JCN 12-MAY-72 18:30 10371

SUGGESTED ARC TIME CHARGE "BASE ACCOUNTS" BY PERSON

The following are "home base" accounts chosen (very arbitrarily) by JCN to aid people in starting to use the new ARC project and overhead subnumbering system when filling out their time sheets this Friday. There are obviously some people who will need to spread their time charges over many accounts. These are the suggested accounts for now: 1

Note that: 1a

PODAC meetings are still to be charged to overhead: 750543. 1a1

LINAC, FRAMAC and PERC meetings should be charged to 750512 (except for DCE who charges 750511) 1a2

Project 1868 - (subnumber listed below): 1b

(106) M.F. Auerbach 1b1
(204) W.L. Bass 1b2
(208) W.S. Duvall 1b3
(104) W.R. Ferguson 1b4
(105) B.A. Hardeman 1b5
(102) M.E. Hardy 1b6
(208) J.D. Hopper 1b7
(203) C.H. Irby 1b8
(208) D.S. Kaye 1b9
(202) M.D. Kudlick 1b10
(105) L.L. Lane 1b11
(208) H.G. Lehtman 1b12
(102) D. Limuti 1b13
(105) P.M. Lister 1b14
(601) J.B. North 1b15
(605) C. Page 1b16
(702) W.H. Paxton 1b17
(102) J.C. Peters 1b18
(104) R. Prather 1b19
(102) J. Ratliff 1b20
(105) B.E. Row 1b21
(208) J.F. Vallee 1b22
(102) E.K. Van De Riet 1b23
(103) K.E. Victor 1b24
(103) D.C. Wallace 1b25
(601) R.W. Watson 1b26
(606) J.E. White 1b27

Project 8622 - (subnumber listed below): 1c

(805) M.E. Jernigan 1c1

Project 1894 - (subnumber listed below): 1d

(901) J.C. Norton 1d1
(901) P. Rech 1d2
(901) D.H. van Nouhuys 1d3

SUGGESTED ARC TIME CHARGE "BASE ACCOUNTS" BY PERSON

Overhead: 750 + (subnumber listed below): 1e
(511) D.C. Engelbart 1e1

As we learn more about the process of having people charging several tasks they are really working on (after agreements with the Pushers of those tasks), we can begin to get some better recording of our efforts by task. Until then, the above "home base" number set will aid where other appropriate numbers are hard to determine. 2

James C. Norton
Augmentation Research Center
Stanford Research Institute
Menlo Park, California 94025

To:
Access Copy

10372

JCN 10-MAY-72 7:57 10372

Fans for the ARC Conference Room - A Request

(J10372) 10-MAY-72 7:57; Title: Author(s): James C. Norton/JCN;
Distribution: Douglas C. Engelbart, Walt Bass, Charles H. Irby, Michael D. Kudlick, James C. Norton, William H. Paxton, Paul Rech, Richard W. Watson, Dirk H. van Nouhuys, Kenneth E. Victor/PERC DVN KEV;
Sub-Collections: SRI-ARC PERC; Clerk: JCN;
Origin: <NORTON>FANS.NLS;2, 10-MAY-72 7:50 JCN ; HJOURNAL="JCN 20 MAY 72 6:05AM 10372";

JCN 10-MAY-72 7:57 10372
Fans for the ARC Conference Room - A Request

TO: Bob Wing 1

From: Jim Norton cc: ARC PERC, KEV, DVN

---------- 2

We have a problem with the use of our conference room (J2077) in that the ventilation is insufficient. When the doors are closed for a meeting of more than ten or so people the room becomes quite stuffy. The problem becomes more aggravated if there are any people who smoke in the room. 3

We hold meetings of this size several times a week. 3a

Groups of as many as 40 people have been given demonstrations of the ARC system in the room in the past. We expect an increasing use of the facility for such demonstrations to SRI and other ARC visitors. The temperature and stuffiness of the room has seriously affected such presentations, even with the doors open. 3b

We need to do something about the problem. 3c

Perhaps a couple of exhaust fans in the ceiling would solve the problem. Or would more air conditioning need to be added? 3c1

Could you help us find the right solution? 3d

Additional Notes on the ARC-RADC Meeting - JCN April 25-26

Duane Stone's meeting notes (see -- 10327,1:xbn) present a good picture of the discussions that took place in April at RADC between ARC and RADC personnel. The following are some ideas that were noted by JCN. They are offered here for the record. 1

1. ARC's suggested meeting objectives were used as the agenda for the two-day discussions. (see -- 10362,1:xbn) 1a

2. Both RADC and ARC agreed that since it does not appear feasible to transfer ARC augmentation technology directly into the Air Force operating environments, one of the prime purposes of the RADC-ARC joint effort is to develop in a "non-critical, but real" AF environment, applications of the technology to real AF problems ... those centered on planning of team efforts. 1b

3. ARC requested an online RADC organization chart, clearly showing the relationshhip of the RADC group to the rest of the Center. Make it hierarchical? 1c

4. RADC may wish to change the passwords of its users in the interest of keeping the few sensitive documents it may have online more secure. Details on how to use the TENEX file access restriction features will be outlined for RADC use by ARC soon. (see -- 10341,) 1d

5. John McNamara's two week trial of having both of his groups (AHI and "the other one") update their Effort Writeups was discussed. It appears that although the AHI group experienced periods of ARC system or RADC TIP unavailability, they were able to complete the process while the other group was not yet done. Obviously this may be attributable to several possible factors ...but at least the AHI group didn't come in last. 1e

6. The present RADC NLS users are: 1f

Roger Panera
Joe Cavano (1/2 time)
Duane Stone
Tom Lawrence
Jim Bair
Marcel Petell .... who is just starting to learn 1f1

7. The RADC Effort Writeups should be identified for ARC to see (see -- 10327,1c2) and should also be entered into the Journal, even if only in draft stage now. They can be so marked. This will give us stationary targets to refer to in

our work and will also afford some picture of their development. 1g

8. The question of how to continue TNLS printouts (in the Output Device Teletype mode) after the process has stopped was discussed. 1h

The possibility of a special directive gathering program was mentioned. 1h1

Temporary solutions were offered: 1h2

One can attatch to the detached job and continue if being detached is the problem. 1h2a

One can copy the origin statement (or just its directives) to the end of the text of the last statement previously printed. This will miss added or offsetting directives in the first part of the document, but will permit the printout to be controlled by what are usually the main key directives. The file should be unlocked after such a process to restore it to its original state. 1h2b

9. DLS says that the Effort Writeups are the heart of the RADC BMS. 1i

10. There was discussion of how RADC AHI people (including Frank Tomaini) now do their writing. This has a bearing on the training situation as they begin to move their material online. 1j

It appears that although some dictation to machines occurs, most of the writing is done by making handwritten drafts and then having typed them by secretaries, some using the MTST system. 1j1

11. The need for the AF to eventually augment the SPO's (System Project Officers) was discussed. This is a possible goal that RADC should keep in mind when looking into the area of potential application in other parts of the AF. 1k

12. There will be a need for seminars on the use of L10 to write user programs. When to do this is not yet established. Possibly, we should hold a brief introduction seminar on the next visit just to establish a basic understanding of the process. 1l

13. John McNamara said that he wants to have 30 RADC NLS users by July 1973. 1m

Future planning needs to be done during the next few months is this is to happen. It is not now in ARC's plans. 1m1

Added NLS service capacity (with a utility like Tymshare?) would need to be added. 1m2

The state of the training and overall RADC BMS system design and implementation at that time will also bear on this question. 1m3

JCN said that the cost of the added service when provided under such an arrangement is not now known. We hope to get a better idea of the cost per user hour during the next few months. 1m4

RADC should be prepared to provide funding at a fairly high level, however, in light of the heavy system use implied in the system being developed by their people. DEX use may of course reduce some of the higher costs that display NLS use would require. 1m4a

14. Re: Privacy of users files in their directories: JCN stated that ARC would prepare a memo on the subject. DCE may do this. 1n

15. Since user motivation is a key to the success of the RADC BMS (and ARC's), we will center on this in the design and introduction of the system at RADC. 1o

16. John McNamara stressed the need for "private trial sessions" for individual users as they are learning the system. This permits them to make mistakes they need to make in the process of learning without the fear of others being critical of them. This, in conjunction with training sessions, of course. 1p

17. We discussed the need for the RADC-ARC training team to get "state of learning" profiles on the RADC users at various stages to follow their development. 1q

How to do this is not yet clear, but it seems to be an idea worth trying. 1q1

18. We discussed DLS search for printers for RADC. 1r

He is considering two at the present time: 1r1

Honeywell 316 and Vogue printers. Details should be noted in the Journal as they become available. 1r2

Augmenting Human Intellect: A Conceptual Framework
A Structured Version of the (3906,) October 1962 Introduction

CONTENTS (of the entire 1962 document) 1

Augmenting Human Intellect: A Conceptual Framework
A Structured Version of the (3906,) October 1962 Introduction

INTRODUCTION

Note: The remaining parts of the original document are still in the process of being transcribed. This Introduction is produced now for use in early FRAMAC discussions. The rest will be forthcoming and entered into the Journal as soon as possible, hopefully in the next few weeks.

*** THIS VERSION HAS BEEN HIERARCHICALLY STRUCTURED TO LEVELS NOT SO STRUCTURED IN THE ORIGINAL DOCUMENT ***

JCN 5/12/72 2

A. GENERAL 2a

By "augmenting human intellect" we mean increasing the capability of a man to approach a complex problem situation, to gain comprehension to suit his particular needs, and to derive solutions to problems. 2a1

Increased capability in this respect is taken to mean a mixture of the following: 2a1a

more-rapid comprehension, 2a1a1

better comprehension, 2a1a2

the possibility of gaining a useful degree of comprehension in a situation that previously was too complex, 2a1a3

speedier solutions, 2a1a4

better solutions, 2a1a5

and the possibility of finding solutions to problems that before seemed insoluble. 2a1a6

And by "complex situations" we include the professional problems of 2a1b

diplomats, 2a1b1
executives, 2a1b2
social scientists, 2a1b3
life scientists, 2a1b4
physical scientists, 2a1b5
attorneys, designers 2a1b6

--whether the problem situation exists for twenty minutes or twenty years. 2a1c

We do not speak of isolated clever tricks that help in particular situations. 2a1d

We refer to a way of life in an integrated domain where hunches, cut-and-try, intangibles, and the human "feel for a situation" usefully co-exist with powerful concepts, streamlined terminology and notation, sophisticated methods, and high-powered electronic aids. 2a1d1

Man's population and gross product are increasing at a considerable rate, but the complexity of his problems grows still faster, and the urgency with which solutions must be found becomes steadily greater in response to the increased rate of activity and the increasingly global nature of that activity. 2a2

Augmenting man's intellect, in the sense defined above, would warrant full pursuit by an enlightened society if there could be shown a reasonable approach and some plausible benefits. 2a2a

This report covers the first phase of a program aimed at developing means to augment the human intellect. 2a3

These "means" can include many things--all of which appear to be but extensions of means developed and used in the past to help man apply his native sensory, mental, and motor capabilities--and we consider the whole system of a human and his augmentation means as a proper field of search for practical possiblities. 2a3a

It is a very important system to our society, and like most systems its performance can best be improved by considering the whole as a set of interacting components rather than by considering the components in isolation. 2a3b

This kind of system approach to human intellecutal effectiveness does not find a ready-made conceptual framework such as exists for established disciplines. 2a4

Before a research program can be designed to pursue such an approach intelligently, so that practical benefits might be derived within a reasonable time while

also producing results of long-range significance, a conceptual framework must be search out 2a4a

--a framework that provides orientation as to the important factors of the system, the relationships among these factors, the types of change among the system factors that offer likely improvements in performance, and the sort of research goals and methodology that seem promising. 2a4a1

In the first (search) phase of our program we have developed a conceptual framework that seems satisfactory for the current needs of designing a research phase. 2a5

Section II contains the essence of this framework as derived from several different ways of looking at the system made up of a human and his intellect-augmentation means. 2a5a

The process of developing this conceptual framework brought out a number of significant realizations: 2a6

that the intellectual effectiveness exercised today by a given human has little likelihood of being intelligence limited 2a6a

--that there are dozens of disciplines in engineering, mathematics, and the social, life, and physical sciences that can contribute improvements to the system of intellect-augmentation means; 2a6b

that any one such improvement can be expected to trigger a chain of coordinating improvements; 2a6c

that until every one of these disciplines comes to a stand-still and we have exhausted all the improvement possibilities we could glean from it, we can expect to continue to develop improvements in this "human-intellect" system; 2a6d

that there is no particular reason not to expect gains in personal intellectual effectiveness for a concerted system-oriented approach that compare to those made in personal geographic mobility since horseback and sailboat days. 2a6e

The picture of how one can view the possibilities for a systematic approach to increasing human intellectual

effectiveness, as put forth in Section II in the sober and general terms of an initial basic analysis, does not seem to convey all of the richness and promise that was stimulated by the development of that picture. Consequently, 2a7

Section III is intended to present some definite images that illustrate meaningful possibilities deriveable from the conceptual framework presented in Section II--and in a rather marked deviation from ordinary technical writing, a good portion of Section III presents these images in a fiction-dialogue style as a mechanism for transmitting a feeling for the richness and promise of the possibilities in one region of the "improvement space" that is roughly mapped in Section II. 2a7a

The style of Section III seems to make for easier reading. If Section II begins to seem unrewardingly difficult, the reader may find it helpful to skip from Section II-B directly to Section III. 2a8

If it serves its purpose well enough, Section III will provide a context within which the reader can go back and finish Section II with less effort. 2a8a

In Section IV (Research Recommendations) we present a general strategy for pursuing research toward increasing human intellectual effectiveness. 2a9

This strategy evolved directly from the concepts presented in Sections II and III; one of its important precepts is to pursue the quickest gains first, and use the increased intellectual effectiveness thus derived to help pursue successive gains. 2a9a

We see the quickest gains emerging from 2a9b

(1) giving the human the minute-by-minute services of a digital computer equipped with computer-driven cathode-ray-tube display, and 2a9b1

(2) developing the new methods of thinking and working that allow the human to capitalize upon the computer's help. 2a9b2

By this same strategy, we recommend that an initial research effort develop a prototype system of this sort

aimed at increasing human effectiveness in the task of computer programming. 2a9c

To give the reader an initial orientation about what sort of thing this computer-aided working system might be, we include below a short description of a possible system of this sort. 2a10

This illustrative example is not to be considered a description of the actual system that will emerge from the program. 2a10a

It is given only to show the general direction of the work, and is clothed in fiction only to make it easier to visualize. 2a10b

Let us consider an "augmented" architect at work. He sits at a working station that has a visual display screen some three feet on a side; this is his working surface, and is controlled by a computer (his "clerk") with which he can communicate by means of a small keyboard and various other devices. 2a11

He is designing a building. He has already dreamed up several basic layouts and structural forms, and is trying them out on the screen. 2a12

The surveying data for the layout he is working on now have already been entered, and he has just coaxed the "clerk" to show him a perspective view of the steep hillside building site with the roadway above, symbolic representations of the various trees that are to remain on the lot, and the service tie points for the different utilities. 2a12a

The view occupies the left two-thirds of the screen. 2a12b

With a "pointer", he indicates two points of interest, moves his left hand rapidly over the keyboard, and the distance and elevation between the points indicated appear on the right-hand third of the screen. 2a12c

Now he enters a reference line with his "pointer" and the keyboard. Gradually the screen begins to show the work he is doing--a neat excavation appears in the hillside, revises itself slightly, and revises itself again. 2a13

After a moment, the architect changes the scene on the

screen to an overhead plan view of the site, still showing the excavation. 2a13a

A few minutes of study, and he enters on the keyboard a list of items, checking each one as it appears on the screen, to be studied later. 2a13b

Ignoring the representation on the display, the architect next begins to enter a series of specifications and data--a six-inch slab floor, twelve-inch concrete walls eight feet high within the excavation, and so on. 2a14

When he has finished, the revised scene appears on the screen. 2a14a

A structure is taking shape. He examines it, adjusts it, pauses long enough to ask for handbook or catalog information from the "clerk" at various points, and readjusts accordingly. 2a14b

He often recalls from the "clerk" his working lists of specifications and considerations to refer to them, modify them, or add to them. These lists grow into an ever-more-detailed, interlinked structure, which represents the maturing thought behind the actual design. 2a14c

Prescribing different planes here and there, curved surfaces occasionally, and moving the whole structure about five feet, he finally has the rough external form of the building balanced nicely with the setting and he is assured that this form is basically compatible with the materials to be used as well as with the function of the building. 2a15

Now he begins to enter detailed information about the interior. 2a16

Here the capability of the "clerk" to show him any view he wants to examine (a slice of the interior, or how the structure would look from the roadway above) is important. 2a16a

He enters particular fixture designs, and examines them in a particular room. 2a16b

He checks to make sure that sun glare from the windows will not blind a driver on the roadway, and the "clerk" computes the information that one window will reflect

strongly onto the roadway between 6 and 6:30 on midsummer mornings. 2a16c

Next he begins a functional analysis. 2a17

He has a list of the people who will occupy this building, and the daily sequences of their activities. 2a17a

The "clerk" allows him to follow each in turn, examining how doors swing, where special lighting might be needed. 2a17b

Finally he has the "clerk" combine all of these sequences of activity to indicate spots where traffic is heavy in the building, or where congestion might occur, and to determine what the severest drain on the utilities is likely to be. 2a17c

All of this information (the building design and its associated "thought structure") can be stored on a tape to represent the "design manual" for the building. 2a18

Loading this tape into his own "clerk", another architect, a builder, or the client can maneuver within this "design manual" to pursue whatever details or insights are of interest to him--and can append special notes that are integrated into the "design manual" for his own or someone else's later benefit. 2a18a

In such a future working relationship between human problem-solver and computer "clerk", the capability of the computer for executing mathematical processes would be used whenever it was needed. 2a19

However, the computer has many other capabilities for manipulating and displaying mathematical processes of planning, organizing, studying, etc. 2a19a

Every person who does his thinking with symbolized concepts (whether in the form of the English language, pictographs, formal logic, or mathematics) should be able to benefit significantly. 2a19b

B. OBJECTIVE OF THE STUDY 2b

The objective of this study is to develop a conceptual framework within which could grow a coordinated research and development program whose goals would be the following: 2b1

(1) to find the factors that limit the effectiveness of the individual's basic information-handling capabilities in meeting the various needs of society for problem solving in its most general sense; and 2b1a

(2) to develop new techniques, procedures, and systems that will better match these basic capabilities to the needs, problems, and progress of society. 2b1b

We have placed the following specifications on this framework: 2b1c

(1) That it provide perspective for both long-range basic research and research that will yield practical results soon. 2b1c1

(2) That it indicate what this augmentation will actually involve in the way of changes in working environment, in thinking, in skills, and in methods of working. 2b1c2

(3) That it be a basis for evaluating the possible relevance of work and knowledge from existing fields and for assimilating whatever is relevant. 2b1c3

(4) That it reveal areas where research is possible and ways to assess the research, be a basis for choosing starting points, and indicate how to develop appropriate methodologies for the needed research. 2b1c4

Two points need emphasis here. 2b1d

First, although a conceptual framework has been constructed, it is still rudimentary. 2b1d1

Further search, and actual research, are needed for the evolution of the framework. 2b1d1a

Second, even if our conceptual framework did provide an accurate and complete basic analysis of the system from which stems a human's intellectual effectiveness, the explicit nature of future improved

systems would be highly affected by (expected) changes in our technology or in our understanding of the human being. 2b1d2

JCN 7-MAY-72 18:23 10375
Initial Design for New System Use Accounts

The following ideas are presented for criticisms, suggestions, comments, etc., in the interest of coming to a commonly accepted design for the accounting of ARC system use we so badly need. 1

Please let me have any feedback you wish to offer. 1a

INTRODUCTION 2

With the introduction of a new ARC accounting system for project subnumbers (see -- 10367,), we plan to set up a corresponding set of TENEX account numbers for use by ARC people in their daily online work sessions. 2a

At present, TENEX allows almost any alphanumeric account numbers to be given by users. Network users are giving a specially designed set of alpha accounts when they enter. 2a1

There is a daily detailed record made of CPU, console, and file storage use by user and by account number. These records are kept on factfiles that are closed and archived nightly by Ralph Prather, our operator. 2a2

There is a subsystem named <ACCOUNTS> that permits us to summarize these charges. Robert Dendy was producing trial cost summaries while he was here. 2a3

These provided a reasonably good picture of system use. 2a3a

The introductiion of our auto logout feature will make the console use figures more meaningful than they were previously. 2a3b

Production of these summaries will be resumed soon, probably to be run by Ralph. 2a3c

AN INITIAL SCHEME 3

The initial system-use accounting scheme envisioned will consist of the following features: 3a

There will be a set of offically-approved accounts allowed for entry by users of the ARC system. Any other accounts entered will not be accepted by the system. 3a1

When a user logs in, he will be asked for an account by the system as at present. 3a2

If he wishes to use the default account (to be asigned

to him soon), he may answer with a CR (null) and that account will be assumed. 3a2a

If he wishes to enter a different valid account, the session use will be charged to that account until such time as he changes the account to be charged by use of the TENEX change-account command. 3a2b

The command is: CHANGE [(account # to)] xxxx CR. 3a2b1

A new NLS account status and change command set needs to be designed and implemented soon to make the changes easier for users. 3a2b2

If he enters an invalid account, the system will ask for another, valid one. 3a2c

If he is a guest, he will enter the account "GUEST". This will be monitored to see that it is used as intended. 3a2d

ACCOUNT "1" NOW IN USE BY MOST ARC USES WILL NO LONGER BE VALID. 3a2e

There will be account listings posted conveniently at ARC and also listed in an easily reached Journal file on-line for reference when needed for other than default account number use. 3a3

The weekly accounting summaries for system use will be resumed and entered into the Journal for more visibility. 3b

There are variable charge rates built into the TENEX accounts summary system. These are now set at rates that do not match our overall costs. 3b1

We plan to experiment by setting rates that more closely result in the "paper recovery" of costs incurred monthly, even though we do not plan to actually send real bills for system use to users. These trials will help prepare us for the time when we DO charge users (outside of ARC) for system use. 3b1a

We will use these charge amounts to see what ARC use costs, by project, task, etc. 3b1b

A note for the future: when the Baseline Record System task framework has been re-arranged to match the new ARC project subnumber system (see -- 10367,4c), we will

consider the design where individual tasks will have numbers that relate to the higher level activity numbers of the project subnumber set. 3b2

This will permit us to work toward getting more detailed records of the actual system use costs by task. This stage will not be attempted until the initial use of system accounts has proven to be accepted and runs smoothly. 3b2a

ACCOUNTS TO START WITH 4

A suggested set of valid accounts follows: 4a

ARC project and overhead accounts: 4a1

OPERATIONS 4a1a

101 Administration 4a1a1
102 CSO - Hardware 4a1a2
103 CSO - Software 4a1a3
104 CSO - Operators 4a1a4
105 PSO - General 4a1a5
106 User Interface 4a1a6

DEVELOPMENT 4a1b

201 Development Coordination 4a1b1
202 Delivery 4a1b2
203 DSS - Dialog Support System 4a1b3
204 DPCS - Documentation Production and Support SYstem 4a1b4
205 BRS - Baseline Record System 4a1b5
206 SDHS - System Developers Handbook System 4a1b6
207 SEAS - Software Engineering Augmentation System 4a1b7
208 Basic NLS development 4a1b8
209 Other development 4a1b9

MINI-CONSOLE 4a1c

301 Administration 4a1c1
302 System Development 4a1c2

IPT 4a1d

401 Administration 4a1d1

NIC 4a1e

601 Administration 4a1e1
603 CSO 4a1e2
605 PSO 4a1e3
606 Net interface 4a1e4
(includes station agent, Liaison and Net participation) 4a1e4a
607 NIC Development 4a1e5

XEROX 4a1f

701 Administration	4a1f1
702 MPS development	4a1f2
SDIS (RINS)	4a1g
801 Administration	4a1g1
808 SDIS - System Developers Intelligence System	4a1g2
RADC	4a1h
901 Administration	4a1h1
905 Baseline Management System Development Support	4a1h2

SRI overhead codes: 4a1i

Code No.	Title	
511	Administration and Planning - General	4a1i2
512	Administration and Planning by Project Professionals	4a1i3
521	Institute Publication	4a1i4
522	Technical Papers	4a1i5
523	SRI-sponsored Symposia and Seminars	4a1i6
524	Non SRI-sponsored Symposia and Seminars	4a1i7
525	Client Liaison	4a1i8
531	Institute Research and Development	4a1i9
541	Formal Education Courses	4a1i10
542	Orientation and Staff Training	4a1i11
543	Staff Development	4a1i12
544	Overseas Travel	4a1i13
551	Recruiting	4a1i14
552	Relocations and Transfers	4a1i15
561	Facilities Expense and Support Services	4a1i16
562	Laboratory Equipment Calibration and Repair	4a1i17
563	Other Maintenance	4a1i18
564	Minor Construction Work Orders	4a1i19
571	Interim Technical Study	4a1i20
581	Proposal Liaison	4a1i21
582	Concept Formulation	4a1i22
583	Proposal Preparation	4a1i23

Network users accounts: 4a2

AMES-ILLIAC	4a2a
BBN-IMP	4a2b
BBN-TENEX	4a2c
..... and so on for each site	4a2d

ARC "system" use accounts 4a3

220100 plus others? 4a3a

Special "no-charge" guest account: 4a4

GUEST 4a4a

POSSIBLE INITIAL DEFAULT ACCOUNTS BY BY PERSON 5

These dafault accounts are chosen very arbitrarily as a start. There are obviously some people who will need to spread their system use charges over many accounts. These are the suggested "home base" accounts for now: 5a

(103) D.I. Andrews 5b
(106) M.F. Auerbach 5c
(204) W.L. Bass 5d
(208) W.S. Duvall 5e
(511) D.C. Engelbart 5f
(104) W.R. Ferguson 5g
(105) B.A. Hardeman 5h
(102) M.E. Hardy 5i
(208) J.D. Hopper 5j
(203) C.H. Irby 5k
(105) M.E. Jernigan 5l
(208) D.S. Kaye 5m
(202) M.D. Kudlick 5n
(105) L.L. Lane 5o
(208) H.G. Lehtman 5p
(102) D. Limuti 5q
(105) P.M. Lister 5r
(601) J.B. North 5s
(101) J.C. Norton 5t
(605) C. Page 5u
(702) W.H. Paxton 5v
(102) J.C. Peters 5w
(104) R. Prather 5x
(102) J. Ratliff 5y
(901) P. Rech 5z
(105) B.E. Row 5a*
(208) J.F. Vallee 5aa
(102) E.K. Van De Riet 5ab
(101) D.H. van Nouhuys 5ac
(103) K.E. Victor 5ad
(103) D.C. Wallace 5ae
(601) R.W. Watson 5af
(606) J.E. White 5ag

HGL 7-MAY-72 19:32 10376

NEW NLS BROUGHT UP ON SUNDAY

New NLS brought up this weekend with Walter's dynamic user program buffer allocator. Let us know if there is any trouble.... HGL 1

DLS 8-MAY-72 6:28 10377

BC Needs and Possibilities Notes: DCE 17 MAY 72 4:13AM

This is the first record of a mmeting between DCE & DLS when we were in the formative stages of how to use/evaluate AHI. It is being entered into the journal for historical purposes--was held 20JUN71.

New notes -- 17 June 71 1

With Duane Stone, re. ARC/RADC working relationships 1a

Possibly they might benefit by pushing on local establishment of a DPCS, for their use, or for some other Air-Force group. 1a1

We'd like to see the use initally aim toward documentation of computer systems, since this would provide much better bootstrapping coordination with activity by ARC and any other people we can get to go along similar paths (e.g. ILLIAC, EIN, etc ...) 1a1a

1a1b

Documents with mixed text amd graphics: hardwae, software, syystem analysis, project mangement (baseline, PERT, etc.) 1a1c

A group in RADC maintains officia JOVIAL manual. 1a1d

One local task they are cnsidering is to support their "Program Call," which is a intensive review activity of their planning statements for their programs. 1a2

This is an annual exercise, normally during November-December at he section level. 1a2a

Duane thinks that the genera level of fule security that TENEX offers would be adequate. 1a2b

A reaonable DPCS would serve well -- even with one-day turn around. 1a2c

If they had an IMLAC for quick review and updating, would help beyond that. 1a2d

Basic scheduling data: 1a3

Their TIP is scheduled for 1 Oct. 1a3a

Local Printout: Could fund a new-buy, 1a3b

otherwise like a TTY37. 1a3b1

They have two prototype 37's owned by Teletype Corp, maintained by a local guy (but not well) 1a3b1a

They have been looking into electrostatic copier, working from face of a CRT. 1a3b2

Have some MTSTs. 1a3b3

Duane thinks that there is a coupler available now to hook an MTST unit to a phone line. 1a3b3a

Would we have a suggestion? 1a3b4

DATA PRODUCTs printer, like ours, only usingthe desk-top model, would be a solid way to start. 1a3b4a

Possibilities for direct collaboration. 1a4

Consider RADC's shipping us a fixed-dollar parcel, for between now and end of contract, to cover both ARC-personnel and -computer services. We set about adding staff to be able to meet our other cmmitments while providing this interface. We work on some reasonable guess for how to increment service capacity so that RADC's usage doesn't intrude upon ARC's or NIC's other commitments. 1a4a

Configuration possibility at RADC: 1a5

n on-line typewriters 1a5a

Two Execuports now, with two bad TTTY37s, some o.k. TTY33s generally available -- at least two of which have paper-tape punches. 1a5a1

Table-top line printer (lease this, so later can go to graphic system -- like Gould and PDP-11?) 1a5b

Some spooling-input, off-line terminals 1a5c

33ASRs, or some special, Selectric-cassette terminals 1a5c1

A spooled-data reader terminal 1a5d

One IMLAC, with mouse and keyset 1a5e

While IMLAC working on 1800-bauc moem, could perhaps connect the spooled-data reader and the line printer to work off it. 1a5e1

(How about a TEKTRONIX display-printout termina??) 1a5f

Possibility of ARC procuring a coordinated package of hardware for RADC -- it be installed there more or less by contract through us. 1a6

Two components of hhelp here (possibly): 1a6a

getting the specs, cost/tradeoffs, etc 1a6a1

procuremnt help 1a6a2

Sometimes it is hard for them to be quick and flexible about their acquisition. 1a6b

This might be especially attractive if combined with NASA and even EIN DPCS-facility development. 1a6c

He'll develop a sort of scenario for the Program-Call process, so we could look at it and help evalute that as a test thing for their use of NLS tools. 1a7

Do it on TNLS, and stick it in the Journal. 1a7a

RWW 8-MAY-72 8:44 10378

Visit Log to System Concepts 5-5-72

Friday May 5, I went up to SF to see Mike Levitt at System Concepts. 1

System Concepts is known to ARC and as you know does custom hardware work and the associated software to support it. SC has built hardware for several ARPA contractors and others. 2

Inspection of work in progress impressed me by the quality of workmanship they are doing. 3

They are presently planning a "IMLAC" like system based on PDP-11 type processor about 3 times th PDP-11 speed and 18 bits instead of 16. They expect to sell an 8k version for around 17k $. The display processor can drive several displays and have unlimited push down list subroutine linkages. The system will have a large 21 or 24 inch tube. They expect the prototype to be working in mid summer and hope to sell 30 or so to MIT-MAC. 4

I told them we were leery of one of a kind stuff and that we would probably not be very interested in the display untill they had built and sold quite a few, but that we would like to see the prototype when it was running. 5

They are installing a drum controller to Suppes 10 and would keep me informed to demonstrate the speed of acceptance and reliability. 6

DVN 8-MAY-72 9:23 10379

1971 Rome Report:(documentation, section-I,) went bad.

Bill, the file to which you submitted your writeup of the dialog suport system, namely (documentation,section-I,1a), went bad and we had to go back to a version before you put your stuff in. Can you replace it out of your files? If not let me know where to find it on the dump; failing that we happen to have a printout. 1

PL 8-MAY-72 12:22 10382

Baseline Task View File -- 8 May 1972

Bill and Don -- your Baseline Task View file is ready -- 8 May 1972. 1

PL 8-MAY-72 12:22 10382

Baseline Task View File -- 8 May 1972

(J10382) 8-MAY-72 12:22; Title: Author(s): Priscilla Lister/PL;
Distribution: William S. Duvall, Don I. Andrews/WSD DIA;
Sub-Collections: SRI-ARC; Clerk: PL;

MFA 8-MAY-72 13:56 10384

re: <documentation>request

You're right - not only does it seem not to work, but it indeed does not work through no fault of your own. Any file not referenced within the last 30 or so days is automatically archived by the system to save space. "Request" had fallen into that category. I'll have to design somthing that allows for apathy and inattention. Why don't you send me something appropriate through the Journal and I'll work at building a better mousetrap (bugtrap???). Sorry for the hassle and thanks for the note. M.

1

DVN 8-MAY-72 14:30 10387

Authorship of the 1971 Report to Rome:a tentative plan

I have collected response to my note on authorship in (journal,10088,7) and formed a tentative plan: 1

A page in the front matter will give credit to the entire staff as in the past (journal,8277,2). 1a

Authorship, in the sense in which technical journal articles have authroship, will appear at the head of each large secttion as appropriate. 1b

The outline below is a first cut at attributing authorship. 1b1

Head Matter [None] 1b1a

Abstract [None] 1b1b

Summary [None] 1b1c

I Team Augmentation
by Charles H Irby, William H Paxton, William S Duval, James C Norton, Bruce L Parsley, Mary S Church, Harvey G Lehtman, Waltter L Bass, J David Hopper, Douglas C. Englebart, L Peter Deutch, James L. Mitchell 1b1d

II NIC Development and Operations
by Richard W Watson [RWW may want to add names] 1b1e

III Network Participation
by Richard W Watson [RWW may want to add names] 1b1f

IV Computer Facility
by Donald S Wallace, James C Norton, John T Melvin, Donald I Andrews Edward K van de Reit, Kenneth E Victor 1b1g

V Plans James C Norton, Richar W Watson, Douglas C. Engelbart 1b1h

Glossary [None] 1b1i

Index [None] 1b1j

Appendices (?) 1b1k

I will insert a paragraph in the credits and the summary expalining our authorship conventions. 1c

If you prefer some other plan, or feel the names should change in this plan, please let me know. 2

again

this is a message tom me once again maybe i'll get it
if so it will ce interesting none have come thru 1

again

(J10388) 8-MAY-72 14:57; Title: Author(s): Stanley Cohen/SC;
Distribution: Stanley Cohen/SC; Sub-Collections: NIC; Clerk: SC;

WLB 8-MAY-72 17:04 10389

User Programs Buffer Size Change and Command

If you've been having trouble with compiling user programs, this memo may help.

User Programs Buffer Size Change and Command

There is a new command for changing the size of the user programs buffer: 1

g[oto] p[rograms] b[uffer size] <number> CA [in TNLS -- CA] 1a

where <number> is the number of pages (512 words each) to be allocated to the user programs buffer. 1b

The user programs buffer shares memory with data pages for files which the user has open -- i.e., increasing the size of the user programs buffer decreases the amount of space available for file data (with a possible slowdown in response for that user). 2

As a result of this consideration, the user programs buffer size has been reduced from the previous fixed size of 16 pages to a current initial size of 4 pages. 2a

This means that some programs which formerly compiled OK may not compile anymore until the buffer size has been increased using the GPB command -- i.e., if you get strange "SYSTEM ERROR" messages when attempting to compile a user program, try increasing the buffer size and recompiling before panicing. 2b

We're sorry for any inconvenience this change may cause, but think that the overall improvement in performance and capability will more than offset it. 2c

RMS 8-MAY-72 17:23 10390

A Test Of My Journal Skills

This is an exercise in using the NLS Journal Subsystem. I had hopes of issuing this message without assigning a NIC Catalog number. I have discovered that the system prevents you from doing
that. However, I am assured by NIC personnel that NIC #'s are cheap. It seems wasteful to assign a number for a document which is a heap of crap. But then again, this is a characteristic which is not unique to this document.

new paragraph. bla,bla,...,bla. end paragraph. 1

new jsys

```
;  RTRMT - JSYS 525 - READ TERMINAL TYPE JSYS                          1
;                                                                      2
;  ACCEPTS:                                                            3
;       IN 1:  BITS 0-17 - LINE NUMBER (-1 MEANS CONTROLLING TTY)      4
;                                                                      5
;  RETURNS:                                                            6
;       +1: ERROR RETURN, WITH ERROR CODE IN 1                         7
;                STRX1 - ILLEGAL COMBINATION OF PARAMETERS (BAD
LINE #)                                                                8
;       +2: SUCCESSFUL WITH R1 AS FOLLOWS:                             9
;                BITS 0-17 - LINE NUMBER                               10
;                BITS 26-29 - GRID TYPE (SEE STRMT)                    11
;                BITS 30-35 - TERMINAL TYPE (SEE STRMT)                12
;                                                                      13
```

Principles of Chi (First Guess)

Chi is the Life Energy which manifests as the Universe. 1

Chi has an active principle, which is Memory directing Action, and a passive principle, which is Memory reflecting Action. 2

Chi is manifest in radiation and reception as among DNA molecules, and no living cell is insular but rather is related to every cell in every body through this field of Chi. 3

Reincarnation is the flow of Chi from ego to ego. 4

In the Ecology of Chi, Time is the flow of Chi from Memory into Action, and Perception is the flow of Chi from Action into Memory. 5

Chi is a form of Energy and obeys the Laws of Energy. 6

- Like any other form of Energy, Chi can be concentrated or dissipated. 6a

- Remembered Action concentrates Chi; forgotten Action dissipates Chi. 6b

  - Remembered Action is Action concentrated in Space -- e.g., matter. 6b1

  - Forgotten Action is Action dissipated in Space -- e.g., free Energy. 6b2

- In lesser frames of reference concentration appears as conversion from another form of energy and dissipation as conversion to another form of energy; in more inclusive frames of reference Chi appears to be conserved. 6c

Civilization is an organization process evidencing a "critical mass" of Chi. 7

- Chi is in dynamic ballance with all other forms of Energy, and a Civilization may evolve either from or into a stellar body. 7a

- Concentrations of Chi affect all other Energy phenomena. When Chi changes, as in an evolving Civilization, Time changes (since Time is a flow of Chi), and this must result in Relativistic changes in other physical properties of the universe as observed from that Civilization. 7b

In spite of all that can be said about Chi, Chi may be a purely linguistic construct; however, I doubt that, because I think I am Chi. 8

DVN 9-MAY-72 8:57 10394

Accounting for Play: a note on (journal,10375,)

Playing around wth the system ,e.g. trying all the new commands atleast three times as they come out or seeing what cute thing yo can do in L-10 this week that you could not do last week, is not only fun and desireable, but absolutely ncessary if a user is to stay in living touch with our ever-changing augmentation. 1

JCN knows the value of constant learning, but it is not clear what account number he hopes we will charge it to, if any. 2

542 &543, the education and development numbers? 2a

DVN 9-MAY-72 9:43 10395

For Show-and-Tell meetings: a response to (10255,)

I just read your suggestion to hold show and tell meetings to help integrate new people. I think it's a good idea, particularly for the same of ourselves. 1

JEW 9-MAY-72 11:49 10397

this is a message

this is a message fir wgu xxx white 1

JEW 9-MAY-72 11:49 10397

this is a message

(J10397) 9-MAY-72 11:49; Title: Author(s): James E. White/JEW; Distribution: James E. White, James E. White/JEW JEW; Sub-Collections: SRI-ARC; Clerk: JEW;

LPD 9-MAY-72 15:47 10398

What's the DCA network all about?

I would like to know more about the DCA network that Charles Irby and I first found out about at the ARPA Graphics meeting; Charles says you know something about it. Can you enlighten me? Specifically, where are the sites; who will run it; what is it intended for; how is it likely to be connected to the ARPA net? Also, do you have an up-to-date list of the current and scheduled ARPA nodes with installation dates? 1

DHC 9-MAY-72 16:18 10399

thanx & directives

maralyn,

thanx for the quick response. the main thing i had wanted to let you know about was, in fact, the error with 'request'. i don't think the problem is just with 'request''s being off-line, tho. i tried outputting file to 'ask' and it didn't like that either....oh, well.

however, there is another thing ...

the nic user's guide seems to have a somewhat incomplete list of output directives, e.g., 'pgn=' and 'tabstops='. is there a complete list, somewhere?

thanx. D. 1

DHC 9-MAY-72 16:18 10399

thanx & directives

(J10399) 9-MAY-72 16:18; Title: Author(s): David H. Crocker/DHC;
Distribution: Marilyn F. Auerbach/MFA; Sub-Collections: NIC; Clerk: DHC;

DHC 9-MAY-72 16:56 10400

resource notebook?

m:

hello, again. just tried to access network resource notebook (nic,6740) and don't seem to be able to. this has hapened to me before, with some other files. problems are such fun. tnx. bye.
D. 1

DHC 9-MAY-72 16:56 10400

resource notebook?

(J10400) 9-MAY-72 16:56; Title: Author(s): David H. Crocker/DHC;
Distribution: Marilyn F. Auerbach/MFA; Sub-Collections: NIC; Clerk: DHC;

KEV 9-MAY-72 17:39 10401

sub-summary of pod responses

this is a compendeum of the responses to the question about goals for pods given current podac structure in podcom's request to the pods

sub-summary of pod responses

There was no general consensus among the individual PODs as to what the goals of PODAC should be given its continued existance in its present form. However, the following list of goals, and suggestions as to how to attain them were suggessted by the PODs. 1

We should attempt to accentuate the positive, rather than spending much energy on negative feelings, i.e., it would be nice if PODs were an energy-gathering place. 1a

We should try to attain an increased awareness or understanding of each other's points of view with regard to: 1b

recognition of problem areas 1b1

problem definition 1b2

solutions to problems 1b3

attitudes towards problems 1b4

etc. 1b5

We should use PODs to get to know each ARC member more thoroughly, find out what their jobs are and their views on their jobs and ARC. This could clear up a lot of confusion on who is supposed to do what, and if somebody is not in who else knows how to do it. 1c

We should learn about the field of O.D. and P.D. 1d

by reading and discussing books on the subject and inviting individuals who are recognized in the field to talk to us about it. 1d1

We should possibly treat only non-work related topics 1e

perhaps share talents or experiences with each other (like how to tune an automobile engine). 1e1

We should get DCE into a pod 1f

We should find out how ARC fits into ARPA 1g

We could have instruction in "Mind Dynamics" and massage. 1h

We should be more open to suggestions from within the Pod (We have always allowed the veto of any one dissenter to block any plan; people seemed to think we should reexamine this rule). 1i

sub-summary of pod responses

We should field meaningful questions from outside the Pod and returning meaningful replies to the questioners. 1j

Some of the suggestions as to how to attain some of the above goals are: 1k

We should be keeping a personal or group journal of what had been going on relevant to personal ad organizational development. 1k1

We feel that having an agenda in advance of a meeting enables members to come to a meeting prepared to discuss an issue. 1k2

(without an agenda it might be easy to fall into a griping mood) 1k2a

PODs could take on, at times, the nature of a study group. 1k3

This would and could include required reading or studying by the members before the meeting 1k3a

One POD is going to have a rotating LEADER of it's pod 1k4

There will be a different LEADER for each pod meeting 1k4a

Assuming the role of LEADER is a requirement and not a voluntary action 1k4b

It will be the LEADER's choice as to what and how an individual pod meeting will discuss and be run 1k4c

This is subject to the restraints of requests from podcom and other pods 1k4c1

One POD feels that audio and/or video taping it's meetings and rerunning them for self enlightenment is a good idea. 1k5

We urge that ARC carry out its long-standing plan to get a video tape machine. 1k6

KEV 9-MAY-72 18:38 10402

accounting for personal use (a comment on 10375)

we also need a charge number for use of the system for personal use, e.g., letter writing, etc. (I feel we should be encouraging use of the system by individuals for personal augmentation as long as it is not a drain on our resourses). 1

DHC 9-MAY-72 20:38 10403

directly to the right

hello, again, again:

how do you right-justify headings? I looked at the range of directives you used for one of the writeups, since i know it does, in fact, set its headings to the right, but there were too many directives that made no sense to me.

Thanx, and sorry to be so much of a pain. /D. 1

directly to the right

(J10403) 9-MAY-72 20:38; Title: Author(s): David H. Crocker/DHC;
Distribution: Marilyn F. Auerbach/MFA; Sub-Collections: NIC; Clerk: DHC;

hi there this is a test

(J10404) 9-MAY-72 21:13; Author(s): Barry D. Wessler/BDW;
Distribution: Barry D. Wessler, Don R. Oestreicher/BDW DRO;
Sub-Collections: NIC; Clerk: BDW;

HGL 10-MAY-72 0:02 10406

Another NLS

New NLS (again) with some fixes in marker mechanism, the ident system, hard copy distribution, and NLS automatic compiling is now up. Hope it works..... HGL 1

HGL 10-MAY-72 0:02 10406

Another NLS

(J10406) 10-MAY-72 0:02; Title: Author(s): Harvey G. Lehtman/HGL; Distribution: James E. White, Augmentation Research Handbook, Jacques F. Vallee, Diane S. Kaye, Paul Rech, Michael D. Kudlick, Donald R. Cone, Don Limuti, William R. Ferguson, Priscilla Lister, Linda L. Lane, Marilyn F. Auerbach, Walt Bass, Mary S. Church, William S. Duvall, Douglas C. Engelbart, Beauregard A. Hardeman, Martin E. Hardy, J. D. Hopper, Charles H. Irby, Mil E. Jernigan, Harvey G. Lehtman, Jeanne B. North, James C. Norton, Cindy Page, William H. Paxton, Jeffrey C. Peters, Jake Ratliff, Barbara E. Row, Ed K. Van De Riet, Dirk H. van Nouhuys, Kenneth E. Victor, Donald C. Wallace, Richard W. Watson, Don I. Andrews/SRI-ARC; Sub-Collections: SRI-ARC; Clerk: HGL;

BER 10-MAY-72 8:37 10408

New IDENT for Diana Merry

Diana,
Because NLS limits idents to four characters, I had to change your ident to DIAN. This way you should be able to go into NLS with your own ident. Let me or Dirk know if you have any problems. Barbara 1

BER 10-MAY-72 8:37 10408

New IDENT for Diana Merry

(J10408) 10-MAY-72 8:37; Title: Author(s): Barbara E. Row/BER;
Distribution: Diana L. Merry, Dirk H. van Nouhuys/DIAN DVN;
Sub-Collections: NIC; Clerk: BER;

JBP 10-MAY-72 16:59 10409

help iam locked out !!!

some how the file i let you mess with when you were down here is locked please fix it for me. 1

JBP 10-MAY-72 16:59 10409

help iam locked out !!!

(J10409) 10-MAY-72 16:59; Title: Author(s): Jonathan B. Postel/JBP; Distribution: Charles H. Irby, James E. White/CHI JEW; Sub-Collections: NIC; Clerk: JBP;

Obituary Announcement - Fir POD

TO: ARC DATE: May 10, 1972

FROM: Fir PODers

OBITUARY ANNOUNCEMENT

Fir POD Died Today (May 10, 1972, 4:15 P.M.)

May It Rest In Peace (or Elsewhere)

```
**********************
*  Watch for further *
*     Announcements  *
**********************
```

TPO-14--for FY-73

I'm journaling this file for a number of reasons: It is last year's TPO prepared for FY-73 and as such represents the branch's thinking at that time concerning the planned technical activity in the branch. It was put into the system by MDP and edited by me in a few hours--indicating that this mode of using NLS can conceivably be used at RADC. It represents a "real use of the system, since we are now starting the wtiting of the FY-74 TPO, and much of the verbage is repeated from year to year. Finally, I would like to make this one of the "live" documents under BMS rather than the once-a-year exercise that it is now.

3.14 Technology Planning Objective No. 14 -DATA PROCESSING SOFTWARE 1

3.14.1 GENERAL OBJECTIVE 1a

(U) The general objective of this TPO is to develop data processing software and techniques to provide the Air Force with the capability to perform large volume, rapid access storage and processing of numerical and non-numerical data;to run programs of essentially unlimited size; to process and to collate high data rate information; and to program completely in higher order language (HOL). 1a1

3.14.2 SPECIFIC GOALS AND TECHNICAL APPROACHES 1b

3.14.2.1 Specific Goals- The Overview Chart (Fig. 3.14-1) illustrates the plan for meeting the general objective. This objective will be systems shown on the right side of the chart. In general, they are of the command and control or management information nature. These system are essential to any application of Air Force power in response to a directive from the President of the United States. In addition, data processing software supports data reduction activities in practically all other systems. To support these conceptual systems, the efforts in this TPO are oriented toward thee eight major goals or "products" shown on the overview chart. These "products" or goals consist of software tools and techniques to aid programmers and users in performing their jobs. Although details of these cannot be defined fully at this time, available estimates of the performance requirements, design configuration and operational utilization are provided in the following paragraphs. 1b1

Standard HOL Implementation Tool - Use of higher order languages (HOL) is predicated on the existence of good compilers for those languages. One way to write good compilers is to give the compiler writer a tool that will generate most of the standard features common to every compiler and will free him to do the tricky parts that are peculiar to the specific machine that he is working on. The specific form of this tool will come out of the JOVIAL Compiler Implementation Tool (JOCIT) effort. 1b1a

Performance Test and Evaluation Standards and Procedures - This product package will enable the Air Force to both quantitatively and qualitatively comparee vendor supplied data management systems. 1b1b

Generalized Data Management Specifications - This product will provide any potential Air Force user the ability to specify only those parts of a data management system that he needs to satisfy his requirements. 1b1c

Microprogrammable Computer - The goal here is a computer that will have the means to internally change its instruction set and therefore be capable of handling the security problem and of making it easier to implement the direct interpretation of HOL in the computer. 1b1d

Associative Processor - This product will have all the additional featufes in it that have been deemed necessary by the thorough testing and evaluating of the Associative Processor test bed. With these features, the machine will truly bring about the long promised gains of associative processing. 1b1e

Modular Spaceborne Computer - This product is a highly reliable, high-data-rate processor that functions in space. SAMSO and AFAL are primarily responsible for this product under AFAL TPO S.3. 1b1f

Job Performance Aids - This goal will provide the means for many staff officers to interact with each other and with a large data base on a computer to produce plans and position papers in hours instead of in weeks and months. 1b1g

3.14.2.2 Technical Approach - To accomplish the goals in 3.14.1.2 research and development will be accomplished in four areas of effort. They are labeled A,B, C, and D on the Overview Chart (FIG. 3.14-1). 1b2

Higher Order Languages - Basic knowledge in higher order languages, in compiler generation and in software validation will be established by various contractual and in-house tasks during the period FY 72 - FY 74. In FY 75 the final specification of a Standard HOL Implementation Tool wil be developed. 1b2a

Data Management Systems - RADC plans to expand its capability in data management systems by developing testing and evaluating methodology so that various data management systems can be compared and so that specifications of future systems can be easily produced. 1b2b

Architecture - The main thrust here is to apply 10 years of associative processing study to the actual hardware implementation and evaluation of an associative processor. Other promising techniques in computer hardware that will be investigated are the microprogrammable computer, the HOL computer, and the modular spaceborne computer. 1b2c

Augmented Human Intellect - This area has been sponsored by ARPA with RADC being technically abreast of the work at Stanford Research Institute (SRI). The techniques developed at SRI will be used in-house at RADC to develop the type of team interaction techniques that will be applicable to the Air Staff. 1b2d

In addition, the capability represented by this TPO is used to provide extensive system support. 1b2e

3.14.3 Relation to desired Capabilities or Conceptual Systems 1c

This TPO will result in the "products" or goals shown in Figure 3.14.-1. The relation between these goals and the AFSC conceptual systems is also shown. 1c1

3.14.4 Milestone Charts and Index Charts - In the following section individual efforts within each "area of effort" are summarized by a Milestone Chart and an associated TPO index 1d

3.14.5 Technical Discussion of Milestone Charts 1e

3.14.5.1 Higher Order Languages A -Efforts in the Higher Order Languages (HOL) area will provide the knowledge and competence within the Air Force to have a standard set of HOL and compliers. This knowledge can then be used to develop a Standard HOL Implementation Tool. To accomplish this objective, the following will be done: 1e1

The standardization of the JOVIAL programming language as an intermediate solution to the Air Force's HOL problems. This contains the following subtasks: 1e1a

The use of an Air Force sponsored committee to update AFM 100-24, the Air Force JOVIAL specification, to make the language more responsive to users and modern hardware. 1e1b

The in-house evaluation, correction, and augmentation of the JOVIAL Compiler Validation System (jcvs) to give the Air Force a tool for accepting or rejecting compilers purchased for the updated AFM 100-24 definition of JOVIAL. 1e1c

An in-house compiler generation tools study to determine their value to the AIR force with respect to compiler implementations. 1e1d

The development of a JOVIAL Compiler Implementation Tool (JOCIT) to lower compiler costs and keep the JOVIAL language dialects consistent so that software transferability will be increased. 1e1e

The use of the Semantics Oriented Language (SEMANOL) to unambiguously define JOVIAL and its standard implementation to help enable the language to be implemented "correctly" each time and increase transferability. 1e1f

The development and standardization of a USAF HOL(s) to meet total Air Force requirements. This contains the subtasks listed below and is based on the "standardization" techniques developed for JOVIAL: 1e1g

An in-house USAF HOL Study to determine the Air Force's requirements for HOL features. 1e1g1

The development of Specifications for HOL or Set of HOL's to meet total Air Force requirement. This language(s) will also be specified in SEMANOL. 1e1g2

The extension of techniques developed for JCVS to develop a Standard USAF Valiidator System for the USAF's standard language(s). 1e1g3

The extension of the "JOCIT" techniques to develop Standard USAF Implementatioon Tools for USAF language(s). 1e1g4

3.14.5.2 Data Management Systems B - The efforts in the Data Management Systems area will lead to the development of generalized data management software techhniques and standards and to procedures for evaluating the performance of data management systems. The two main thrusts of the program are represented on the chart. The top half represents the path toward the goal of Performance Testing & Evaluation, and the bottom half the way toward Generalized Data Management Specifications. 1e2

In FY 72, RADC has completed, in cooperation with ESD, testing a system called ADVISOR, developed by the GE Space Division for NASA. This system has been installed as an interim data management system for the Data Services Center. RADC is currently testing a small scale on-line interactive system which runs on its 1604B as a dedicated system. Finally, RADC will be testing, during FY73, more sophisticated systems such as its own DM-1 and Honeywell's data management system - Integrated Data Store. A set of standards and procedures will be produced in FY 75. 1e2a

RADC is completing the first implementation of a data management system DM-1 (Data Manager). This system is extremely felxible in design, is programmed in JOVVIAL and its overall design contains the best features of many other systems incorporated into one system design. Two additional components, a query language and a report production system, will be implemented during FY 72 andd FY73. From DM-1 will come many of the items that will be in the Generalized Data Management Specifications. 1e2b

RADC is devoting a modest level of effort to evaluating the potential of MULTICS to solve the security problem. This system has some unique features such as its ring structure which is attractive from a security standpoint. 1e2c

3.14.5.3 Architecture C - The objective of the Architecture area is to develop and to evaluate those features of proposed hardware that can provide the means to attaining some of the overall objectives of this TPO. 1e3

During FY72 the Assocative Processing Program will move into the Advanced Development Category. The advanced development program (a task under project 5550) will be a three year effort during which time a commercially available associative processor will be purchased and integrated with the HIS-645 System under Multics. This complex will serve as the test bed for assessing the capabiliity of an Associative Processor-Sequential Processor configuration to respond to the real time data processing requirements common to airborne surveillance systems. In-house application analysts will work closely with AWACS personnel in developing associative solutions to critical AWACS real-time functions. The associative system will be evaluated in terms of efficiency and cost efectiveness. In those cases where different functional designs can increase system efficiencies, these designs will be pseudo implemented in the test bed by means of microprogram control. In this manner, the test bed system will evolve into an Associative Processor Computing System (APCS) design capable of, efficiently and on a cost effective basis, supporting the realtime processing requirements of AWACS and AWACS type systems. This design, the solution algorithms and the cost effectiveness evaluations will be documented and distributed. The APCS design along with specifications for an APCS operating system and language will be the basis for the fabrication of a tactical/airborne real-time associative prrocessor under a follow-on Advanced Development Program. 1e3a

During this program, the microprogramming experience gained using the testbed associative processor will provide insight as to what are the required features of a generalized microprogrammable computer. This knowledge will be used to select, for acquisition, a microprogrammable computer on which continuing research can be conducted in this important area. Active in the above program will be professors and graduate students from Syracuse University and the University of Michigan who will provide support in the areas of languages, instrumentation, and microprogramming. 1e3b

3.14.5.4 Augmented Human Intellect D - Efforts in the Augmented Human Intellect (ahi) area will result in a general purpose integrated system of hardware, sofftware, methods and procedures which can significantly improve the performance off individuals and teams engaged in complex problem solving and decision making tasks. 1e4

Stanford Research Institute has developed a highly interactive on-line computer system under ARPA sponsorship which demonstrates the feasibility of such a system. RADC sponsored an effort to explore the possibilities of using the system to augment management. It was concluded that managers could be assisted as an individual by the system, but that the real benefits lie in having all the people in the manager's organization use the system for as much of their daily work as possible. Subsequently, an effort was recently launched to evaluate the technology through extensive in-house use of the system at SRI via the ARPA Network for a two year period. The potential "customers" of this technology are in Air Staff, particularily DCS/P&O, where this system couold aid in the deliberation, coordination, documentation, and communication of policy and decisions on matters of national defense. 1e4a

An initial evaluation of the SRI system will be made in-house by training a selected group of people, purchasing terminals, using the system, and administering questionaires, surveys, and recording individual's comments. In addition, proocedures and methods will be developed to allow effective use of the system withiin the government environment. 1e4b

A second, more controlled experiment will be undertaken during FY 72-73, which will attempt to measure the differences in effectiveness between two Branches - one using AHI technology, the other using conventional office tools and procedures. 1e4c

If these evaluations and initial uses at Air Staff are successful, an engineering development plan will be prepared to implement a prototype system for some subset of Air Staff. 1e4d

3.14.6 RELATED EFFORTS 1f

(u) Mr. Warren Loper of the Naval Electronics Lab (NEL) at San Diego, CA is project head to develop a high level compiler language for utilizing parallel and associative processing. 1f1

(U) Dr. David Jefferson at the Naval Weapons Lab (NWL) has been using and evaluating AED (Automated Engineering Design) for building language processors and other software planned for use by the Navy. 1f2

(U) Under ARPA sponsorship, RAND Corporation has published a set of guidelines toward handling the general data security problem (RAND R-609) for Security Controls in Multi-User Computer Systems. 1f3

3.14.7 Relation to TNs, ROCs, RADs, etc. 1g

This TPO is responsive to the folllowing requirements: 1g1

ESD TN-24-69-02	Associative Processor Techniques & Applications	1g2
ESD TN-24-69-06	Structuring large Data Bases For Data Management	1g3
ESD TN-24-71-15	Man-Computer Communication in Interactive Systems	1g4
ESD TN-24-72-17	Security Controls in Multi-Users Computer Systems	1g5
SAMSO TN-24-71-103	Ballistic Missile Computer Software	1g6
SAMSO TN-24-71-104 Techniques	Software Verification-Validation	1g7
SAMSO TN-24-71-107	Modular Operating Systems for Ground Computers	1g8
SAMSO TN-24-71-108	Computer Selection Simulator	1g9
SAMSO TN-24-71-110	Software Test Estimation and Control	1g10
SAMSO TN-24-71-111	Control of Software Development by Networking Techniques	1g11
PMD P-2P-031(1)	Data Processing Hardware & Software Technology	1g12

3.14.8 Research Needs 1h

Basic research is needed in the area of formalization of code generation for HOL compilers. This is the only area of a compiler which has not been effectively formalized in a "cook-book" like fashion. That is, while formal techniques exist for building code generators, the code they produce does not compare in efficiency to "hand-coded" code generators. 1h1

For large file applications the following needs exist: 1h2

a. Automatic Multi level systems to control the movement of files within the storage hierarchy in orrder to prevent a high priority storage device from being overcrowded with inactive files. 1h2a

b. A file processing system which permits the integration of all user dates into a data base and controls the accessing of the data base by multiple user programs. In order to achieve this type of processing, it is required that a job in multiprogramming must be able to communicate with another job to effect a synchronous processing action. Studies should be pursued to determine the modifications to conventional operating systems required to obtain this type of processing. 1h2b

c. Sophisticated hardware and software tools are required to measure the performance of complex computer software handling large file applications. The high cost of overhead software in current systems dictates a need for formal evaluation techniques. 1h2c

d. The advent of computers capable of supporting several users in a time shared or multiprogrammed mode has greatly increased the difficulty of safeguarding classified information processed by such system, particularly when classified and unclassified information must be processed simultaneously. Technology is not currently available to meet Air Force requirements for a multi device, open computer system. 1h2d

3.14.9 Test Requirements 1i

3.14.10 TPO Focal Point 1j

Header Positioning Options

Feel free -
Header Positioning is controlled by the .HP=...; directive. The options available are: 1

1 - set flush to left margin 1a

2 - set flush to right margin 1b

3 - center between left and right margins 1c

4 - center between left edge of page and right margin 1d

5 - center between right margin and indented left margin 1e

6 - center first visible character between margins 1f

7 - center first visible character between left edge and right margin 1g

8 - set odd/even pages flush left/right 1h

9 - set odd/even pages flush right/left 1i

These values may also be used to position (horizontally): the Body Area (BodyP), a line (LP), a statement (SP).
anytime... M 1j

JEW 11-MAY-72 8:49 10414

Test message to verfy id system change. 1

CHI 11-MAY-72 9:04 10415

<ucla-nmc>news is now unlocked

john, sorry about leaving news locked. i was logged in as duvall when i played with it and consequently did not see (via the directory command) that i had it locked. i have unlocked it. by the way, did you get my message about the new version of NLS? did it work alright? 1

CHI 11-MAY-72 9:04 10415

<ucla-nmc>news is now unlocked

(J10415) 11-MAY-72 9:04; Title: Author(s): Charles H. Irby/CHI; Distribution: Jonathan B. Postel/JBP; Sub-Collections: SRI-ARC; Clerk: CHI;

NF INFO

Network Facilitator Info 1

H. Ito 1a

Aerospace Corp. 1b

p.o. box 95085 1c

la. ca. 90045 1d

(213) 648-5040 1e

Noticed ARPANET in apr72 Datamation, looked up SJCC70 papers, called me. Aerospace has ibm370/155 and cdc7600 and is interested in arpanet and in particular in ucla360/91. refered to braden@ucla and dolan@arpa. i mentioned that there will be papers presented at sjcc72 next week, and i sent him a copy of the roberts/wessler paper "the arpa network" may 71 which talks about economics of the net. 1f

MFA 11-MAY-72 12:12 10417

re: output processor directives (again)

It's me again - I'm sending you (via Seondary Distribution, so it may take a while) (6912,) - "Brief Output Proessor User Guide". Let me know if it doesn't get to you. 1

KCK 11-MAY-72 14:48 10418

REQUEST FOR AID ON FILE COPY TO RAND

JIM WHITE...FROM KARL KELLEY, MARV GRAHAM, ET AL...
THE SCHEME PROBABLY WORKS FINE, HOWEVER, WE CANNOT GET TO THE RUN
COMMAND FROM THE NETWORK...IT RESPONDS COMMAND NOT AVAILABLE FOR
NIC USE....WOULD YOU PLEASE TAKE CARE OF TRANSFERRING TREE-META
TO RANDCSG FOR US?...THANK YOU

1

KCK 11-MAY-72 14:48 10418

REQUEST FOR AID ON FILE COPY TO RAND

(J10418) 11-MAY-72 14:48; Title: Author(s): Karl C. Kelley/KCK;
Distribution: James E. White/JEW; Sub-Collections: NIC; Clerk: KCK;

MCK 11-MAY-72 14:47 10419

IMPDIAG doc

Jim - I ran across the NIC number of your IMPDIAG 1

documentation the other day...it's 7955. Mark 2

1971 Report to Rome: Progress Snapshot

THE PRESENT STATE OF THE REPORT 1

The outline below list the sate of completion of the parts of the report as of Thursday afternoon, May 7th. Content analysis shows that ["JCN"] ["RWW"] ["DVN"] and ["DCW"] are substantially behind schedule. ["DIA"] and ["DCE"] owe some writing too. 1a

(Contents)(entry)OUTLINE
Link to master schedule (vannouhuys,rome71,S:BnDxbbbrr) 1b

Head Matter (MEJ) <DVN> Pages=5 On Schedule. Draft was finished in hard copy last week. Review going on now. Draft supposed to go online today (documentation, headmatter,) 1b1

Abstract (DVN) <JCN> Pages =1 Behind schedule. Scheduled for completion yesterday and review starting today. Not written. 1b2

Summary (DVN) <JCN Behind schedule. Due for completeion last week and for review this week Partially completed draft is on line (documentation, summary,)> 1b3

Background on ARC Pages =1 1b3a

Structure of this report Pages =1 1b3b

Summary of Content 1970 Report Pages =1 1b3c

I Team Augmentation
Link to brokendown schedule (vannouhuys,rome71,Isc:BnDw)
Link to Documentation file (documentation,section-i,:xb) 1b4

DSS (WSD) <JCN> Pages =10 On Schedule, being re-written following review 1b4a

Journal 1b4a1

Journal Catalogs 1b4a2

Ident System 1b4a3

Number System 1b4a4

Handbook (MFA) <JCN>On Schedule, in review 1b4b

Contents Pages =30 as appendix 1b4b1

Description Pages= 3 1b4b2

BRS (JCN) <DVN>Pages= 5 Behind Schedule. Due for review this week but unwritten. 1b4c

Basic NLS(CHI) <JCN> 1b4d

User Features (CHI)Pages=15 On Schedule, in review 1b4d1

Sort/Merge (JDH) 1b4d1a

Split Screens (CHI) 1b4d1b

Cross File Editing (CHI) 1b4d1c

User Programs (HGL) 1b4d1d

Output Processor 1b4d1e

Control File 1b4d1f

Dex (HGL) 1b4d1g

TNLS (MFA /HGL) 1b4d1h

. 1b4d1i

. 1b4d1j

. 1b4d1k

Languages On Schedule,in review 1b4d2

L10 (HGL) Pages =5 1b4d2a

Tree Meta (HGL) Pages=10 1b4d2b

MPS (WHP) On schedule, in review 1b4d3

Internal organizationrt 1b4e

Team Structure(JCN) <DVN> <RWW> Pages =5 Behind scheudle. Schedulled for completion lastt week, not written. 1b4e1

POD Activity(JDN,DVNBehind scheudle. Schedulled for completion lastt week, not written.) <JCN> Pages =2 1b4e2

1b4f

II NIC Development and Operations (RWW) <JCN>Pages = 20

Overdue. Scheduled to be finished last week. RWW says he is taking more time because he hopes for something really good. Hopes to finish the end of this week.(documentation,section-II,:xb) 1b5

. 1b5a

. 1b5b

. 1b5c

III Network Participation (RWW) <JCN>Pages=10
Overdue. Scheduled to be finished last week. RWW says he is taking more time because he hopes for something really good. Hopes to finidsh the end of this week.(documentation,section-III,xb) 1b6

Working Group Participation 1b6a

System Software 1b6b

IV Computer Facility
Link to Documentation file (documentation,section-iv,:xb)
Link to brokendown schedule (vannouhuys,rome71,IVsc:BnDw) 1b7

Hardware (JCN) <DVN,EKV>Pages=10 Behind Schedule, should have been finihsed last week 1b7a

Summary Description 1b7a1

RPO-2'S 1b7a1a

Terminals 1b7a1b

PDP-10 1b7a1c

Printer 1b7a1d

Display System 1b7a1e

X-core 1b7a1f

Bryant Drum 1b7a1g

UNIVAC Drums 1b7a1h

BB&N Network Interface 1b7a1i

BB&N Pager 1b7a1j

Problems 1b7a2

Plans Pages=5 1b7a2a

System Software (DCW) <JCN> Pages=10Behind Schedule, should have been finihsed last week 1b7b

IMLAC (CHI) 1b7b1

TENEX 1b7b2

User Features 1b7b3

Superwatch (DIA) 1b7b4

V Plans <DVN>
Link to brokendown schedule (vannouhuys,rome71,Vsc:BnDw)
Link to Documentation file (documentation,section-V,:xb)(1b8

Project (JCN) (journal,7404,:x) Pages=5 1b8a

Behind Schedule, should have been finished last week. 1b8b

Bootstrap Community (DCE) Pages=5 Behind Schedule, should have been finihsed last week, It is not clear whether Doug intends to write such a section. 1b8c

1b9

Glossary (DVN) <MFA> Pages=4 1b10

On Schedule, partially finished draft in (documentation, glossary,) 1b11

Index (MEJ)<DVN>Pages =5 1b12

Not behind schedule, also not started because of incomplete draft state of report. 1b13

Appendices (?) 1b14

THE TITLE 2

We used the title of the contrat, "Network Information Center and Computer-Augmented Team Interaction" last year. 2a

Mostly to avoid confusion, especially in cataloging, several people would like to chage the title this year. 2b

I think it proper to keep the title of the contract as a subtitle. 2c

Various suggestions have been shot down. The one still standing at the moment is: 2d

"Augmented Team Environment:Network Information Center and Computer Augmented Team Interaction." 2d1

Network Working Group
Request for Comments : 346

NIC : 10425

Jon Postel
Computer Science
UCLA-NMC
30 May 72

Categories : Echo Plex, Satellite
References : RFC's 1, 5, 51

1

Satellite Considerations

2

The consideration of using space satellite transmission links in the ARPANET should be cause for some thought by the parties making use of the network. The satellite transmission path will not neessarily affect the transmission rate but it will affect the delay. The change in the delay characteristics can be approximated by the change in path length. Thus if the satellite is in synchronous orbit about 22,000 miles above the earth, the path length is about 44,000 miles compared to (worst case) 3,000 miles or about a 15 to 1 increase in path length and delay. [The time for light to travel 3,000 miles is .016 seconds, to travel 44,000 miles is .236 seconds.] 3

In the current (surface) ARPANET delays are such that interactive servers with character-at-a-time remote echo are only marginally useful. While I belive that this delay (unmeasured) is largely due to the host systems, adding a half second transmission delay will cause these marginal systems to become unuseable. 4

Thought should also be given to buffer allocations. If a receiving system allowes only one line of text to be buffered at a time and refreshes the allocation as each line is output to a human user there will be at least a half second delay between the arrival of each line at the receiving system. This need not be a problem until the speed of the output device is above about 150 characters/second. This "small buffer" problem can be expected to occur even with lower speed devices since host delays are estimated to be in the range 0.1 second to 1.0 second. 5

I suggest that it is appropriate to resume a discussion of measures to circumvent the difficulties brought about by these large delay characteristics. Some areas of discussion could be: buffer sizes in servers and users, echo plex techniques, moving part of the input processing to the user system. If it is decided to move the echo plex functions to the user system, it would be

wise to try for a "standard" package, thus reducing a M times N problem to a M plus N problem. 6

Please dig out and read RFC's #1 Crocker, #5 Rulifson, #51 Elie to see som previous thinking about this type of problem. 7

(J10425) 30-MAY-72 11:31; Title: Author(s): Jonathan B. Postel/JBP;
Distribution: Cindy Page/CXP; Sub-Collections: NIC; RFC# 346; Clerk:
CXP;
Origin: <UCLA-NMC>RFC-SATELLITE.NLS;4, 30-MAY-72 11:12 JBP ;

Network Working Group
Request for Comments : 347

NIC : 10426

Jon Postel
Computer Science
UCLA-NMC
30 May 72

Categories : Standard Processes

1

Echo Process

2

I suggest that for debugging and measurement purposes those hosts which are willing implement an "Echo" process. 3

This echo process would listen for a request for connection and execute the Initial Connection Protocol (ICP) as specified in NIC 7104 the "Current Network Protocols" notebook. Upon completion of the ICP the echo process would wait for data from the network. When data is received from the network it is echoed at once, (and the buffer space is re-allocated). By echoed I mean that the data received is sent back over the network, bit for bit with no modification by the echo process. The echo process is terminated by closing the network connections. 4

Note that BBN-TENEX has had such an echo process available for use for a long time. 5

(J10426) 30-MAY-72 11:35; Title: Author(s): Jonathan B. Postel/JBP;
Distribution: Cindy Page/CXP; Sub-Collections: NIC; RFC# 347; Clerk:
CXP;
Origin: <UCLA-NMC>RFC-ECHO.NLS;5, 30-MAY-72 11:11 JBP ;

Network Working Group
Request for Comments : 348

NIC : 10427

Jon Postel
Computer Science
UCLA-NMC
30 May 72

Categories : Standard Processes

1

Discard Process

2

I suggest that for debugging and measurement purposes those hosts which are willing implement a "Discard" process. 3

This discard process would listen for a request for connection and execute the Initial Connection Protocol (ICP) as specified in NIC 7104 the "Current Network Protocols" notebook. Upon completion of the ICP the discard process would wait for data from the network. When data is received from the network it is discarded at once, (and the buffer space is re-allocated). The discard process is terminated by closing the network connections. 4

(J10427) 30-MAY-72 11:41; Title: Author(s): Jonathan B. Postel/JBP;
Distribution: Cindy Page/CXP; Sub-Collections: NIC; RFC# 348; Clerk:
CXP;
Origin: <UCLA-NMC>RFC-DISCARD.NLS;4, 30-MAY-72 11:15 JBP ;

Network Working Group
Request for Comments : 349

NIC : 10428

Jon Postel
Computer Science
UCLA-NMC
30 May 72

Categories : Socket Numbers
References : RFC's 322, 204

1

Proposed Standard Socket Numbers

2

I propose that there be a czar (me ?) who hands out offical socket numbers for use by standard protocols. This czar should also keep track of and publish a list of those socket numbers where host specific services can be obtained. I further suggest that the initial allocation be as follows:

Sockets	Assignment
0 - 63	Network wide standard functions
64 - 127	Host specific functions
128 - 239	Reserved for future use
240 - 255	Any experimental function

and within the network wide standard functions the following particular assignments be made:

Socket	Assignment
1	Telnet
3	File Transfer
5	Remote Job Entry
7	Echo
9	Discard

these socket numbers (decimal) are to be used for the socket called "L" in the offical Initial Connection Protocol (ICP) as specified in NIC 7104 the "Current Network Protocols" notebook. 3

(J10428) 30-MAY-72 12:11; Title: Author(s): Jonathan B. Postel/JBP;
Distribution: Cindy Page/CXP; Sub-Collections: NIC; RFC# 349; Clerk:
CXP;
Origin: <UCLA-NMC>RFC-SOCKETS.NLS;5, 30-MAY-72 11:18 JBP ;

DVN 11-MAY-72 15:36 10429

Confirmation of Trips to Rmome

This is to confirm: 1

That I will to be at Rome May 17th and 18th to teach TNLS. 1a

I will neet a room large enough to house the students, terminals hooked up in the room for the students, and a board to hold fip charts. I will bring with me everything else I need. 1a1

Jim Norton will come with me. 1b

Paul Rech expects to go to Rome and then to Washingtn in the week of June 5th. 1c

Catalog Meeting Notes, 1 May 1972

PRESENT: BER MEJ JBN WLB RWW BAH 1

Dick would like the people who are involved in the catalog work (BER MEJ JBN WLB RWW BAH plus JFV JCN MDK CHI) to get together weekly to discuss any problems we might be having. It was decided that Tuesdays at 8:30 would be the regularly scheduled meeting time. 2

Most of the rest of the time Walter spent discussing his new 'automatic' catalog production run. The Proof run would take a file (or several files if we decide to do it that way) of citations and reformat the raw entries five times (actually six, including the proof format) -- 3

Author Index 3a

Number Index 3b

Titleword 3c

RFC Index 3d

Full Listing 3e

Proof 3f

At each stage you can either give the file a name or leave the name out and a work file will be created for the subsequent processing and then be thrown away. The final result is a file that is ready for the output processor (including the correct directives), then hardcopy. 4

Dick said we must run the May NIC Catalog by hand, but Walter would like Beau to use the new formatter programs on this catalog so we can debug the programs. 5

Submitted by: Barbara Row 6

PMK 11-MAY-72 16:30 10432

hi stan this is speakeasy's godfather i dropped in on the mitre bunch to see their tip and thought i would leave a note in your electronic mail slot

1

PMK 11-MAY-72 16:30 10432

(J10432) 11-MAY-72 16:30; Title: Author(s): Peggy M. Karp/PMK;
Distribution: Stanley Cohen/SC; Sub-Collections: NIC; Clerk: EHF;

DVN 11-MAY-72 16:49 10433

Notice of OAK Interview Summary

My summary of our interviews lies in my directory vanNouhuys,podac,). Please take the opportunity to make comments and suggeet changes. Pending comments, I intend to send it to DCE and PODCOM Monday afternoon. 1

DVN 11-MAY-72 16:49 10433

N:tice of OAK Interview Summary

(J10433) 11-MAY-72 16:49; Title: Author(s): Dirk H. van Nouhuys/DVN; Sub-Collections: SRI-ARC; Clerk: DVN;

JGM 12-MAY-72 11:26 10449

INTRODUCTION TO THE MODULAR PROGRAMMING SYSTEM

Preliminary version of introductory chapter to MPS degign document.

INTRODUCTION TO THE MODULAR PROGRAMMING SYSTEM

23 MAY 72

MPS 2.0

James G. Mitchell*

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(415) 326-6200

GOALS 2

The Modular Programming System (MPS) is a set of tools for the development and continued evolution of large software systems in an interactive environment. All such large software systems share certain characteristics: 2a

(a1) they are the work of a group of people, whose membership will change over time; 2a1

(a2) they are necessarily constructed from a number of separately developed programs; 2a2

(a3) they evolve and grow throughout their lifetimes (and there is evidence that they also "age" [Lehman & Belady]). 2a3

The MPS project aims to decrease the effort required to build and evolve such systems and to increase the reliability of the resultant products. As a specific test of its capabilities, MPS will be used in the rewriting and restructuring of the NLS system developed at Stanford Research Institute. 2b

APOLOGIA 3

Points a1, a2, a3 are axiomatic statements about the dynamics of all large software systems. The following discussion uses these and a few other axioms to establish desirable characteristics for MPS. They are intended only to lend plausibility to the set of capabilities which the MPS project is investigating. Furthermore, the "logical conclusions" only represent design choices to satisy the axioms; other choices could certainly be made which would not be inconsistent with the axiom set, but that is another research project. Hopefully there is a minimum of hidden meaning in the following discussion: each axiom and consequence is intended to be taken strictly at face value. 3a

We first add two more axioms to the above set: 3b

(a4) Large software systems must be able to take advantage of available hardware for efficiency. 3b1

(a5) Program bugs are not known before they occur. 3b2

(a4a) a1-a4 imply that software components, hereafter called modules, should be separately compilable and debuggable. Therefore there must be a way of linking or binding separate components together to provide an environment (data and programs) within which a module can be debugged. 3c

(a6) In an interactive programming environment, users must be able to develop and use debugging tools applicable to programs

in the same programming system [Krutar] [Mitchell] [Perlis] [Teitelman]. 3d

a4a, a5, and a6 then imply that 3e

(a6a) the environment of a program must be dynamically alterable; 3e1

(a6b) a program should not have to be altered when its environment changes in ways which do not affect the semantic intent of the program [Dennis] -- this is called programming generality. 3e2

(a3a) a3 suggests that a desirable characteristic for tools for building large systems should be that the energy to change part of the system should be more a function of the complexity of the change than of the size of the system. 3f

(a3b) A new system always has parts which are functionally similar to previously developed systems. The new system may therefore be regarded as a change (though perhaps substantial) to an older system. a3a then points out the necessity for being able to reuse components which have been made reliable through usage. This increases the initial reliability of the new system and decreases its cost. 3g

(a3c) One way of constructing useful components is to build them from combinations of already existing modules (a3b). Hence there must be a way of bundling useful configurations together as seemingly atomic modules so they can be readily reused. 3h

MPS CAPABILITIES 4

To satisfy these objectives, MPS has concentrated on providing the following capabilities: 4a

control mechanisms which enable modules to be linked together with a minimum of built in assumptions about how each interprets control transfer over the link between them. 4a1

simple function call and return mechanisms alone do not satisfy this requirement. 4a1a

Data definition facilities that: 4a2

clarify the specification of the data structures which, together with control, completely specify the interfaces between modules; 4a2a

are potentially economical in space and accessing speed without being dependent on a particular machine; 4a2b

are an aid in developing and describing program components and the structure of algorithms. 4a2c

Facilities for dynamically binding the virtual objects required by a module for execution to real objects: 4a3

e.g., for binding a procedure call to a real procedure, a "typed" pointer to a data structure of the correct type, etc. The set of bindings for a module's virtual objects at a given moment comprises the environment for that module. 4a3a

Complete accessibility to the MPS "viitual machine" (which is a set of primitive MPS programs) and to MPS programs as data structures. 4a4

This enables debugging and measuring tools to be built as standard MPS programs and along with dynamic binding allows such tools to be brought to bear on MPS programs whenever necessary. 4a4a

The ability to bundle a configuration of data and program modules together as a module which may be saved for later use just as a simple, atomic module: 4a5

this allows systems to be partly initialized by partially executing them and then bundling them up for later use with the initialization computations factored out; 4a5a

it also allows a configuration which has exhibited a bug to be saved away for later perusal with the state as it was when the bug was discovered; 4a5b

lastly, it allows standard modules to be built by configuring them from other modules in the spirit of using already available components whenever possible and provides some logical completeness to the system. 4a5c

A POSITION PAPER ON PODs AND PLANS FOR FURTHER RESEARCH 1

By SIGCORE (Special Interest Groups Core) 2

Fir POD met Wednesday, May 10, 1972, at 3 P.M. with all members present. After report by PODCOM representatives, Cindy Page and Smokey Wallace, there were some initial expressions of dissatisfaction with: 3

(1) The obvious halting and uninspired method of operation and organization of PODs and PODCOM. There is still too much tendency to operate defensively, evidencing the typical ARC-syndrome (symbolized by baby robins sitting in the ARC nest with opened beaks raised to the sky, cheeping "Doug, feed us ideas "). 3a

(2) Continued complaints from ARCers (including ourselves) about "what is wrong with PODs". (We are sick of hearing this, especially from ourselves.) 3b

(3) Three and a half months of spinning our wheels and not doing anything really constructive beyond (a) electing a protem chairman to PODCOM, (b) spending several weeks attempting to agree on a meeting day and time, (c) one seminar-lecture. 3c

On the other hand, considerable satisfaction and faith in themselves and each other were expressed by Fir PODers in their achievements in the following areas: 4

(1) PODs enabled the group to become acquainted to some depth beyond what ordinary work environment as presently seen in ARC would have allowed without PODs. This was considered valuable -- in fact the most valuable asset arising from PODs to date. 4a

(2) This deeper acquaintance and trust among Fir PODers is being and can be further applied in their work environment, and can very possibly be used to considerably change that work environment in areas of friction or inefficiency. 4b

(3) The deepening trust and knowledge of each other is a highly important factor in building the evolving ARC team. 4c

(4) Vistas of possible team interaction are beginning to be seen that were not thought of before PODs. 4d

(5) To summarize, (reference to statement by RWW and concurred in by Fir PODers (,10188,4a)), POD activity as experienced in

Fir POD has been worthwhile, and Fir PODers are now ready for the next step in growing awareness and evolvement. 4e

At this point, the natural inclination of Fir PODers to strike out into pioneering methods, to blaze new trails, and to avoid boredom, came to the fore. We said, "We are intelligent adults and are given a virtual carte blanche to explore new fields, so let's do it. We now begin " 5

We set parameters: 6

WE WILL: 6a

Recognize the dignity of the individuals among us and their inalienable right to remain individuals -- unique, developing, growing as human beings and as personalities. We intend to enhance this dignity and recognize that right by constructive action. 6a1

COMMENT: 6a1a

One of the resentments against the present POD organization as experienced by ARCers (although it is certain that this was not intended by Doug when he launched PODs) is that each POD is a group of individuals who have, at first glance, little in common in personal interests, and have varied backgrounds, and varied roles in ARC which have to be shed like a coat when entering POD meetings, then replaced like an ill-fitting garment when returning to work. This "garment" should be either permanently shed, or the working environment stabilized so that the garment remains permanently in place. (Hopefully, the former -- a point which will come under study by some of us.) 6a1a1

On the other hand, the very crossing of natural work boundaries enabled PODers to break out of the rigid class lines imposed by the usual management structure -- a drastic but productive measure, and one to be further scrutinized (see last sentence, above). 6a1a2

The present POD organization enforces a "faceless anonimity" on each POD member, who thereupon becomes not "Joe Bloke, individual" (what he is to himself), or even "Joe Bloke, computer programmer/or whatever" (a role which Joe Bloke tacitly accepted when he took the job of Computer Programmer), but another

involuntary identity, a stranger to Joe Bloke -- i.e., "Joe Bloke, POD member". This is a role Joe Bloke has not considered, is not familiar with, and has not agreed to. Understandably, Joe Bloke feels somewhat put upon when he is suddenly shoved into this unfamiliar role. It is a credit to ARCers that they are adapting to this new role and are building some strength into this somewhat nebulous new identity under very difficult circumstances. 6a1a3

Explore, recognize, and find ways to utilize the individual and more personal skills of each ARCer that are part of his personal interests but not presently known or brought out through his current day-to-day work environment. 6a2

COMMENT: 6a2a

Each member of a social structure (and working groups are social structures) fits into that structure like a cogwheel in a series of interlocking cogwheels: Areas of effective interaction are cogs that are present in the correct size and shape to intermesh with other wheels, while inactive areas or points of friction are missing or ill-fitting cogs. An online community (culture) is a very special social structure which has unique qualities not heretofore seen. Therefore, criteria formerly used in the building, operation, and maintenance of previous social structures are no longer necessarily relevant. "Cogs" in our (ARCers') personal and professional "cogwheels" that were applicable and effective elsewhere will not necessarily function as expected when fitted into this online community environment. On the other hand, "cogs" that ARCers might not think about being applicable to this online community might be the very functional element that would be highly useful to solve a difficult problem. 6a2a1

One of the vital parameters of the ARC online community is the broad spectrum of personality, skills, interests, abilities, and personal goals of each individual ARCer. Before we try to build the ARC online community configuration of "cogwheels", it makes sense to explore rather thoroughly what we have to work with. A better knowledge of our ARC stockpile (ARCers) will create a more efficient and flexible structure. We may find unexpected abilities and skills among ARCers that will prove highly

valuable in what, by definition, is an unusual and pioneering social structure. Our strengths, weaknesses, and potentials are very pertinent to our project. 6a2a2

WE DECIDED: 6b

To place Fir POD, as it has existed up to this time, in an offline status, archived, and inactive until and unless needed again. 6b1

To organize for proper functioning along lines mentioned above, see paragraphs .6a1 and .6a2. 6b2

WE HAVE: 6c

Set up several groups for special purpose functions (we call them Special Interest Groups -- SIG) and to explore special interests. There are certain criteria which have been set for these groups: 6c1

They will have a Coordinator who will keep the ball rolling, coordinate meeting dates and times, notify members of meetings or items of interest, and generally (but amiably and rather loosely) keep the group headed in their predetermined direction. 6c1a

Membership will be voluntary and to the depth each member chooses: Active, working, interested bystander, researcher, etc. We set our own pace. Membership will be based on interest in the purpose of the group. Members are invited from any part or all of ARC. (So, come on you other PODers...you've been asking for Special Interest Groups. Now you've got 'em.) 6c1b

These groups will be an alternative to present POD activity but not an excuse to drop all activity, and if a POD decides to continue to function within its present framework -- Cool You are still invited to participate in any or all of these groups. 6c1c

No more than one meeting a week (unless you so choose). 6c1d

Each group will have a predetermined, stated, and set purpose. 6c1e

Each group will live as long as the interest continues and it serves some useful purpose. 6c1f

A Position Paper on PODs and Plans for Further Research From Fir POD (SIGCORE)

The members of (former) Fir POD (call us SIGCORE?), for the present (until the groups get really organized and/or decide different), will act as Coordinator, Instigator, Pusher and General Organizer of the new groups coming into being. As soon as the groups meet and organize, each group should select its own coordinator -- generally, the one who is most interested in the subject (energy for work naturally follows interest). 6c1g

During the 10 May 1972 Fir POD (SIGCORE) meeting, the following five groups were organized, with coordinators as indicated and membership from SIGCORE as shown. Members, listeners, explorers are invited. See the Coordinator. 6c1h

(1) Meeting Effectiveness (Small Group Dynamics)
Coordinator - WRF Interested - RWW JFV MEJ 6c1h1

(2) Language and Information (Structure of Thinking)
Coordinator - JFV Interested - MEJ WRF RWW 6c1h2

(3) Effective Group Organization (types of organization)
Coordinator - WRF Interested - MEJ 6c1h3

(4) Special Skills Groups
i.e.:
Hardware technology - JR
Technical skills -
Others?
Anyone for knitting?
Chess?
Subliminal communication?
Hypnosis quotient of extended display use? 6c1h4

(5) Scientology
Coordinator - CXP Interested - DCW RWW
(Note: This is not a recruiting, but a "finding out" trip.) 6c1h5

WE INVITE: 6d

Any and all ARCers to join these groups. 6d1

Any and all ARCers to suggest and help us organize other groups in other areas of interest and development. 6d2

WE ASK: 6e

That other groups now going or being organized or contemplated invite us to join with you. 6e1

That no idea be rejected as too "wild", "far out", or "not job related". Let's discuss it. 6e2

That we hear from you, personally and via ARC-JOURNAL, regarding this move. 6e3

An Interesting Pod Meeting

The purpose of this memo is to share with others an interesting pod meeting we (CEDAR) had yesterday (5/10/72). 1

Each of us took the below list of values and ordered them according to how important they were as values for us as individuals. 1a

After everyone had ordered them for herself, we then discussed each others orderings and definitions, etc. 1b

At the end of the meeting we then drew up a composite ordering. 1c

AMBITIOUS 1c1

BROADMINDED 1c2

CAPABLE 1c3

CHEERFUL 1c4

CLEAN 1c5

COURAGEOUS 1c6

FORGIVING 1c7

HELPFUL 1c8

HONEST 1c9

IMAGINATIVE 1c10

INDEPENDENT 1c11

INTELLECTUAL 1c12

LOGICAL 1c13

LOVING 1c14

OBEDIENT 1c15

POLITE 1c16

RESPONSIBLE 1c17

SELF CONTROLLED 1c18

Establishing an ARC policy on the file-privacy issue

This memo deals with the issue of privacy of on-line files. I expect that later on, in FRAMAC/PODAC, we will have both a forum and a framework within which we can put such issues into perspective and set policies in a more participative manner -- but for the time being, I am stating the following to be ARC's policy on the file-privacy issue. 1

SUMMARY OF THE POLICY: 2

Note: This policy is to become effective now; it is subject to change at any time, but only with due warning via an explicit Journal memo from (or authorized by) me. 2a

Private files are to be treated as private. It is expected that no one will access a private file without explicit agreement from the owner. There are various degress of "access" -- on-line browsing, copying into one's own files, making a hard-copy printout, and/or quoting or otherwise treating as information representing the owner's position on something -- and this policy is to cover them all; the degree of access, and the information accessed, should be clearly and explicitly agreed upon. 2b

Access thus becomes a matter of personal choice and agreement. A person may choose to announce a complete openness to all of his files; or he may agree to let some specified people have completely open access; or he may restrict in any combination the files that are accessible, by whom they may be accessed, and the degree of access -- but in any event, it is his right to have the degree of privacy he wants, and access to any of his files is a privilege that is his only to bestow. 2c

A pesone who desires a given degree of privacy for a particular personal file should be able to have reasonable (sufficient unto him) confience that he will get that degree of privacy; I want him to feel free to use reasonable means to provide himself with that "suficient degree of confidence." For instance, he may use TENEX capabilities for passwords, or even private encryption if his information is particularly sensitive and/or his confidence very low. But I hope that generally it won't require such measures to assure one of adequate privacy. 2d

EXCEPTIONS -- FILE THAT ARE TO BE ASSUMED ACCESSIBLE: 2e

Currently, the Journal files are all considered "publicly accessible". I'm not sure whether or not we will want eventually to have privacy categories there, for instance having Journal files that are unaccessible to outsiders,

and/or perhaps categories unaccessible to some insiders. I currently expect to keep all Journal files open to all. 2e1

Within our other on-line file categories, there may be personal or group files of certain clearly identfiable types to which, by convention, access rights are automatically granted to specified individuals or groups. For instance, our Baseline Records may by convention link to certain kinds of personal files where role/task contractors keep up-to-date information representing the dynamic extensions of the Baseline Record for which they are the custodians -- and people should feel free to access any such personal file. 2e2

Very Special Consideration: Where the cost of providing his file storage is borne by Project X, Person A must stand ready, at the request of a person (XL) who is responsible for Project-X resources, to either 2e3

a) assure XL that the purpose and contents of his files are relevant (which may include having to show XL the contents to verify this claim), 2e3a

b) or remove the files from X's cost-supported service. 2e3b

DISCUSSION 3

I don't want to come across with unnecessary harshness about this issue -- my aim is to be clear and unequivocative. I have had periods of ambivalence on this issue, and periods of favoring complete and universal openess of our personal files. But, as the size and complexity of our operations have grown, there have been definite indications to me of the need for at least a clear, explicit policy statement; and also I have come to appreciate the nature of the problems to be solved before we could operate effectively with the policy of complete openness that is a logical (not saying "reasonable") extension of the goals, philosophies, and experiments of our past years. 3a

Until we can instill a feeling of confidence, within a given individual or subgroup, that a given type of information of which he is the owner (or "custodian") would not be inappropriately used, his claim for privacy should be respected. It is the responsibility of the person(s) desiring access to develop the custodian's confidence, towards gaining such permission. It is not appropriate to intrude upon private places when not invited. 3b

I personally feel that the most effective team will have a

great deal of openness. But it will be able to benefit from such openness only by learning how to establish and maintain enough confidence within the custodians that by being open they have more to gain than lose -- and this confidence must be established within each individual in accordance with: his perception of team processes; his value framework; his perception of the risk; his tolerance of risk; his faith in his team mates, etc. 3c

For an experimental team to hunt for the optimum degree of openness, by working under various policies, it must be prepared to explore degrees of openness beyond the optimum, and to accommodate the consequent penalties. As of now, I am not willing to take us beyond the line described above (which I don't feel is optimum in terms of effectiveness). 3c1

FUTURE DEVELOPMENT 4

Toward getting us ready to explore further, I deem it the proper business of PODAC to spread among us all an understanding and appreciation for such as: 4a

What is the perception of risk and apprehension by those who choose not to give blanket permission to access their files? What sorts of attitude and behavior on the part of the rest of us would reduce the feelings of risk and apprehension in such a person? 4a1

What explicit kinds of policy, convention, discipline, codes of conduct, etc., could a team practice to a reasonable degree, that would usefully increase the degree of openness (by decreasing perception of risk, or increasing the tolerance to risk)? 4a2

How can PODAC help? 4a3

Then, in conjunction with PODAC's work on this, FRAMAC would need to deal with such questions as: 4b

In what general and specific ways does increased openness promise to be valuable? Or promises to have negative value? 4b1

HGL 12-MAY-72 15:44 10453

Reply to FIR memo (10450,)

A fast reply to FIR PODs memo 10450. (Perhaps more to come upon my return from Atlantic city.) 1

Such a move is tantamount to secession from the Union. If the other PODs had agreed to become voluntary discussion groups, this would have been legitimate. However, technically as things now stand there are problems. 2

PODs should not deal with line activities. Thus technical and professional seminars do not fit. 2a

PODs were to a certain extent meant to develop in all ARC members the tools of interacting with those who do not have a completely common background or framework and get them into the habit of looking at the process of interaction. Looking at FIRs list of topics, one can see that several fit the subject requirement while others are far afield. Also, it is clear that a "group" of one person concerned with his professional interest is stretching things. 2b

There is not a balence of resources. To permit someone to spend an open number of hours in as many interest groups as he or she desires is a greater waste than the current POD activity. 2c

The mix in the groups is not random. There is no growing commonality with others. 3

It would seem that FIR is admitting defeat. 4

CEDAR has become quite successful in several areas recemtly. 5

We are developing the ability to look at the form of what we are doing as well as the content. KEV and I agree that this has been useful in dealing with the dynamics of other LINAC related meetings. 5a

The format is apt and several rules are evolving. 6

A focus is necessary at first. 6a

This focus may be a paper, an agenda, a topic. We rotate chairpeople who select a topic to discuss. Perhaps FIR wold modify this and become a discussion group for several weeks on a topic. However, it is important that the dynamicsof the meeting be as important as the content. If someone is not actively participating or if the participation leaves something to be desired (e.g., not listening to others, etc.), a meta-meeting mode could be

Reply to FIR memo (10450,)

entered in which the observations could be dealt with directly. Talents must be developed if we are to function effectively in our roles as goal setters and team members. 6a1

Active participation is useful and should be required for a time. 6b

It may be useful to start with POD documents. MFAs bibliography for example or DCEs paper. Develop our internal energies for a time rather than going outside for other people. 6c

We learn in PODs from those who are different from us. The FIR proposal is like a separate but equal arrangement with only similar people in a group. These groups are likely to be unequal. 6d

It is too soon to go out of the small structure imposed by DCE. There are many things that could develop organically within the strucutre. CEDAR was having a worse time than FIR a few weeks ago, examined what was going on and came up with a viable structure within DCEs limits. 7

This was hastily drafted before I left for SJCC. It will be revised and expanded upon my return. However, I feel it important enough to prepare today. 8

DSK 12-MAY-72 16:09 10454

Reply to FIR POD memo (10450,)

As a quick response to Fir POD'S decision to disintegrate into special interest groups, I feel personally compelled to record my gut reaction that this really represents an attempt to get back into the comfortable familiar place of doing activities with only those people who share your particular point of view or special interest. Looking back over the type of POD meetings that have benefited me personally (and others as far as I could tell), they tended to be situations where we all started out in a different place and went somewhere together, taking into account everyone's opinions and gaining experience about such things as consensus building along the way. 1

The SIGCORE paper mentions boredom and talk about 'what is wrong with PODs'. I think by working with the whole POD group, people can 'pioneer' into interesting topics and away from boredom while experiencing firsthand the dynamics of working in the kind of real-world meeting situation at ARC where things often are uncomfortable. 2

File system design group to meet every Wednesday morning.

The second meeting of the file system design group took place on Wed,May 10th from 9 to 10. 1

Charles described the NLS file system and provided claarification of previous design documents. Concepts currently at the planning stage were discussed. 1a

It is felt that in coming weeks this group will: 1b

i) Evolve away from a tutorial approach to get increasingly concerned with implementation. 1c

ii) Introduce better terminology for NLS files to make it easier in the future to think about information systems (either of the "set" type or of the "catalog" type) 1d

The group is expected to get smaller as it goes into implementation. It will meet every Wednesday from 9 to 10. Anyone interested can participate. 1e

MEJ 12-MAY-72 17:25 10456

Rebuttal - Jernigan Answers Lehtman/Kaye As a Member of Fir POD/SIGCORE

This paper is particularly in reply to a memo to Fir POD (,10453) dated 12 May 1972, from Harvey Lehtman and to a memo from Diane S. Kaye. These two memos were a first-glance reaction to Fir POD's "Position Paper" (,10050). This reply is an item-by-item reply to the Lehtman paper (10453). A full understanding of what is given below is gained by checking the Lehtman paper along with each "Item" mentioned below. 1

Item 2 (of the Lehtman paper) 2

"Fir POD" has not seceeded from the union. Instead, we are seriously conducting an active experiment in line with and participating with DCE's admonition concerning: 2a

(1) Personal Development -- The study groups proposed are on this subject, NOT on technical or line activities. 2a1

(2) Organizational Development -- The study groups are on this subject; see the preliminary list of subjects for study. Also see below. 2a2

Item 2A 3

No line activities or technical/professional seminars or subjects are even being considered. 3a

Item 2B 4

Fir POD has been busy for the past two months developing habits and methods of interacting with each other and are now ready to use what we have built constructively and usefully for specific purposes, such as the subjects suggested (and others to be suggested). Last sentence of this item -- It is not contemplated or suggested that there be any "one person" groups. If only one person is interested, the subject will be pursued privately and not offered for group discussion (monologue?). PODs are obviously not an end within themselves, but are only a means to the end of teaching PODers how to usefully build and maintain a team effort for work in this very real world. That is part of what ARC and the coming SYDIA are all about. 4a

Item 2B 5

It is not contemplated that anyone will spend more than 2 hours of working time per week in a Special Interest Group meeting, see (,10050,6c1d). 5a

Rebuttal - Jernigan Answers Lehtman/Kaye As a Member of Fir POD/SIGCORE

Item 3 6

Reference (,10050,6d1 and ,6c1b) in which we ask any and all ARCers to join in a heightened activity, a program of increased learning in whatever subjects are felt will aid their personal development and will assist their understanding in the area of organizational development. Fir POD has already established a "growing commonality" within Fir POD and would now like to establish a healthy and active learning environment with ALL OF ARC. Please remind yourself: Insularity is just as much insularity, whether it is personal or broadened simply to the confines of one POD. Two months ago we broadened our "interactive spirit" to include all of Fir POD. Now we are reaching for all of ARC; tomorrow the world 6a

Item 4 7

Take another look 7a

Items 5 through 6b 8

Fir POD (now SIGCORE) is delighted to hear that Cedar POD is getting turned on. It sounds as though Cedar POD is doing some very interesting research in group organization. Bill Ferguson and I would be delighted to have you join the study group on "Effective Group Organization" (,10050,6c1h3), or the study group on Meeting Effectiveness (,10050,6c1h1) -- or both? 8a

Item 6d 9

We do, indeed, learn from people who are different from ourselves (,10050,6a1 and especially ,6a2). That is why we now are ready to enter into study groups not confined only to our present group of 7 people. We invite and ask that ALL KINDS OF DIFFERENT PEOPLE -- all of ARC -- join in these study groups. We do not want to confine ourselves to one small group, as pleasant an association as that is, but wish to raise our sights, expand our vision, and prepare for larger goals. 9a

Item 7 10

One of the reasons for starting PODs, according to DCE, was to conduct research and expand our awareness in the area of Organizational Development. The metamorphous of Fir POD into a service group to assist all of ARC in expanding their

learning curve is a serious and dynamic experiment in organizational development -- the development of several different kinds of organizations or small groups -- into group structure and dynamics. We have expanded our vision beyond our own little group and are learning by doing. 10a

INTRODUCTION 1

These are the start of the notes JCN took during the FRAMAC kickoff meeting May 5th, 10:00 to 12:00 1a

The session was recorded. The tape will be transcribed by PSO, with speakers other than DCE indentified with statement names. HGL will handle. 1a1

Those present were: 1a2

DI Andrews 1a3
MF Auerbach 1a4
WL Bass 1a5
DC Engelbart 1a6
JD Hopper 1a7
CH Irby 1a8
DS Kaye 1a9
MD Kudlick 1a10
HG Lehtman 1a11
JB North 1a12
JC Norton 1a13
P Rech 1a14
JF Vallee 1a15
DH van Nouhuys 1a16
KE Victor 1a17
DC Wallace 1a18
RW Watson 1a19
JE White 1a20

DR Brown 1a21

The FRAMAC meeting was announced and FRAMAC discussed in the DCE memo: (10331,). This was available in hardcopy for reading before the meeting. 1b

AGENDA GIVEN BY DCE AT START OF THE MEETING: 2

Voting machine intro 2a

Historical review by DCE 2b

FRAMAC: what and why - did not cover much 2c

View downstream - did not cover 2d

DCE wants to discuss views downstream, history, then get samples of FRAMAC understanding/beliefs, then periodic samples ..using voting machine if ok. 2e

TRIAL OF VOTING MACHINE 3

One use of the voting machine is for the group to sample the understandings and beliefs of the group as a whole. 3a

To illustrate the range of differences of opinion in such a group, DCE asked question: how many commands in our augmentation system two years from now:
200? 500? 1000? 3b

Voting responses were:
57% 50% 15% 3c

DCE talked of his trial of voting-machine techniques at MIT-MAC held several years ago. 3d

Question stack of people, one question each, reentry at bottom of stack to try to gain acceptance of ideas, explored areas of non-understanding, working toward more common set of beliefs. 3d1

Inconsistencies were pin-pointed through this process. 3d2

Points of order were set up by the MIT-MAC people. 3d3

FRAMAC voted to set up the following points of order to be used at future FRAMAC sessions (?): 3e

1 buzz: Not as worthwhile as I'd like 3e1

2 buzzes: Request clarification 3e2

3 buzzes: Let's move on 3e3

4 buzzes: Irrelevant 3e4

When one feels he wishes to raise one of these points of order, he pushes the two buttons on his voting "wand"; immediately, a buzzer sounds, and the rest of the group should vote 3f

Black button = YES, I agree 3f1

If YES, we stop and discuss; 3f1a

Red button = NO on the point. 3f2

If NO, we continue with the discussion. 3f2a

The resulting % yes, % no, % voting, and net % yes or no is displayed on meters visible to the group. 3g

There was no discussion of what % constitutes a yes vs what is a no from the group as a whole. 3g1

SERIES OF COMMENTS/DISCUSSION - DCE LED 4

DCE: was the FRAMAC memo clear? (see -- 10331,) 4a

KEV: Why are these particular people in FRAMAC? 4a1

DCE: This group is as close to the LINAC planning and design teams as he could get. It seemed important to have a close match. He wanted to establish working group for dialog. 4a1a

Introduced Dave Liddel (sp?) from Owens-Illinois who happened to be visiting today and was invited to the meeting. 4b

DCE said that his own makeup/state will affect our getting going in FRAMAC 4c

-When we review history, we will see his waits, gambles, hassles, all having effects on his present state. 4c1

- DCE has a need to unload, share history to get common area of understanding about how he feels, sees. 4c2

- this and future meetings to get DCE into a "certain state" and also FRAMAC people, too as perceived by DCE. 4c3

DCE is asking that FRAMAC not get involved in heavy disbelief trips until later stages. 4d

He expressed a need to feel that there is general understanding of his hassles, background, aspirations, for lots more of his framework to be seen before he can accept heavy disbelief. When DCE feels the understanding is there, he will be ready to accept (such trips). 4d1

He wants confidence we understand him even if we don't agree with him. Wants to withhold expressions of strong disagreement until we've hear him out; then he would like full expression. However, hw welcomes disagreement at any point it is blocking hearing him. 4d2

KEV: Wasn't PODAC for this kind of thing? 4e

DCE: the main differences are - 4e1

FRAMAC is to discuss and set the framework and goals 4e1a

LINAC is to carry out activities within the framework that move us toward the goals 4e1b

PODAC is to deal with beliefs, interests, help people and the organization in dealing with the goals and line activities that result. 4e1c

DCE ON HISTORY OF THE ARC PROGRAM DEVELOPMENT 5

The whole vector of our augmentation and bootstrapping community started in 1945 when DCE was in the Navy and stationed in the Phillipines. There he read Vannevar Bush's article on Memex, just published in Atantic Monthly, including some pictures and extrapolations. 5a

He had just been in a Navy radar training course and was impressed with the amount of work that could go on in a 16th of a second inside a radar set. 5a1

He later got intrigued with the possibility of training animals with electronics. That led him to think about the interfaces between organisms and equipment. 5a2

In late 1950, he got engaged. At that time he had graduated from college and had a steady job. The goals he had been working toward were reached and he found he needed a new set for the professional side of his life. 5b

He examined various crusades only to find that it appeared that there was a low probability that any one of them would really make a difference to the world, mainly due to the complexity of the problems they were focussing on and the environment in which they would have to be carried out. 5b1

The world seemed so complex that it was hard to know what specific state of affairs he would subscribe to create. He noted that crusades have the characteristic of being skewed from the main currents - they can't be run like a normal corporation. This adds to the probability that they won't have the effect they are seeking. 5b1a

He came to realize that one possible goal would be to improve the effectiveness within the society for dealing with urgent, complex problems. He decided to do this. 5b2

His engineering background, radar training and other interests led him to picture someone sitting at a cathode-ray tube, etc. -- it seemed like a great picture. 5b2a

In 1951, he left the job and went to UC Berkeley. 5c

At that time, he met Dave Brown who was just leaving for MIT. He also met Ed Van De Reit, a student there. 5c1

He tried a number of approaches as he worked toward a graduate degree. 5c2

He tried to formulate a machine that would teach people to type. The psychologists were interested, but the Engineering Department people felt it was too far away from their field - and computers. 5c2a

He did a survey on symbolic logic and its utilization, but it attracted no interest, just barely receiving a passing grade. 5c2b

He finally picked gas-discharge devices for his main effort. Some patents came from that work. His thesis involved making registers with these devices. 5c2c

He observed several phenomena in this effort -- doing logic by combinations of these, a thing you could use for memory, some of these phenomena go together to make the plasma display. 5c2c1

When he finished his graduate work, he stayed a while to teach, hoping to get some research going in this (augmentation?) field. 5c3

UC offered him an assistant professorship, including the opportunity to build up the computer research area, teach, get research going. 5c3a

Other people advised him that this might be dangerous and that he should get onto some project and write papers to establish himself. 5c3b

He decided that perhaps financial independence would help him later get into the field he really wanted to work in. (augmentation?) 5c4

This led him to embark upon a business venture using the gas-discharge patents he had acquired. 5c4a

He got a small company started with some partners and financial backing for the first year. 5d

After a while the backers hired SRI to evaluate to prospects for the company. They said it had come along too late, so the backers pulled out, leaving the equipment for DCE and his partners to use. 5d1

Soon, DCE decided that this would not lead him into the field he really wanted to work in. 5d2

So, he pulled out of the company and decided to go to SRI to get a steady income and build a position from which he could work into our field. 5d3

In 1957 he joined SRI's Computer Techniques Laboratory. 5e

He was advised early that he should put his "dream" aside for a while, so he did. 5e1

He worked for several years on magnetic core designs, acquiring some patents, and learned a lot about the whole semi-conductor solid-state electronics field. 5e1a

In 1959 he got some SRI overhead funds to work toward his "dream". 5f

He had trouble spending the money due to pressures of other SRI projects. 5f1

He did start a seminar with SRI and Stanford people to discuss augmentation and the effect on people if you bring in a whole new kind of technology into their environment to help them work. 5f2

His theme was that it really changes their way of thinking and working. 5f2a

This was very hard for them to see. 5f2b

He also said that if you bring it into a group, his hypothesis was that because of the dynamics of a group, it would be even more sensitive to the effect of this dynamics when bringing in new technology. 5f2c

He used the voting machine to illustrate the changes that occur in a group's way of doing things when technology is introduced. 5f2d

They experimented with different ways of using the machine. 5f2d1

It takes a lot of learning and skill and a design of rules of order to bring something like that in effectively. 5f2d2

Finally, there was a project for DCE from an idea of his: The Philosophy of Logic Realization. It helped him later conceptually. 5g

This project effort was directed toward the effects of changes in scale that were coming in electronics and the philosophy that was needed to deal with these effects. 5g1

The report from this work crossed the desk of a man in the Air Force Office of Scientific Research (AFOSR) and was the start of the project that permitted DCE to formulate his Conceptual Framework document, the 1962 OSR-1 report (3906,). 5h

Charlie Rosen was instrumental in getting the project started, by a timely visit to AFOSR. The AFOSR project was funded at $ 26,000. 5h1

The writing of the 1962 report was a very painful and lonesome process for DCE. 5h2

He had few, if any, people to talk with but did receive help 5h2a

from Rowena Swanson at AFOSR - she kept the project alive from that end, even though the sponsor's interest was lagging when he saw the first "far-out" ideas DCE came up with - and 5h2a1

from Shirley Hensel of SRI's editing staff, who gave him lots of time and patience. 5h2a2

SRI and AFOSR people who read the report didn't even ask how to pronounce H/LAMT and showed little understanding of what it was all about. 5h3

There were constant flareups of antagonism, misunderstandings, and misrepresentations so that DCE had a difficult job of trying to write the report to get across his ideas while still avoiding the controversies he expected. 5h4

When the report went out, people reacted against it. There

were a succession of SRI proposals for continuation of the work. 5h5

Their rejections were hard on DCE, but he kept trying. 5h5a

Some people even told SRI that the proposals were giving SRI a bad name and that they shouldn't let such stuff out as serious proposals. 5h5b

Then there was a series of proposals to NIH, ending in an NIH site visit to SRI where DCE was kept somewhat aside while others answered many questions for him. 5i

The proposal asked for a whole experimental computer facility that would cost something like $ 150-200 K for a CDC 160A computer. 5i1

DCE said that first he wanted to get a display. He would start with text and work toward getting fast and flexible manipulation and formulation of things on it. 5i2

The NIH people said that was not dramatic enough. 5i2a

DCE said that he wanted to get the basic things working smoothly before going on to more dramatic things, like storage etc. 5i2b

The proposal was rejected. 5i3

Then DCE met J.C.R. Licklider who had written a paper called "Man-Machine Symbiosis". 5j

This was a "beautiful article" and the start of new journal transactions on the human factors in electronics. 5j1

JCRL was at BBN and went to head an ARPA office (now the IPT office) to get computer and timesharing efforts going. 5j2

He had what was in those days a very large budget for such an unstructured program - DCE guesses $ 8-9 million/year. 5j2a

When he arrived at his new job, a copy of DCE's 1962 report was waiting. 5j2b

Since the program proposed fit with some of the things JCRL had been talking about, he gave DCE a project at the $ 200K level. 5j2c

The first ARPA project was started in an atmosphere of some non-understanding or at least non-agreement mainly over the question of what DCE should focus on at first. 5j3

At issue was DCE's desire to make user response really fast and flexible. ARPA felt that this had already been done at MIT. 5j3a

DCE felt that what he meant by FAST and FLEXIBLE wasn't getting through. 5j3b

The SRI efforts were directed toward use of the SDC Q32 machine at Santa Monica. 5j4

Early efforts were performed at Santa Monica with the SRI display 177 feet from the computer in another room. This, together with only two hours a day - and this in short bursts - wasn't a workable situation and JCRL saw this. 5j4a

DCE next proposed getting a CDC 160A and tying it to the Q32 over phone lines. After months they got it working. 5j5

SRI felt that DCE should be isolated from managing the project, so they set him up as an advisor off to the side. 5j5a

The design process was such that DCE couldn't get his ideas into the process effectively, being off to the side to prevent him from "stirring up too much controversy". 5j5b

The resulting design was far from what DCE thought he had advertized in the proposal, and the result was that ARPA stopped the project and proposed to cut it back to just DCE, a programmer, and the CDC 160A computer. 5j5b1

Even at that (for some reasons not mentioned?), DCE was faced with the loss of the 160A and the program was about to die right there. 5j5b2

At that time, there were some things going on at NASA that had a bearing on the future of DCE's program. 5k

Bob Taylor was a young psychologist who was learning about computers to help formulate what computers NASA would place at NASA's Electronic Research Center. DCE met him in his

search for support. Taylor soon was trying to find support for DCE's ideas. 5k1

He found $ 100 k that would be given through NASA Langley's Research Center. 5k2

At this time, Bill English agreed to come and help DCE. That was the Spring of 1964. 5k3

This was another point where the program would have died except for these fortunate events. 5k3a

There was also a project with the Air Force Electronics Systems Division that didn't turn out well due to changes at ESD and other factors. 5l

NASA and ARPA decided to put their funds together and put in funds in two-year intervals. A year later, DCE's program got the CDC 3100 computer. 5m

A movie was made on the 3100 that DCE showed at the ARPA contractors' meeting at MIT. This really showed what he had been talking about in the way of fast, flexible response. People were really impressed and the kind of timesharing they had been talking about to that time was seen as not being able to support such interaction. 5m1

Bob Taylor told DCE to think big ... and to submit a new proposal to ARPA, where Taylor was now located. 5m2

By summer, DCE had decided on getting an SDS 940 computer and the proposal reflected this. 5m2a

After a critical review by both ARPA and NASA the project was started. 5m2b

The transfer to the 940 took longer than expected. That was the start of the meta-complier techniques. 5m2c

Then came the chance to put on a show at the Fall Joint Computer Conference in 1968. 5m2d

Although putting on the show was a large gamble, contractually and professionally, it came off very well. This was another turning point. 5m2d1

In the Spring of '66 or '67, ARPA announced that it was going to put in the Network. They had the idea they were going to just couple computers computers together with x

kilobaud lines, and pretty soon. That was April; by August they hoped to have this connected and going. 5m3

DCE saw in this effort the need for some kind of information control center and he viewed it as an opportunity for more progress toward his own program's goals. 5m3a

So he volunteered to provide a Network Information Center service. 5m3b

The reception of the NIC idea at ARC was cool and even antagonistic. The need for providing typewriter service was also resisted. 5m3c

People (in the proposed Net?) were saying we needed NIC features at first that really had no way of being implemented soon --- CRT's everywnere, artificial intelligence things. 5m3c1

The ARPA community acceptance of the NIC (and ARC?) finally appeared reasonably good to DCE at the ARPA contractors' Meeting last Fall - 1971. The previous meeting was very difficult for him. 5m3d

During the past year, DCE has turned more attention toward his future plans. This let out many things he had been keeping pent up for years and has therefore been very hard on him. 5m4

This effort made the need for a better team organization even more clear. 5m4a

Therefore, he has been concentrating on getting LINAC, PODAC, and now FRAMAC started, so that our framework and goals can be made more clear, accepted, and carried out. 5m4b

QUESTIONS FROM THE GROUP 6

RWW: Expressed a need for more perspective on what the environment was at SRI for other programs getting started and just keeping alive. Is a course of events such as DCE experienced normal? Is this the kind of world the AI project, for example has lived in? Is this from some quirk in you or because of SRI or because of man-macnine stuff, 6a

DCE deferred to DRB and JCN for comments, since they have observed the process for some years. 6a1

DRB: Other projects at SRI have had their ups and downs and struggles like this. DCE had a combination of accidental factors including changes in personalities at ARPA. 6a2

He had some friends and enemies in SRI management and SRI had the general opinion that he was not a manager and kept management responsibility away from him. 6a2a

Programs that grow are generally run by "good managers" and they get support as this is recognized. This affected the course of DCE's program's development and it was many years before he was given any recognition in SRI's view. 6a2b

JCN: Charlie Rosen had some parallel problems in the development of his AI project (being thought of as a bad manager was not one of them), but as he started, his other interest, microelectronics, kept his group well funded and provided some protection to his new ventures. 6a3

DCE: Another difference was Charlie's support from Jerre Noe for the Perceptron ideas. The team meetings and promotion efforts really helped him. DCE didn't get this kind of attention and help. 6a4

Also, DCE's group was always the first one to get a new type of computer facility. This caused problems inside SRI in the approval chain. 6a4a

Another aspect was that although DCE says he is not a good manager, and that he has trouble communicating his ideas through incoherence, etc., the disparity of perspective between his goals and others expectations has made his communication even more difficult. 6a4b

The 3100 film made a great difference to people who, when they saw it, acted as though he had never told them about the value of speed and flexibility. 6a4b1

DCE discussed here the added value to the user as you go down to faster and faster response times, even to fractions of a second. This is generally not appreciated, until the image is really built in peoples' minds. It took the film to do this for the people at the MIT meeting. 6a4b2

PR: Did you have a vision in 1962 of where you would be today? 6b

DCE said that he coudn't guess about the timing, but that most of the things we have today were forseen in the 1962 report. One exception would be the development of the meta-compiler. 6b1

There were ideas about teams working together that would have appeared in the 1962 report, but that were cut out of the text. 6b1a

PR: You visualized what could be done with the hardware; did you have lots of thoughts about what information is and a concept of information? 6c

DCE: Yes, the 1962 report dealt with this. The report focussed on two things: 6c1

a. what's this thing called an augmentation system - what are the elements in it?, and 6c1a

b. what's an approach towards trying to get a discipline that can deal with it?. 6c1b

The approach soon turned out to be a very pragmatic evolutionary thing, and worked into bootstrapping. 6c1b1

CHI: Suggested that everyone re-read the 1962 report before the next meeting. 6d

RWW and DCE agreed that the next meeting should focus on the report. 6d1

DCE commented that no one mentioned or cited from the report for a long time it was published. 6d2

There was some discussion about the report being published in a book by Paul Howerton, with Rowena Swanson's help. 6d3

DCE also mentioned a paper he presented to the ADI (later ASIS) in 1959 and the subsequent 1969 ASIS presentation. 6d4

WLB: Did you forsee the resources that have been needed to get us to the present state in 1962? 6e

DCE: Not really. There was a choice someplace about whether to go ahead building a one-display system or whether to go the team route. He chose the team route, but has often had the thought that the system might be much farther along if he had stayed with one display. 6e1

The route we are on has to be explored, however, so most of the time he is happy with the choice. 6e1a

WLB: Now do you feel we're really moving back in the other direction where its providing a more central, individual augmentation system to the outside world? 6f

This wasn't really answered by DCE, rather he said that where we are now going is to places that are important to get to. We might have gotten there faster if it had been just one isolated example if it had been bright and exciting enough, dramatic enough to really sell people. 6f1

It is up to FRAMAC to integrate the possibilities for the future and repaint the pictures, in stages that may develop. With FRAMAC effort we should get this done and commit ourselves to a course of action along those lines. 6f2

7

To: Duane Stone, RADC 1

From: Jim Norton, ARC 2

We are forwarding to you five (5) copies of the ARC L10 Users Guide (9246,) in accordance with the requirements of our contract. 3

L10 User Guides for RADC

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