruzic
Received at: 17-APR-75 19:37:42 3s

Please activate the Ident RED for Reddy Dively who will be working with
Pam on directory Kruzic, Location = L1092, Ext.=2649,..Thanks Glenn 3s1

17-APR-75 1926-PDT SHERWOOD: Sendmail hassle
Distribution: PETERS, FEEDBACK, sherwood, mabrey
Received at: 17-APR-75 19:26:57 3t

I evidently have a bad file or some such conflict with the Sendmail
system,,,Thursday Sandy said she had it fixed, I just tried and had the
same trouble (see previous msg). She also said the Jeff could probably
fix it when he got back Friday,,,would you fix it Jeff ? I'd
like to be able to Journal some stuff I send,,,Thank you Glenn 3t1

17-APR-75 1910-PDT SHERWOOD: Telecon Stuff
Distribution: MABREY, sherwood
Received at: 17-APR-75 19:10:01 3u

Kathy, I have copied Roger's questionaire file into my directory and its
called Telquest,,,would you fix the little stuff in it too when you do the
Conf file ? I'd like a hardcopy of both when done and your thots/inputs
also,,,Thanks Glenn 3u1

17-APR-75 1905-PDT SHERWOOD: BJRFILE
Distribution: PORT, GRIMM, sherwood, mabrey
Received at: 17-APR-75 19:05:02 3v

Steve & Carolyn, I have removed those old versions of goodstuff (24 & 25)
and have added BJRFILE to Steve's directory,,,BJRFILE was Ripple-Save
on her directory, I am requesting removeal of the Ripple directory now,
It make take awhile before your directories will stabilize at 500 pages
each, you'll have to make do with 600 in the meantime,,,Glenn 3v1

17-APR-75 1739-PDT SHERWOOD: Training part 2
Distribution: KRUZIC, mabrey, sherwood
Received at: 17-APR-75 17:39:40 3w

Pam, Susan will be leaving for 2 weeks as of Friday (tommorrow),,,so
if you and Reddy want to meet with her again Friday afternoon is a good time for her,,,I'll leave it up to you to arrange it, ok?
her ext. 4757,,,Glenn 3w1

17-APR-75 1403-PDT O'KEEFE: directory
Distribution: SHERWOOD, SCOTT, BERTRAND, o'keefe
Received at: 17-APR-75 14:03:53 3x

Bertrand is going away and so is his directory. This is to notify all interested parties that Hal's directory only has his mailbox file and hence no data needs to be transferred. Thus I am authorizing Glenn to delete his directory. We will then look into ways to set up a PDG directory. 3x1

17-APR-75 0935-PDT MABREY: NORM NIELSEN'S CLASS TODAY
Distribution: SHERWOOD, mabrey
Received at: 17-APR-75 09:35:20 3y

Glenn: Norm has a meeting and can't stop by Office-1 until around 4:00--see you then if you can stop by. I should neve the
teleconferencing file entered by noon today.
Kath 3y1

17-APR-75 0906-PDT PLACKO: Question About Archived Files
Distribution: FEEDBACK, placko, sherwood
Received at: 17-APR-75 09:06:29 3z

Assume that file X has been archived. If a user retreives that file for reading purposes only (doesn't modify it), may the user then delete that file from his directory and assume that it is still archived (not "unarchived" upon retreival)? If the user doesn't delete it, will it be "re-archived" in the future?
-- Mike 3z1

16-APR-75 1300-PDT SCOTT: printer terminal
Distribution: O'KEEFE, sherwood, scott
Received at: 16-APR-75 13:00:17 3a@

Pat: It is 4:pm and I have not heard from ICE MAN yet. I'm getting out of it and letting Bertrand handle it he might be able to get some action sooner. I'll work on the computer tomorrow morning from 8 to 11 am and will enter as many contacts as possible. Bye for now. N 3a@1

16-APR-75 0920-PDT OPER: MORE DISK PGS ON LOAN TO SRI
Distribution: SHERWOOD, O'KEEFE, FEEDBACK, norton, martinez
Received at: 16-APR-75 09:20:40 3aa

AS PER A CALL FROM GLENN SHERWOOD I HAVE INCREASED THE DISK PAGE
ALLOCATION OF SRI USER O'KEEFE FROM 300 TO 600 PAGES.
THANX

BOBM
TYM/OFFICE-1 3aa1

15-APR-75 1917-PDT SHERWOOD: Sendmail trouble
Distribution: FEEDBACK, sherwood
Received at: 15-APR-75 19:17:51 3ab

I sent you a message before regarding my hassle with Sendmail,,,Same problemwith more detail : I have a file loaded that I have been editing and I UFC & VF the file,,,I then proceed to GS and Interrogate where I get prompted to enter for ACTION,,,I then enter FEED, BOBM <ca>,,,msg appears at top of screen "frst entry nonexistant,,,,the screen flutters ,,, msg at top of screen "pushdown overflow at 34104,,,the Tenex @ appears and I'm in big Tenex,,,,? What am I doing wrong ? 3ab1

15-APR-75 1229-PDT MARTINEZ: MORE GOODS
Distribution: SHERWOOD, MABREY, PORT, GRIMM, martinez
Received at: 15-APR-75 12:29:02 3ac

AT REQ, OF GLENN I HAVE RECOVERED GOODSTUFF.NLS;24,25 AND RE 3ac1

15-APR-75 1116-PDT OPER: ACCT CHANGE
Distribution: PLACKO, FEEDBACK, SHERWOOD, peters, martinez
Received at: 15-APR-75 11:16:26 3ad

AS PER MAIL OF 4/10 (AND 4/14) I HAVE CHANGED THE ACCOUNT TO DIRECTORY PLACKO FROM 700 TO 880.
THANX
BOBM
TYM/OFFICE-1 3ad1

15-APR-75 1110-PDT FEEDBACK: KRUZIC Directory
Distribution: SHERWOOD, FEEDBACK
Received at: 15-APR-75 11:10:56 3ae

Glenn: this directory is tested and ready to go. Sandy Johnson 3ae1

15-APR-75 1048-PDT PLACKO: PRSETD Account
Distribution: SHERWOOD, placko
Received at: 15-APR-75 10:48:37 3af

Noticed this morning that PRSETD is still listed as being in account 700 when you LOGOUT. I've tried repeatedly to get this fixed,,,
-- Mike 3af1

15-APR-75 0958-PDT SHERWOOD: TAD FILES

Distribution: MABREY, sherwood
Received at: 15-APR-75 09:58:11 3ag

Kathy-- I talked with Steve about the bad files and what I'm going to do is to (hopefully) have Office-1 reload GOODSTUFF versions 24 & 25 to fixed and Steve is going to delete BJRCATALOG (the original bad file). Evidently they would like to get a clean copy of GOODSTUFF before they go. Glenn 3ag1

15-APR-75 0900-PDT MABREY:
Distribution: SHERWOOD, mabrey
Received at: 15-APR-75 09:00:26 3an

Glenn: Mike won't be able to attend the meeting. 3ah1

I have set the class up for Wednesday at 3:30 (Reddy couldn't attend today. 3ah2

Grimm and Port are ready to get off the system and are through with their
files but alas they are still bad. I talked some more with Jeff Peters
about fixing them (it should be a long process though). 3ah3

Kath 3ah4

15-APR-75 0854-PDT SHERWOOD: THE FINK ICE MAN
Distribution: SCOTT, O'KEEFE, sherwood, mabrey
Received at: 15-APR-75 08:54:03 3ai

MARIA...I'm sorry about this whole mess...I'm going to chip some Ice,
and I'll get back to you...keep the faith--Glenn 3ai1

15-APR-75 0751-PDT SCOTT: Ice Man
Distribution: SHERWOOD, O'KEEFE, scott
Received at: 15-APR-75 07:51:46 3aj

The printer has not been installed yet. Not one person has even shown up here or called. Perhaps he did install equipment for some other area here, but neither Barbara or the Ice Man has been in touch with me at all. Maria. 3aj1

14-APR-75 1652-PDT PLACKO: PLACKO Directory Account
Distribution: MARTINEZ, placko, sherwood, peters
Received at: 14-APR-75 16:52:55 3ak

I notice that my directory is still given as being in account

#700 when I LOGOUT -- it should be 880! See my memo of 10 April, -- Mike 3ak1

14-APR-75 1620-PDT SHERWOOD: ICE 300 TERMINAL PRINTER INSTALLATION
Distribution: SCOTT, O'KEEFE, sherwood, mabrey
Received at: 14-APR-75 16:20:03 3al

MARIA...I WAS TOLD BY THE ICE MAN HERE THAT YOUR PRINTER WAS INSTALLED
FRIDAY MORNING ...HE HAD CONFIRMED THIS WITH BARBARA SPAGILONI...IS THIS CORRECT ? DO YOU KNOW HOW TO WORK IT NOW ? ANY MORE PROBLEMS I CAN
HELP WITH ? GLENN 3al1

14-APR-75 1601-PDT SHERWOOD: MEETING TUES, 2:00 YOUR OFFICE RE: TELECON
Distribution: PLACKO, hough, sherwood
Received at: 14-APR-75 16:01:21 3am

MIKE-- CAN YOU MEET ROGER AND ME TOMMOROW AT 2:00 YOUR OFFICE ? I'D LIKE
TO REVIEW ROGER'S PIECE ON CONFERENCING AND SEND IT OFF ASAP...GLENN 3am1

14-APR-75 1326-PDT PETERS: KRUZIC INITIAL FILE
Distribution: FEEDBACK, SHERWOOD
Received at: 14-APR-75 13:26:56 3an

IT'S EASY TO SET UP THE PGK INITIAL FILE IN <KRUZIC>, SIMPLY LOG IN
AS KRUZIC AND THEN GO INTO NLS AND THAT'S ALL THERE IS TO IT, THIS
MAY NOT HAVE BEEN POSSIBLE EARLIER WHEN THE DIRECTORY WAS NOT COMPLETELY FINISHED, BUT IT CERTAINLY IS NOW, - JEFFES 3an1

14-APR-75 1137-PDT SHERWOOD: THIS WEEK'S TRAINING SESSION
Distribution: MABREY, sherwood
Received at: 14-APR-75 11:38:02 3ao

KATHY...I have talked with Reddy Dively who is interested in a intermediate refresher course is NLS and I think Pam is too...so could you set
up a date/time this week (w/ Susan ?)for it ? Include anybody you think
may be interested as well ...OK? Thanks Glenn 3ao1

14-APR-75 1131-PDT SHERWOOD: DIRECTORY KRUZIC & INITIAL FILE

Distribution: FEEDBACK, PETERS, sherwood, mabrey
Received at: 14-APR-75 11:31:34 3ap

I have just checked the KRUZIC directory,,,its there but has no Initial
file for recieving Journal mail ,,,would you please set this up or
better yet, show me how to set this up ? Thanks Glenn, 3ap1

14-APR-75 0953-PDT SHERWOOD: ENLARGED DIRECTORIES FOR FILE CLEAN-UP
Distribution: PORT, GRIMM, MABREY, peters, sherwood
Received at: 14-APR-75 09:53:28 3aq

TAD, I have requested 300 additional pages of disk for each of you,
to allow for file maintenance without having to fret "bad" files created
by insufficient disk space,,,Please notify me as soon as you are done with your files , we need the space for others, As of noon
today Port = 600 pages,,,Grimm = 600 pages,,,Thanks Glenn 3aq1

14-APR-75 0827-PDT PLACKO: Charge Number for Packet Radio People Training
Distribution: ROETTER, placko, sherwood
Received at: 14-APR-75 08:27:20 3ar

Susan,
If using a charge number for training time given to Packet Radio people is the RIGHT way to do things, then use 2325-072, I'm tired of hasseling every interaction that developes concerning the Utility -- maybe this will make my life a little simpler. MY disenchantment is not meant to be a reaction to your personal involvement or way of doing things -- you've always been very helpful.
-- Mike 3ar1

14-APR-75 0813-PDT MABREY: TAD FILE MAYBE NOT
Distribution: SHERWOOD, mabrey
Received at: 14-APR-75 08:13:31 3as

I just checked the file status of version 2 and 3, unfortunately
version 3 is one-half the size, I guess I'll have to check with ARC about bad files,
Kath 3as1

13-APR-75 1243-PDT MABREY: TAD FILE BAD NO MO

SRI UTILITY DISK SUMMARY

Distribution: SHERWOOD, mabrey
Received at: 13-APR-75 12:43:50 3at

Glenn: I can't believe this--I printed out the TAD file on Saturday
and could find no bad spots--the whole thing printed out fine. Then I did a verify file and as usual it was BAD. Then for fun I
updated the file and it was "SUCCESSFUL" far out!!! I wonder why,
oh well, its okay now. Just try loading version 3.
Kath 3at1

11-APR-75 1833-PDT SHERWOOD: Ice Man
Distribution: SCOTT, mabrey, sherwood, o'keefe
Received at: 11-APR-75 18:33:02 3au

Maria, I tried to call you Friday afternoon (unsuccessfully) to confirm
wether or not the Ice man arrived....he was susposed to get there
sometime after 1200...if not, then he should be there to install
the terminal and instruct you on its use Monday morning...If there
is a "no-show" by 12 Monday, Please call me and I'll square things away...OK? Glenn ext.2171 or 4115 or 2503..(I get around ?) 3au1

11-APR-75 1456-PDT MABREY: TRAINING SCHEDULES, ETC.
Distribution: SHERWOOD, mabrey
Received at: 11-APR-75 14:56:11 3av

Glenn: As far as further classes go:
Grimm, Ripple, and Port — Not interested in anything at present
Hough — Also not interested right now (but wanted to thank us for the followup
Kruzic, Dively, McDaniel — and sounded encouraging, (were you going to contact them?) 3av1

As far as justification of capital equipment: 3av2

- Nothing mentioned of it in the Admin. manual
- Only needed if over $250
- Needed if a specific supplier or brand name essential

. Bob Wing needs to sign
. A justification statement needs to be attached
I guess that's all for now, I'll keep trying to contact Make about training charges,
Kath 3av3

11-APR-75 0956-PDT SCOTT: Printer Terminal
Distribution: SHERWOOD, o'keefe, scott
Received at: 11-APR-75 09:56:44 3aw

Glenn, I have not heard from the ICE MAN maybe you could contact them and let me know, or tell me who to contact aat this end, I have to go now becaause I am offquota, Bye Maria. 3aw1

10-APR-75 1639-PDT JONES at SRI-AI: ANOMALIES
Distribution: HARRIS AT I4-TENEX, HASSELBLAD AT I4-TENEX,, HFREEMAN AT I4-TENEX, JEFFREY AT I4-TENEX,, MANIPLY AT I4-TENEX, MURRAY AT I4-TENEX, PETE AT I4-TENEX,, WEAVER AT I4-TENEX, jones, sherwood at office-1
Received at: 10-APR-75 16:42:06 3ax

I RECEIVED A MESSAGE FROM MURRAY THIS MORNING WITH THE FOLLOWING HEADER: 3ax1

10-APR-75 08:45:16-PDT,526;000000000000
Mail from I4-TENEX rcvd at 10-APR-75 0845-PDT
Date: 10 APR 1975 0844-PST
From: MURRAY at I4-TENEX
Subject: PDP-11 hosts
To: jones at SRI-AI 3ax2

I FIND IT INTERESTING, FIRST OF ALL, THAT THE ILLIAC-4 GROUP IS MAINTAINING
THAT FINE OLD TRADITION OF DAYLIGHT SAVINGS TIME, SECONDLY, IT WOULD
APPEAR (BASED ON THE .50 PROBABILITY THAT MY IDEA OF DAYLIGHT SAVING
TIME IS CORRECT) THAT THIS MESSAGE WAS CIRCULATING THROUGH THE NET IN A
FINALLY SUCCESSFUL SEARCH FOR ME FOR 59 MINUTES. 3ax3

OF COURSE, THE SYMBOLS COULD BE MISTAKEN, BUT THAT WOULD MEAN THAT IT
ARRIVED ONE MINUTE BEFORE BILL SENT IT. 3ax4

IT WOULD APPEAR THAT WE CANADD ANOTHER ITEM TO THE LIST OF ALTERNATE
TIME SYSTEMS, FANCIFUL TIME,

HO HUM,
RALPH 3ax5

10-APR-75 1614-PDT PLACKO: Account # for PLACKO Directory
Distribution: MARTINEZ, placko, peters, sherwood
Received at: 10-APR-75 16:14:35 3ay

Bob,
Please make sure that the system remembers that the PLACKO directory should now be in the ARPA-NSW group under account #880, I've had thischange made a couple of times and the system keeps forgetting,
-- Mike 3ay1

9-APR-75 1546-PDT SHERWOOD: Sendmail not accepting ident "FEED"
Distribution: FEEDBACK, sherwood, mabrey
Received at: 9-APR-75 15:46:36 3az

I have been attempting to send a directory request to youand it seems that "sendmail will NOT accept the "FEED" ident ..,the mesnage i get is that the first entry is non-existent....I have checked it with show records where of course is does exist,",..can you help me ? Glenn
f 3az1

9-APR-75 1236-PDT LEAVITT: Direct Dial-Up Line
Distribution: SHERWOOD, leavitt, mabrey
Received at: 9-APR-75 12:36:26 3b@

Glenn, it seems that the only time during the day that I will be needing to use the direct line regularly will be from 3:30 to 5:30, If you could schedule your use of it around that time, it would be really great, And we won't be wanting it every day... The other regular users of that line are* Jeff peters at ARC (occasionally), Bob Martinez at Tymshare, and Jerry Wheat, a systems programmer at Tymshare, Our feeling at ARC is that we can ask Wheat and Martinez to relase the line to us when
need it, Sometimes that takes a little time and phoning to Tymshare, but it usually works, Thanks for getting in touch -- Jeanne 3b@1

9-APR-75 0916-PDT SHERWOOD: SDP'S FILE
Distribution: MABREY, sherwood
Received at: 9-APR-75 09:16:20 3ba

KATHY, Good morning ! I talked with Steve about his file "BJRCATALOG.20" and got his password (stafan) so We/ARC can get in (or copy)the file

and fix it up...perhaps even find why or how it happened ? I have a couple of meetings this morning so I thot I'd let you know just in case... Glenn 3ba1

9-APR-75 0902-PDT SHERWOOD: IDENT CORRECTION
Distribution: HOUGH, sherwood, mabrey
Received at: 9-APR-75 09:02:53 3bb

ROGER, YOUR IDENT HAS BEEN CORRECTED...IT IS NOW "RWH". DID YOU GET THE
HOWTOLIST BIT ? HOPEFULLY MORE IS COMING ON FILE TRANFERS AND SUCH...BUT
IF THERE IS ANYTHING SPECIFIC I CAN HELP WITH IN THE MEANTIME PLEASE LET
ME KNOW. HOW'S THE TELECON PIECE GOING ? GLENN 3bb1

8-APR-75 1959-PDT KEENEY: IDENT PROBLEM
Distribution: FEEDBACK, SHERWOOD, MABREY, HOUGH
Received at: 8-APR-75 19:59:15 3bc

ROGER HOUGH'S IDENT HAS BEEN CHANGED FROM RAH TO RWH AND HIS IDENT
HAS BEEN ADDED TO SRIUU PER YOUR REQUEST OF APRIL 7.
MARCIA 3bc1

8-APR-75 1633-PDT SHERWOOD: Stuff
Distribution: MABREY, sherwood
Received at: 8-APR-75 16:33:43 3bd

Kathy, since i'm freaking around here thot I'd send you a quickie too...
Would you please enter the "howtolist" thing into a NLS file of the same name ? the sequence for tranfering files across directoriesis on your desk
...Glenn 3bd1

8-APR-75 1603-PDT SHERWOOD: Feb Use stats
Distribution: PANKO, sherwood
Received at: 8-APR-75 16:03:25 3be

Ray, would you also send me a copy of the Feb use stats along with the Mar stats ? They have dissolved into the cosmos....Thanks Glenn 3be1

8-APR-75 1545-PDT SHERWOOD: YOUR FUNNY FILE
Distribution: PORT, GRIMM, sherwood, mabrey
Received at: 8-APR-75 15:45:02 3bf

I HAVE TALKED WITH SEVERAL PEOPLE WHO ARE MORE THAN WILLING TO

ASSIST YOU WITH THE REBUILDING OF YOUR WEIRD FILE,,,KATHY AND I WOULD BE HAPPY TO HELP IN FACT, IT SEEMS THAT IT MAY CAUSE OTHER PROBLEMS IF YOU DON'T GET IT FIXED, PLEASE SET A TIME AND WE WILL GET SOME ARC HELP IF NECESSARY AND LET'S STRAIGHTEN IT OUT ONCE AND FOR ALL,,,OK?
I'LL BE WAITING TO HEAR FROM YOU,,,GLENN 3bf1

8-APR-75 1520-PDT SHERWOOD: DIRECT DIAL-UP LINE
Distribution: LEAVITT, sherwood, mabrey
Received at: 8-APR-75 15:20:05 3bg

JEANNE, I THOT AN EXPLAINATION MIGHT BE IN ORDER,...I WAS TRYING THE DIRECT LINE TO SEE WHAT THE DIFFERENCE IN PERFORMANCE IS AS COMPARED WITH TIP ACCESS, I WOULD LIKE TO CONTINUE TO USE THE DIRECT LINE FOR COMPARISON IF ITS OK WITH YOU,...IS THERE A SPECIFIC TIME WHEN THIS WILL BE CONVENIENT FOR YOU ? I DON'T WANT TO GET IN THE WAY BUT SINCE I'M IN THE PROCESS OF JUSTIFING THE PURCHASE OF HARDWARE TO PERMIT DIRECT ACCESS FOR THE UTILITY I'M CURIOUS,,,BYE THE WAY ARE YOU THE ONLY USER OF THE
NE? THANKS GLENN 3bg1

8-APR-75 1448-PDT SHERWOOD: ICE 300 TERMINAL PRINTER
Distribution: SCOTT, O'KEEFE, sherwood, mabrey
Received at: 8-APR-75 14:48:50 3bh

MARIA,,,THE ICE MAN COMETH,,,,THERE SHOULD BE SOMEONE OUT THERE IN THE MORNING TO INSTALL THE PRINTER AND GIVE YOU INSTRUCTIONS ON ITS USE, IF YOU HAVE ANY MORE PROBLEMS PLEASE DON'T HESITATE TO NOTIFY ME (GAS2), ,,,GLENN 3bh1

8-APR-75 1144-PDT SHERWOOD: Activating Ident PGK on Account 700
Distribution: MARTINEZ, FEEDBACK, sherwood, mabrey
Received at: 8-APR-75 11:44:22 3bi

Bob--We want to activate an existing Ident PGK on our slot (700),,,I don't think there are any files associated with it but I'm not sure, in fact I would appreciate knowing if there were, After hearing from you onthe current status of PGK I will send a "formal" request, There is one another thing --would you please change the account # of directory "PRSEID" to 880? it's currently on ours (700), Thanks Glenn 3bi1

3-APR-75 1805-PDT SHERWOOD: ROGER'S IDENT
Distribution: FEEDBACK, sherwood, mabrey, hough
Received at: 3-APR-75 18:05:56 3bj

I I have just checked Roger Hough's Ident in the Sendmail system and found that it is in error,,,,RAH is shown as his

Ident (wrong)...his real Ident is RWH...would you please correct this ? and add him to the SRIUU group Ident....Thank you, Glenn 3bj1

3-APR-75 1640-PDT FEEDBACK(FEED) at OFFICE-1: FeedResponse
Distribution: , GAS2(SHERWOOD), FEED(FEEDBACK), CFM(MCDANIEL)
Received at: 3-APR-75 16:40:21 3bK

MABREY@ 3bk1

In reply to your message of 1-APR-75 0857-PDT SHERWOOD
Subject: RWH IDENT AND GROUP IDENT SRIUU 3bk2

Glenn, CFM is included in SRIUU. Sandy 3bk3

3-APR-75 1632-PDT FEEDBACK(FEED) at OFFICE-1: FeedResponse
Distribution: , GAS2(SHERWOOD), FEED(FEEDBACK), KEENEY at
Received at: 3-APR-75 16:32:49 3b1

In reply to your message of 1-APR-75 1057-P GAS2 Subject:
ACCOUNT # CHANGE 3b11

Thanks for your message, Glenn--we'll change MAP2's account from 700 to 880 (packet project). Sandy 3b11a

2-APR-75 1230-PDT PLACKO: TELECON Group Ident
Distribution: KEENEY, placko, sherwood
Received at: 2-APR-75 12:30:47 3bm

Please make Glenn Sherwood (GAS2) the coordinator for the TELECON ident. 3bm1

2-APR-75 1220-PDT PLACKO: SRI Architect
Distribution: PETERS, placko, sherwood
Received at: 2-APR-75 12:20:35 3bn

Jeff,
Glenn Sherwood has replaced me as SRI Architect, and he should be the one who is notified about directories, etc. in the future. For example your notification of hte new McDaniels directory for SRI yesterday. Thanks -- Mike 3bn1

1-APR-75 1347-PDT PLACKO: Change of Groups
Distribution: SHERWOOD, placko
Received at: 1-APR-75 13:47:59 3bo

I've had Jeff Peters make the necessary moves to put me in the ARPA-NSW group -- so consider yourself off the hook. -- Mike 3bo1

SRI UTILITY DISK SUMMARY

1-APR-75 0903-PDT SHERWOOD: MEETING YOU
Distribution: PLACKO, sherwood
Received at: 1-APR-75 09:03:09 3bp

MIKE, could i see you today ? ...at your convenience, of course...Thanks Glenn 3bp1

1-APR-75 0857-PDT SHERWOOD: RWH IDENT AND GROUP IDENT SRIUU
Distribution: FEEDBACK, sherwood, mabrey
Received at: 1-APR-75 08:57:20 3bq

Sandy, Roger is using the Utility on a temporary basis only ...so I wouldn't worry about including him now, ok? How about CFM-is she included?...Glenn 3bq1

21-MAR-75 1218-PDT HOUGH: SRI UTILITY USERS MEETING
Distribution: MABREY, sherwood
Received at: 21-MAR-75 12:18:20 3br

OK FOR HOUGH, I'LL BE THERE. 3br1

21-MAR-75 0840-PDT MABREY: SRI UTILITY WORKSHOP SLOT USERS MEETING
Distribution: GRIMM, HOUGH, O'KEEFE, PLACKO, PORT, RIPPLE, sherwood, mabrey
Received at: 21-MAR-75 08:40:06 3bs

A meeting has been scheduled for the Utility slot (OFFICE-1) users:

Tuesday, March 25, 1975
Conference Room K1006
10:00 a.m. 3bs1

Some of the topics we would like to discuss include:
Documentation Available
Training and Demos
User Stats
Printing
Feedback 3bs2

Please RSVP to Ext. 2503 or send TENEX message. 3bs3

Thanks, Glenn Sherwood
Kathey Mabrey 3bs4

20-MAR-75 1711-PDT KEENEY: KWAC MEMBERSHIP
Distribution: FEEDBACK, placko, sherwood, mabrey
Received at: 20-MAR-75 17:11:54 3bt

GAS2 AND KLM HAVE BEEN ADDED TO KWAC PER FEEDBACK REQUEST,
MARCIA 3bt1

20-MAR-75 1151-PDT FEEDBACK(FEED) at OFFICE-1: KWAC membership
for GAS2
Distribution: , KEENEY, GAS2(SHERWOOD), PETERS, MARTINEZ at
Received at: 20-MAR-75 11:51:53 3bu

FEED(FEEDBACK@) 3bu1

Glenn, we are adding your ident (and Kathey Mabrey's) to the
KWAC
group ident. Sorry for the delay--we've been swamped.
sandy/feed 3bu2

19-MAR-75 1619-PDT FEEDBACK(FEED) at OFFICE-1: FeedResponse to
KWAC additions
Distribution: , KEENEY, PETERS, MARTINEZ, NORTON, BAIR, PLACKO
at
Received at: 19-MAR-75 16:19:32 3bv

SHERWOOD@ MABREY@ feinler@BBNB 3bv1

11-MAR-75 2049-PDT PLACKO: KWAC Membership
Distribution: FEEDBACK, placko, sherwood, mabrey
Received at: 11-MAR-75 20:49:21 3bv2

Please include Glenn Sherwood (GAS2, SRI Architect) and
Kathey
Mabrey (KLM, Assistant SRI Architect) in KWAC. Leave my
ident
(MAP2) in for a little while longer -- until Glenn and
Kathey are up
to speed as Architect. I'll let you know when to
excommunicate me.
-- Mike 3bv3

19-MAR-75 1312-PDT FEEDBACK(FEED) at OFFICE-1: FeedResPonse
Distribution: , GAS2(SHERWOOD), FEED(FEEDBACK), HOPPER, PLACKO
at
Received at: 19-MAR-75 13:12:36 3bw

In reply to your message of 11-MAR-75 2044-PDT PLACKO Subject:
GAS2 Journal Mail 3bw1

I just talked to Dave Hopper and he says everything looks ok
from the journal's end. I just send you a message--let's
see if it gets there,,,sandy/feed 3bw1a

SRI UTILITY DISK SUMMARY

19-MAR-75 1308-PDT FEEDBACK(FEED) at OFFICE-1: test to see if you're getting mail
Distribution: , GAS2(SHERWOOD), FEED(FEEDBACK)
Received at: 19-MAR-75 13:08:49 3bx

test 3bx1

12-MAR-75 1153-PDT *PETERS: GLENN'S JOURNAL DELIVERY
Distribution: PANKO, SHERWOOD
Received at: 12-MAR-75 11:53:21 3by

THE REASON GLENN RECEIVES NO JOURNAL DELIVERY IS THAT HE WAS NOT MARKED
IN THE IDENTFILE FOR ANY DELIVERY WHAT SO EVER, HE MAY HAVE BEEN
DEFAULTED TO HARDCOPY DELIVERY, BUT THAT DOESN'T REALLY HAPPEN ANY MORE
ANYWAY, SO I SET HIM UP FOR ONLINE DELIVERY, AND HE SHOULD RECEIVE
NORMAL DELIVERY TO HIS INITIAL FILE IN <SHERWOOD> FROM HERE ON IN,
- JEFF 3by1

11-MAR-75 2135-PDT PLACKO: Journal Mail
Distribution: SHERWOOD, placko
Received at: 11-MAR-75 21:35:08 3bz

Journal mail isn't being delivered to you as it should be. I've copied all those journal items that you should have received that were delivered to me into your initial file. That should get you caught up. I'll continue to ship appropriate journal items into your initial file until the problem is solved. -- Mike 3bz1

11-MAR-75 2049-PDT PLACKO: KWAC Membership
Distribution: FEEDBACK, placko, sherwood, mabrey
Received at: 11-MAR-75 20:49:22 3c@

Please include Glenn Sherwood (GAS2, SRI Architect) and Kathey Mabrey (KLM, Assistant SRI Architect) in KWAC. Leave my ident (MAP2) in for a little while longer -- until Glenn and Kathey are up to speed as Architect. I'll let you know when to excommunicate me. -- Mike 3c@1

11-MAR-75 2044-PDT PLACKO: GAS2 Journal Mail
Distribution: FEEDBACK, placko, sherwood
Received at: 11-MAR-75 20:44:39 3ca

I've tested SENDMAIL to Glenn Sherwood (GAS2) and he isn't receiving his journal mail, -- Mike 3ca1

11-MAR-75 1928-PDT SHERWOOD: Missing Journal Mail
Distribution: FEEDBACK, placko, sherwood
Received at: 11-MAR-75 19:28:05 3cb

Mike Placko sent me a message with a copy to himself as an example of the Journal mail procedure...he recieved his copy, but I did not recieve my copy. This was approx. 1800 3/10/75...Glenn 3cb1

11-MAR-75 1920-PDT SHERWOOD: Updating SRIUSAGE File
Distribution: PLACKO, sherwood
Received at: 11-MAR-75 19:20:26 3cc

I'm having some trouble and i think you could possibly save me considerable headache...when you have time, By the way , I never did recieve that TEST journal msg. 3cc1

10-MAR-75 1717-PDT OPER: REQUEST FOR FILE
Distribution: SHERWOOD, oper
Received at: 10-MAR-75 17:17:15 3cd

FILE CALLED 'BJRCATALOG,NLS;17' HAS BEEN RECOVERED AND PUT IN USER GRIMM, CANNOT FIND FILE BJRCATALOG,NLS;18 ON OUR BACKUP TAPES,
THANK YOU
STEVE J
TYM/OFFICE-1 3cd1

5-MAR-75 1901-PDT SHERWOOD: files SRIUSAGE & SRIUSAGETEMPLATE
Distribution: PLACKO, sherwood, mabrey
Received at: 5-MAR-75 19:01:31 3ce

Thanks for the files mike, i guess u did get my missive although i never recieved the sent "ok" sign. It seems that the rain effects the ffne lines up here and i am having trouble with garbleness , not to mention the snails pace even with the relatively light load on the system. I ave discussed the above with the operator who tells its me its common for the area...I'll see you when I have licked this bug and get in. 3ce1

5-MAR-75 1847-PDT SHERWOOD: key to office-1
Distribution: MABREY, sherwood
Received at: 5-MAR-75 18:47:11 3cf

kathy: thanks for the notice, i'll check w/ Mae when I get in 3cf1

5-MAR-75 1651-PDT MABREY: KEY TO OFFICE-1
Distribution: SHERWOOD, mabrey
Received at: 5-MAR-75 16:51:05 3cg

Glenn:
Your key is now in. Check with Mae Swanbeck (L1005)--Division Office--
I think you have to fill out some kind of form to pick it up.
Kath 3cg1

4-MAR-75 2029-PDT FEEDBACK(FEED) at OFFICE-1:
Distribution: , SHERWOOD, FEEDBACK at
Received at: 4-MAR-75 20:29:08 3ch

In reply to your message of 27-FEB-75 1647-PDT SHERWOOD
Subject: sri-trainee initial file 3ch1

I just took a look at the sri directory and it looks ok. No permanent damage done. Susan/FEED 3ch1a

4-MAR-75 1702-PDT PLACKO: SRI Slot Usage Statistics
Distribution: SHERWOOD, mabrey, placko
Received at: 4-MAR-75 17:02:34 3ci

You might check out two new files in the SHERWOOD directory:
SRIUSAGE
SRIUSAGETEMPLATE
-- Mike 3ci1

28-FEB-75 1423-PDT MABREY: DOCUMENTATION SEARCH
Distribution: SHERWOOD, mabrey
Received at: 28-FEB-75 14:23:58 3cj

Glenn: 3cj1

No one is around in the ARC to ask about those three documents. I'll have to check Monday. They are in the park celebrating the new system??? Have a good weekend.
Kath 3cj2

28-FEB-75 0939-PDT PLACKO: Training of PDG Personnel in Washington
Distribution: BECK, placko, sherwood, o'keefe
Received at: 28-FEB-75 09:39:15 3ck

Could you bring me up to date as to how much time you've spent training Maria Scott in Washington? And a similar hourly figure for Hal Bertrand? This information will be useful for Glen Sherwood (the new SRI Architect) in his future training

plans. In the future you and Glen should keep in touch sothat he can apportion the SRI training budget appropriately. -- thanks, Mike 3ck1

28-FEB-75 0912-PDT PLACKO: GREEHAN Directory
Distribution: FEEDBACK, placko, sherwood
Received at: 28-FEB-75 09:12:04 3c1

Please delete the GREEHAN directory -- I've received an okay from Washington. Archive all GREEHAN files however, just to be on the safe side. Since Dean Meyer was using that directory you might check with him about any files he'd like to transfer first. -- Mike 3c11

28-FEB-75 0851-PDT PLACKO: Line Noise
Distribution: HARDY, placko, sherwood
Received at: 28-FEB-75 08:51:15 3cm

I had the phone company check out our circuit yesterday. They contend that it checks out fine -- but the noise is still atrocious! Where do we go from here? -- Mike 3cm1

27-FEB-75 1647-PDT SHERWOOD: sri-trainee initial file
Distribution: FEEDBACK, sherwood
Received at: 27-FEB-75 16:47:45 3cn

i'm afraid i removed the initial file from sri-trainee...sorry 'bout that 3cn1

27-FEB-75 1210-PDT MABREY: DOCUMENTATION REQUEST
Distribution: FEEDBACK, mabrey, sherwood
Received at: 27-FEB-75 12:10:11 3co

OFFICE-1 needs copies of the following documents: 3co1

The TNLS Basic Course
TNLS Level 2
TNLS Primer
TNLS-8 Quick Reference
NLS Command Summary 3co2

We could use approximately 5 copies of each at present. Also, any
other documents that you think would be helpful would be appreciated,
Send them to J1046 or call X2503 and I can pick them up.
Thanks, Kathey 3co3

27-FEB-75 0828-PDT PLACKO: SRI Architect's Assistant

Distribution: FEEDBACK, placko, sherwood, mabrey
Received at: 27-FEB-75 08:28:25 3cp

As you know, Glen Sherwood is coming on board an the new SRI Architect, Kathey Mabrey will be acting as his assistant. She will be responsible for documentation requests, information dissemination to the SRI user group, etc. Please notify the appropriate ARC personnel that she will be acting in this capacity. -- Mike 3cp1

443 :
Distribution: SHERWOOD
Received at: 11-APR-75 11:23:43 3cq

FTPMAILWORK,FEED;1
FEEDBACK(FEED)
OFFICE-1
FeedResponse
Distribution: GAS2(SHERWOOD@) FEED(FEEDBACK@) MABREY@ 3cq1

In reply to your message of 9-APR-75 1546-PDT SHERWOOD
Subject: Sendmail not accepting ident "FEED" 3cq2

Glenn: I tried it and it worked for me,..try it once again, if it
still doesn't work, let me know exactly whay you did,..thanks, Sandy
Johnson 3cq3

1064 :
Distribution: SHERWOOD
Received at: 17-APR-75 14:29:06 3cr

FTPMAILWORK,RAH;1
HOUGH(RAH)
OFFICE-1
Questionnaire
Distribution: SHERWOOD@ PLACKO@ MABREY@ HOUGH@ 3cr1

Glenn, the draft questionnaire is in file <HOUGH,HQUEST>. It represents my concept of what we would be wanting to get back from the
Architects, You, Mike, or Kathy might have different ideas, Thus,
please feel completely free to modify it as you choose, and send it out
in any form that you wish. I hope, at least that I haven't missed the
spirit of what you and/or Mike had in mind. 3cr2

You should have RA3Y's draft also by now, I do not know how much
access I'll have to a terminal here in Washington, but you can call me
if you want and leave a message, Phone is (703)347-1300. 3cr3

Cover letter should introduce both documents, Please be sure to
indicate that the background paper is just that, It's not intended to
be a detailed treatise on teleconferencing, or even computer
teleconferencing, Also, RA3Y would like to get comments back on it.
Please ask him about that. 3cr4

Thanks for you help, Roger. 3cr5

aids
<:xbng> 4

Tenex file privacy 4a

77 = read/write access, 52 = read access, 00 = no access 4a1

@pro<esc>(tection of file) FNAME (is) yyggww, where yy is you,
gg is group, ww is world 4a2

example: @pro<esc> file 775200 4a3

Transferring files between machines 4b

(in TENEX):
@ftp<esc><cr>
*conn<esc>other-machine<cr>
*login dirname password account<cr>
*get(or send)<esc>filename<esc>(to)newfilename<cr><cr>
****
*disc<esc><cr>
*ctrl C
("universal" directory on SRI-ARC):NETUSER (UTIL) 4b1

Sending files to TYMSHARE printer 4c

Output Printer File fname = SEND-TO-PLACKO-AT-SRI 4c1

in TENEX copy fname to LPT: 4c2

TELENET procedure 4d

SRI UTILITY DISK SUMMARY

```
      @tel<ESC><CR>
      #conn<ESC>,,,host<CR>,,,
       TENEX,,,
      @login,,,
      ,,,
      @logout
      CTRL-Z
      #disc<ESC>
      #quit
      @,,,                                                    4d1

message procedure                                              5

   (mess)exec prog load prog message                           5a

   exec prog load prog filesc,proc-rep                         5b

   exec mess move message messaged                             5c

   exec mess sort mess message ,d                              5d

   jump name firs message xb                                   5e

   upda file comp                                              5f

files                                                          6

   updated 22-APR-75 18:16                                     6a

   < SHERWOOD, (SHERWOOD)TELECON,PC;3, >                       6b

   < SHERWOOD, CONF,NLS;12, >                                  6c

   < SHERWOOD, DIRECTORYREQUEST,NLS;9, >                       6d

   < SHERWOOD, FEBSTAT,LST;1, >                                6e

   < SHERWOOD, FILESC,PROC-REP;1, >                            6f

   < SHERWOOD, GAS2.NLS;25, >  [ Being Modified By SHERWOOD (GAS2) ]   6g

   < SHERWOOD, MARSTAT,LST;1, >                                6h

   < SHERWOOD, MESSAGE,TXT;1, >                                6i

   < SHERWOOD, NOTES,NLS;7, >                                  6j

   < SHERWOOD, SLOTSUM,NLS;2, >                                6k
```

< SHERWOOD, SLOTUSERS.NLS;6, > 6l

< SHERWOOD, SRIUSAGE.NLS;5, > 6m

< SHERWOOD, SRIUSERS.NLS;8, > 6n

< SHERWOOD, TELQUEST.NLS;4, > [Being Modified By SHERWOOD (GAS2)] 6o

directory procedure 7

(dir)dele plex updated 7a

copy dire files d 7b

inse stat filesdupdated 7c

inse time updated 7d

startup: 8

Exe Pro Loa Pro KELLEY,WUC 8a

SRI UTILITY DISK SUMMARY

(J32374) 24-APR-75 15:27;;;; Title: Author(s): Glenn A. Sherwood/GAS2; Distribution: /FEED([ACTION]) BOBM([ACTION]) JCP([ACTION]) SRIUU([INFO-ONLY]) ; Sub-Collections: NIC SRIUU; Clerk: GAS2; Origin: < SHERWOOD, GAS2.NLS;26, >, 24-APR-75 10:24 GAS2 ;;;;####;

BOBM 24-APR-75 15:58 32375

action taken on sri-uu disk reallocations

as per journal item located in <gjournal>32531 requested by glenn sherwood i have adjusted the sri-uu disk allocations so that they now conform to specifications requested. 1

action taken on sri-uu disk reallocations

(J32375) 24-APR-75 15:58;;;; Title: Author(s): Robert L. Martinez/BOBM; Distribution: /GAS2([INFO-ONLY]) CAG2([INFO-ONLY]) RWH([INFO-ONLY]) PGK([INFO-ONLY]) KLM([INFO-ONLY]) CFM([INFO-ONLY]) PWO([INFO-ONLY]) SDP([INFO-ONLY]) MCS([INFO-ONLY]) SRI([INFO-ONLY]) FEED([INFO-ONLY]) JCN([INFO-ONLY]) ; Sub-Collections: NIC SRI; Clerk: BOBM;

EJK 24-APR-75 16:01 32376

KRUIZ,RDK File

HELP!!!!

EJK 24-APR-75 16:01 32376

KRUTZ,RDK File

Col. Krutz has complained to me that his initials file is a bad file, I have spent the last couple of hours playing with it and I have it to the point where I can make changes in it, print it out, and change the protection codes (On the IMLAC). Seemingly it is normal, but VERIFY FILE gets the message that this is a bad file. I haven't yet tried to do anything with it on the TTY terminals. However, earlier I noticed that we are still getting DOUBLE LOGONs. I tried repeatedly to log on as krutz and each time I was logged on twice. ALSO it seems that if you go to NLS and create a PC, and then come back on at some later tiem you cannot work with the file. Instead you get the message that the file is locked by Krutz and as a result KRUTZ cannot update it. Strange things have been happening and I suspect that the double logons are the cause. CAN you enlighten me and or the Col. ? Can you get us back a good copy of his initials file if the current one is not a good one?? Communicate please.

EJK 24-APR-75 16:01 32376

KRUIZ,RDK File

(J32376) 24-APR-75 16:01;;;; Title: Author(s): Edmund J. Kennedy/EJK; Distribution: /FEED([ACTION]) RDK([INFO-ONLY]) DLS([INFO-ONLY]) JLM([INFO-ONLY]) ; Sub-Collections: RADC; Clerk: EJK;

fuxut

```
;fixup                                                    1
   goto programs                                         1a
   load prog auxchr                                      1b
   quit to base                                          1c
   jum lin (O'Keefe, propsl, )                           1d
   in text %                                             1e
   inser text %%%%%%%%%%                                 1f
   ;fini                                                 1g
```

fuxut

(J32377) 24-APR-75 17:01;;;; Title: Author(s): Pat Whiting O'Keefe/PWO; Distribution: /GAS2([ACTION]) KLM([INFO-ONLY]) ; Sub-Collections: NIC; Clerk: PWO; Origin: < O'KEEFE, FIXIT,NLS;1, >, 23-APR-75 13:00 PWO ;;;;####;

DAP 25-APR-75 05:42 32381

Directory Request

Please set up a new directory as follows:

DIRECTORY NAME: Walton
PASSWORD: JMW
USER NAMES AND IDENTS: Walton, Wesley W.....WWW
West, Jane M....JMW
PHONE NUMBERS: Basic number same as ETS; Extensions are
Walton...6438
West.....6439
PROTECTION: 770000
DISK ALLOCATION: 300 pages

Any other information (e.g., hardcopy address) should be the same as for other ETS directories. I should note that this will be a true multi-user directory (I think); more idents will be added in the near future.

1

DAP 25-APR-75 05:42 32381

Directory Request

(J32381) 25-APR-75 05:42;;;; Title: Author(s): David A. Potter/DAP;
Distribution: /FEEDBACK([ACTION]) DAP([INFO-ONLY]) EJA2([
INFO-ONLY]) ; Sub-Collections: NIC FEEDBACK; Clerk: DAP;

SMT 25-APR-75 08:03 32382

test

message for shirley. 1

i am attempting to use batch mode on a hazeltine terminal to enter text, we will have to see how well this works, if at all. 2

it seemed to work ok on that attempt, so we will try it again. instructions seem to get slightly mixed up using batch mode for that purpose. 3

if you send a string of instructions in batch mode the response is somewhat different than if you send them in full duplex. 4

my conclusion is that it is not wise to use batch for instructions but it works well for entering complete statements. 5

signed:sam 6

test

(J32382) 25-APR-75 08:03;;;; Title: Author(s): Stan M. Taylor/SMT;
Distribution: /JCG([ACTION]) ; Sub-Collections: NIC; Clerk: SMT;
Origin: < BRL, TEST.NLS;2, >, 25-APR-75 07:54 SMT ;;;;####;

DLS 25-APR-75 08:26 32383

Contract Reports--Non delivery & Lateness

Ref Dirk's recent attempts to get out a final report (,25776) & (,25698). 1

Attached to each contract is a Data Requirements List, where various technical, management and financial reports are spelled out,..otherwise known as "boilerplate". For ARPA jobs, a Quarterly management Report (QMR), a Contract Funds Status Report (CFSR) and a Final Technical Report are standard items. The ARC is continually delinquent in delivering these items. 1a

I have been badgered by procurement for some time. They are aware of NLS and its documentation capabilities and have a hard time reconciling that with the late report deliveries. It seems to be more of a management problem, where these items are overlooked or given a low priority. I'll be the first to agree that its difficult to require delivery of these reports where contracts are signed 6-8 months after the work has started. 1b

The "old" ARC contract was extended under the PDP-10X purchase and operate ammendment from 30 Jun 74 to 1 Jan 75. This means that the final report was due 1 Feb 75, not that this should reduce any "guilt" feelings that you might have about being late. There are several quarterly management reports, which I have not received but am willing to ignore, since their generation after the fact defeats their purpose. 1c

There are similar problems with the NSW and NIC contracts, where there have been no quarterly management reports. I'm not sure if the CFSR's have been coming in or not, since I am really not on the distribution list. It looks like the ARC will be given a grace period for the NSW final report, since we are contemplating a 9 month extension to the existing contract. 1d

I'm not trying to play the government "bad guy", but I do have to sign something which says that these items were delivered. I'd like to suggest that when a contract is signed, that someone set up a file with the data items required and the date they are due, and make sure that they are sent out on time. It would make everyone's life easier. Since most of the reports required are highly formatted, I think it would require minimum effort (using NLS) to comply with the letter of the contract as well as the spirit. 1e

DLS 25-APR-75 08:26 32383

Contract Reports--Non delivery & Lateness

(J32383) 25-APR-75 08:26;;;; Title: Author(s): Duane L. Stone/DLS; Distribution: /DCE([ACTION]) RWW([ACTION]) JCN([ACTION]) JAKE([ACTION]) DVN([ACTION]) JLM([INFO-ONLY]) ELF([INFO-ONLY]) ; Sub-Collections: RADC; Clerk: DLS;

DCE 25-APR-75 09:38 32384

Mitchell, Goodwin and Thomas of MITRE at Bedford to visit ARC Mon 12 May 75 re ACOICO

Steve Walker of ARPA IPTO asked me via message dated 12 May to host this group at ARC: Jonathan Mitchell, Nancy Goodwin, and Louis Thomas. They are with MITRE at their Bedford, Mass headquarters; I'd guess that they are associated in some way with the MITRE project that Pete Tasker works on in Oahu (see memo on his visit to ARC on 18 Oct 74 --- 24321,). 1

Arranging details on the phone, I learned that the group will be interested in: 2

Technical details of the core-NLS support to ISI's Military Message Processing System; 2a

What DNLS looks like to users; 2b

Experience we've had in Applications, relevant to using ISI's system in military applications, in areas such as service support, training, and integration into the working life of organizations. 2c

They will arrive about 0900 on Monday 12 May. We will have a meeting, open to all interested parties at 1000 in the ARC conference room, for this group to describe their activities and the nature of any mutual interest they perceive with ARC. We'll have a schedule developed for the rest of the day by the end of that meeting when we have assessed the nature and extent of mutual interests between them and ARC staff. 3

Jim and will each designate an interfacing person to represent his group in seeing that the visitors meet the people they need to and get the demos, descriptions, materials, etc. that they need. 4

DCE 25-APR-75 09:38 32384

Mitchell, Goodwin and Thomas of MITRE at Bedford to visit ARC Mon 12 May 75 re ACOTCO

(J32384) 25-APR-75 09:38;;;; Title: Author(s): Douglas C. Engelbart/DCE; Distribution: /RWW([ACTION]) JCN([ACTION]) SRI-ARC([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk: DCE;

EJK 25-APR-75 11:01 32385

Filters for your Prior/Effort file.

Roger: You can copy these into the top of your file and when you want to use them use the command set Content To: and then bug the beginning of the statement which contains the filter you want. Using the viewspec 'i' you can look, copy or send to the printer, only that which pases the filter. GOOD LUCK Ed.

Filters for your Prior/Effort file.

```
(filters)                                                              1
   "PRTY  TITLE"/["5550"];%shows header and 5550 tasks only%           1a
   "PRTY  TITLE"/["5581"];%shows header and 5581 tasks only%           1b
   "PRTY  TITLE"/["Bergstrom"];%header and Bergstrom tasks only%       1c
   "PRTY  TITLE"/["Cavano"];%header and Cavano tasks only%             1d
   "PRTY  TITLE"/["Cellini"];%header and Cellini tasks only%           1e
   "PRTY  TITLE"/["DiNitto"];%header and DiNitto tasks only%           1f
   "PRTY  TITLE"/["Ives"];%header and Ives tasks only%                 1g
   "PRTY  TITLE"/["Kennedy"];%header and Kennedy tasks only%           1h
   "PRTY  TITLE"/["LaMonica"];%header and LaMonica tasks only%         1i
   "PRTY  TITLE"/["Laforge"];%header and Laforge tasks only%           1j
   "PRTY  TITLE"/["Landes"];%header and Landes tasks only%             1k
   "PRTY  TITLE"/["Liuzzi"];%header and Liuzzi tasks only%             1l
   "PRTY  TITLE"/["Lombardo"];%header and Lombardo tasks only%         1m
   "PRTY  TITLE"/["Motto"];%header and Motto tasks only%               1n
   "PRTY  TITLE"/["Palaimo"];%header and Palaimo tasks only%           1o
   "PRTY  TITLE"/["Panara"];%header and Panara tasks only%             1p
   "PRTY  TITLE"/["Ruple"];%header and Ruple tasks only%               1q
   "PRTY  TITLE"/["Rzepka"];%header and Rzepka tasks only%             1r
   "PRTY  TITLE"/["Slavinski"];%header and Slavinski tasks only%       1s
   "PRTY  TITLE"/["Sliwa"];%header and Sliwa tasks only%               1t
   "PRTY  TITLE"/["Stone"];%header and Stone tasks only%               1u
   "PRTY  TITLE"/["Stover"];%header and Stover tasks only%             1v
   "PRTY  TITLE"/["Sukert"];%header and Sukert tasks only%             1w
   "PRTY  TITLE"/["VanAlstine"];%header and VanAlstine tasks only%     1x
```

EJK 25-APR-75 11:01 32385

Filters for your Prior/Effort file.

```
"PRTY  TITLE"/[^"White"];%header and White tasks only%                    1y
"PRTY  TITLE"/[^"Wingfield"];%header and Wingfield tasks only%            1z
[ENDCHR] < "1  " OR > "PRTY  TITLE";%header and Group 1%                  1a@
[ENDCHR] < "2  " OR > "PRTY  TITLE";%header and group 2%                  1aa
[ENDCHR] < "3  " OR > "PRTY  TITLE";%header and Group 3%                  1ab
[ENDCHR] < "4  " OR > "PRTY  TITLE";%header and Group 4%                  1ac
```

EJK 25-APR-75 11:01 32385

Filters for your Prior/Effort file,

(J32385) 25-APR-75 11:01;;;; Title: Author(s): Edmund J. Kennedy/EJK; Distribution: /RBP([ACTION]) JLM([INFO-ONLY]) DLS([INFO-ONLY]) ; Sub-Collections: RADC; Clerk: EJK;

spaces

Betty,

I finally got the little editing program transferred to Office-1.

The program SPFIX removes any non-printing characters following statement names. It operates on a file called Temp in directory LGYPM.

To run it do the following:

Update the file you wish to edit.

Load the file you want to edit.

Use the NLS command Update File Rename

When NLS prompts for the filename type temp.

Load any other file. This is so NLS won't think 'Temp' is locked or busy.

Load the program: Execute Programs Load Program SPFIX <CA>

Run the program: Execute Programs Run Program SPFIX <CA>

When you get the next command prompt it is finished. I suggest looking at part of the file temp before renaming it to whatever you like.

When you have renamed temp delete it.

spaces

(J32387) 28-APR-75 09:55;;;; Title: Author(s): Elizabeth F. Finney/EFF; Distribution: /EFF([ACTION]) ; Sub-Collections: NIC; Clerk: EFF; Origin: < LGYPM, SPACES.NLS;2, >, 28-APR-75 09:37 EFF ;;;;####;

SMT 28-APR-75 12:57 32388

re-transmission of msg about lineprocessor copy printer

25-APR-75 0641-PDT DTAYLOR: lineprocesor copy printer
Distribution: TAYLOR, dtaylor, wrublewski
Received at: 25-APR-75 06:41:18 1

Stan
We tried to use the TI terminal yesterday as a copy printer on the
lineprocessor, just to make sure that the system worked, It didn't,
The program LPPRINT seemed to be working correctly---at least it thought it was printing because the status lite 0 came on, This was
followed by some activity on the LPR lite opposite EP and also on the LPS lite opposite DI, However, there was no visable activity on
the LPS lite opposite CP and nothing whatever was printed, We were trying to print a message,txt file, Several tries produced the same
results, When RUN was reinitiated, the question 'stop printing?' appeared and an OK did in fact cause the status lite 0
to go out, Everythingseemed to work fine except it didn't print.
??????
Did you notice that the lineprocessor is a different modelthan the original? There is only one lite opposite CP where there used to be two, Corresponding to this ,there is one less board internally,
Don--- 1a

SMT 28-APR-75 12:57 32388

re-transmission of msg about lineprocessor copy printer

(J32388) 28-APR-75 12:57;;;; Title: Author(s): Stan M. Taylor/SMT;
Distribution: /FEEDBACK([ACTION]) DFT([INFO-ONLY]) MEH([
INFO-ONLY]) ; Sub-Collections: NIC FEEDBACK; Clerk: SMT;

EJK 28-APR-75 14:20 32389

Double-logins at RADC

The following is some of the replies that I have been getting to my queries and complaints about double-logins by RADC people using TTY-type terminals. The most recent message, from hiscox at BBN, requires some action by RADC. 1

28-APR-75 0937-EDT HISCOX at BBN-TENEX: double logins
Distribution: KENNEDY AT OFFICE-1, hiscox Received at:
28-APR-75 06:37:28-PDT 1a

ed, i asked ncc to try your numbers over the weekend, they did try some but not enough for my purposes, i've asked them to continue, on friday they did get one double login but didn't do a netsta, this morning i called 4177 and got a horrible answer tone, the tty didn't even recognize it, i then had an operator try all numbers to get an idea of how many might have bad answer tones, he listed 4175,76, and 77 as sick, 4293 was very faint and 2844 was good for 2 seconds and then quit, the others were ok or busy, i doubt that bad modems, in the sense of poor answer signals, will cause a double login, but bell telephone or whoever supplied your modems should be approached to get them repaired, after i get some data with our modem tty, i will get a ti attached to the modem and try logins at 300 baud, i have a couple ideas about what the problem is but no data, i'll keep you informed, ernie 1a1

25-APR-75 1416-PDT FEEDBACK: FeedResponse Distribution:
KENNEDY, NORTON, STONE, FEEDBACK Received at: 25-APR-75 14:16:26 1b

In reply to your message of 25-APR-75 0939-PDT KENNEDY
Subject: double logons 1b1

Ed: Jim Norton discussed this problem this morning with Duane and the solution to double login problems appears to be under study by the NCC ... Keep us informed of any new data you are able to collect with respect to this matter, Sandy Johnson 1b2

25-APR-75 1128-EDT HISCOX at BBN-TENEX: double logins
Distribution: KENNEDY AT OFFICE-1, hiscox at bbn Received at:
25-APR-75 08:28:43 1c

right, we were bagged with several problems, one of which masked this problem, now, i hope to give you a big enough slice of attention to solve it all, when this happens, can you do a netstat to find out which tip ports have the logins? forgive me, but i may be repeating questions you asked before to get back into the picture, does this happen with dialup ports, hardwired ports, or both? does it happen with random ports or particular ports? while i'm waiting for your answers, i'll

have ncc calling the dialup ports to try to get the problem to happen from here, if necessary, i can come out to rome, ernie 1c1

EJK 28-APR-75 14:20 32389

Double-logins at RADC

(J32389) 28-APR-75 14:20;;;; Title: Author(s): Edmund J. Kennedy/EJK; Distribution: /TFL([ACTION]) WFS([ACTION]) FEED([INFO-ONLY]) DLS([INFO-ONLY]) JLM([INFO-ONLY]) ; Sub-Collections: RADC; Clerk: EJK;

SGR 28-APR-75 17:36 32392

HOWDY!

I got your sendmail message and thought I'd send an answer just in case you havn't already gotten one from someone else. I think it would be fine to delete the DPCS and DIRT stuff once you have a printout - I don't know why you would receive citations twice - if it's still happening nextweek when I get back I'll takea look at it. Hope things in general are going o.k. there. Am really looking forward to getting back - See you in a week! --Susan 1

SGR 28-APR-75 17:36 32392

HOWDY!

(J32392) 28-APR-75 17:36;;;; Title: Author(s): Susan Gail Roetter/SGR; Distribution: /DMB([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk: SGR;

DAP 29-APR-75 06:19 32393

FORTRAN Subsystems/Programs?

Jim,

Is it in any way possible to run FORTRAN (or perhaps other non-L10) programs through OFFICE-1? I note the availability of RUN TENEX subsystem commands in the PROGRAM subsystem; I wondered if this might mean the availability of compilers other than L10 at the TENEX level. If it were possible to run FORTRAN programs in this or any other way, I think ETS migh be able to add some very valuable tools to our time-sharing environment.

If the immediate answer is no, is there any way we could do this in the future? You know of my interest in expanding the number crunching potential of NLS by improving CALCULATOR. This is of course not my real goal; what I want to be able to do is to provide the working professional with the tools he needs -- easily, quickly, without requiring much in the way of computer-type sophistication.

Obviously, any help you could give me on this would be appreciated.

DAP 29-APR-75 06:19 32393

FORTRAN Subsystems/Programs?

(J32393) 29-APR-75 06:19;;;; Title: Author(s): David A. Potter/DAP;
Distribution: /JCN([ACTION]) FEEDBACK([INFO-ONLY]) JHB([
INFO-ONLY]) BVH([INFO-ONLY]) ; Sub-Collections: NIC FEEDBACK;
Clerk: DAP;

fixit

```
(fixup)                                                    1
  goto programs                                            1a
  load prog auxchr                                         1b
  quit to base                                             1c
  jum lin (O'Keefe, propsl, )                              1d
  in text %                                                1e
  inser text %%%%%%%%%%%                                   1f
  insert statement fixit,1a,tfixit,1f                      1g
  insert statement fixit,1a,tfixit,1g                      1h
  insert statement fixit,1a,tfixit,1h                      1i
  insert                                                   1j
  inser text %%%%%%%%%%%                                   1k
  insert statement fixit,1a,tfixit,1f                      1l
  insert statement fixit,1a,tfixit,1g                      1m
```

fixit

(J32394) 29-APR-75 15:05;;;; Title: Author(s): Pat Whiting
O'Keefe/PWO; Distribution: /GAS2([ACTION]) ; Sub-Collections: NIC;
Clerk: PWO; Origin: < O'KEEFE, FIXIT,NLS;1, >, 23-APR-75 13:00
PWO ;;;;####;

DAP 29-APR-75 20:17 32395

Subsystem ETSMEMO

Dean --

Your first try at my memo formatter is almost perfect...I'm enthused, I REALLY AM!

It needs two minor -- maybe three minor -- changes:

1. Kill the signature block in its entirety; a memo doesn't need one, and wouldn't no what to do with it if it had it.

2. The "From:" block should be on th left, aligned with the date block, right under it.

3. This will require (I think) moving the two right-hand blocks (date and from) a few spaces to the left in order to prevent overflow on the "from" line.

One question: is there anything that could be done to automatically accomodate relatively lengthy (verbose) subject blocks? I can handle this menually, but it would be nice if I didn't have to -- that is, it would be ideal if a subject title that pushed over too close (less than two spaces) to the date block could automatically overflow to the next line, something like this:

Subject: This memo has a very
long subject.

See what I mean? I think that would be a little bit tricky, but I figure if I don't ask I'll never know.

Meanwhile, I really think it's great. When points 1-3 are taken care of I think this little subsystem should be made available to the other architects to see if it might be of use to them...I think it would be. Good work!

A coupe comments on the subsystem's daddy, LETTER: it would be more useful to me if the program produced a format more like the usual letter format, e.g., statement numbers off, signature block containing name and title rather than name and organizational affiliation (after all, I'm not an Educational Testing SErvice, I'm a Research Psychologist). And the date block is funny, and letters don't generally have titles -- or journal numbers -- the thing seems to have been set up with the NLS Journal system in mind. 1

Subsystem ETSMEMO

(J32395) 29-APR-75 20:17;;;; Title: Author(s): David A. Potter/DAP;
Distribution: /NDM([ACTION]) FEEDBACK([INFO-ONLY]) JCN([
INFO-ONLY]) ; Sub-Collections: NIC FEEDBACK; Clerk: DAP;

JMB 30-APR-75 08:41 32396

Fix up the mail addresses for users of DSDC-SC"

HMH in directory DSDC-sc got his journal mail in Hardcipy mailed from ARC rather than online delivery. I cannot figure out why this i"s so. When I read the identfile record for hmh, the stuff related to mail address is like what's listed for my ident jmb, and I get my journal mail online. All the users in dir DSDC-SC would like to receive their journa mail online. Incidently, in the recent case where hmh recieved hardcopy mail, it was sent from another user of his directory. Is it correct to assume that ttis had nothing to do with it?.....jeanne b.

JMB 30-APR-75 08:41 32396

Fix up the mail addresses for users of DSDC-SC~

(J32396) 30-APR-75 08:41;;;; Title: Author(s): Jeanne M. Beck/JMB; Distribution: /FEEDBACK([ACTION]); Sub-Collections: SRI-ARC FEEDBACK; Clerk: JMB;

DLS 30-APR-75 08:53 32397

NSW Operations--dratt writeUp for the plan

Sorry for the lateness. There is overlap with systms integration functions which may need to be resolved.

NSW OPERATIONS 1

The goal of efforts in this functional area is to develop a stable, reliable, responsive and cost-effective service to NSW users. Since the NSW is the first of a class of distributed systems, aimed specifically at augmenting the programming environment of AF organizations and their contractors, special consideration must be given to its operation while it is still in development. Development funds and effort must be applied to devising operational policies and procedures if the NSW is to successfully make the transition from a R&D project to an operational system. 1a

The three NSW components requiring primary attention are: 1a1

The Works Manager, which provides a unified file system 1a1a

The Front End, which provides a coherent user interface to tools and the WM 1a1b

The "core tools", consisting of NLS and a Project Management tool 1a1c

The protocols that define the component and tool interfaces are also a critical part of the NSW, since they are the "glue" that holds it all together. 1a2

These components and protocols have elements of hardware, software, procedures, training and people that must all "do their thing" in a coordinated manner, before one can say that the NSW is operating properly. 1b

PROBLEMS 2

There will be parallel operation and development within the NSW world. Parts of the NSW and versions of the parts will be considered operational at any point in time. Criteria for deciding when a component or version moves from developmental to operational status must be clearly defined. 2a

Although the underlying mechanisms of the NSW should be almost "invisible" to the user, they must be highly visible to the operators and maintainers. Several levels of documentation on the system, its components and its protocols must be developed and maintained to support system management, maintenance, tool installation, training and trouble shooting. 2b

An environment must be created where tools can be readily added,

deleted and modified to meet the needs of a growing NSW user community. 2c

Guidelines, standards and ultimately certification procedures must be developed to allow the orderly modification of the core system and the addition of new tools and tool bearing hosts. 2c1

The financial manipulations necessary to purchase the access to tools and computer resources should also be as painless as possible. Contractual mechanisims must be established to provide for acquisition, accounting and billing for computer resources. 2d

Mechanisms have to be established to handle problems on a real-time basis and to provide feedback to system developers on efficiency and effectiveness. 2e

The NSW is dependent on the ARPANET for its basic communication for the forseeable future. Its components will run under different operating systems on several brands of hardware. These underlying hardware/software/communication systems must themselves be stable and reliable, if the NSW is to attain a service status. 2f

APPROACH 3

The approach in dealing with the above issues and bringing the NSW into the AF inventory will be to establish a NSW Operations Center (NOC). It will be established in-house at RADC and initially manned internally. As the NSW grows and the required level of manning increases, it will be supported by contactual assistance. After resolution of the key issues, establishment of operating policy and shakedown of procedures, the management of the NOC will be turned over to an AF (or DOD, if the Army and Navy join) organization with an operational mission. 3a

The NOC will use that portion of the NSW that is operational at any instant in time to perform its functions. The policy and procedures developed should therfore be based on practical experience rather than on intuitive speculation. 3a1

RADC will act as a broker, in planning for and procuring computer resources, training and documentation. They will monitor resource useage via the WM and issue the necessary invoices, and perform the contractual paperwork necessary to meet invoices from TBH and tool suppliers. 3a2

Why RADC 3b

experience with the ARPANET and NLS 3b1

experience gained in setting up the WUS 3b2

contractual focal point for NSW development 3b3

contact with other AFSC S/W development projects 3b4

within the mission to do "advanced development,..fine tuning, engineering, cost effectiveness 3b5

source of funds which can be used to support operational goals 3b6

TASKS 4

The following tasks need to be accomplished during the next 6-9 months to place the NSW in a position where it can begin operation. 4a

Documentation--NLS will be used to develop, deliver and update all NSW documentation. 4a1

establish a NSW documentation framework. 4a1a

develop a descriptive NSW systems document. 4a1b

develop a WM functional description document. 4a1b1

develop a FE functional description document. 4a1b2

develop a protocol functional description document. 4a1b3

develop a TBH specification document. 4a1c

develop a tool installation guide. 4a1d

develop a CML guide for tool installers. 4a1d1

develop a PMI functional description document. 4a1e

User guides 4a1f

devlop a NSW userguide. 4a1f1

modify the NLS userguide. 4a1f2

Help data bases 4a1g

update the NLS help data base. 4a1g1

develop a WM help data base. 4a1g2

Computer Resources--TENEX and MULTICS for the first year. 4a2

develop an integrated plan for computer resources required to support DSDC, DSC and RADC. 4a2a

establish contractual procedures for acquiring the necessary resources. 4a2b

determine an equitable means of distributing NSW overhead. 4a2b1

establish contractual procedures for "automatic" billing and payment. 4a2c

establish WM resource useage reports (detail, format and frequency). 4a2d

maintain historical resource useage record for future expenditure rate estimation. 4a2e

Training 4a3

establish course material and conduct training sessions in use of NSW and NLS. 4a3a

establish sylabus for training trainers at DSDC, DSC and RADC. 4a3b

define and implement basic lessons for NSW and NLS in SCHOLAR. 4a3c

Trouble shooting 4a4

establish NOC feeback capability for accumulating, classifying and analyzing problems and responses. 4a4a

Install WATS lines between NOC, the users and the principle NSW developers. 4a4b

establish fault isolation procedures. 4a4c

Contractual 4a5

interact with procurement to establish a smooth money transfer mechanism where there is: 4a5a

an NSW overhead that must be equitably distributed across users. 4a5a1

multiple suppliers of TBH's and tools, 4a5a2

with a mix of GFE, not for profit and profit, 4a5a2a

multiple users of subsets of these tools, 4a5a3

where the exact user-supplier matix cannot be completely determined ahead of time, 4a5a4

DLS 30-APR-75 08:53 32397

NSW Operations--draft writeup for the plan

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Demonstrating the Sendmail System

Just testing

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Demonstrating the Sendmail System

We are testing, or rather using the sendmail system to prove that it can go to more than one person in a directory if both idents of the individuals are specified. 1

Demonstrating the Sendmail System

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