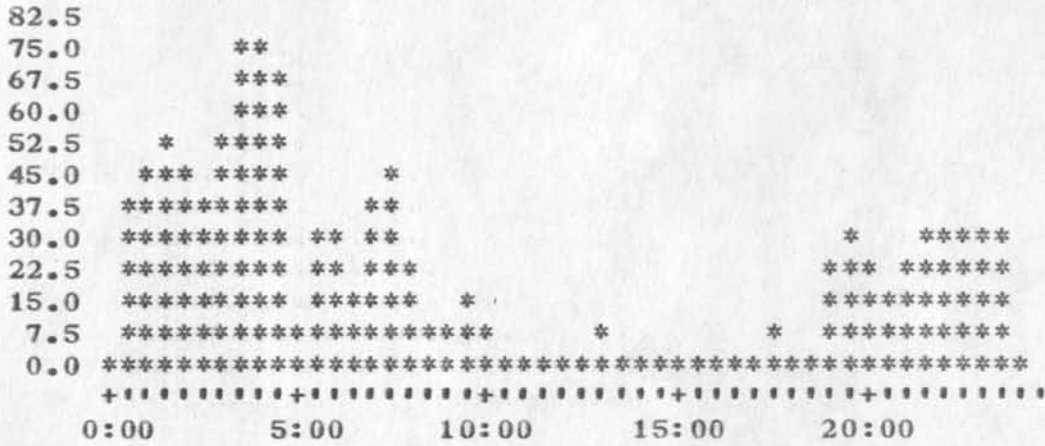


Superwatch Average Graphs for Week of 8/13/73

TIME PLOT OF AVERAGE IDLE TIME FOR WEEK OF 8/13/73
x axis labeled in units of hr:min, xunit = 30 minutes

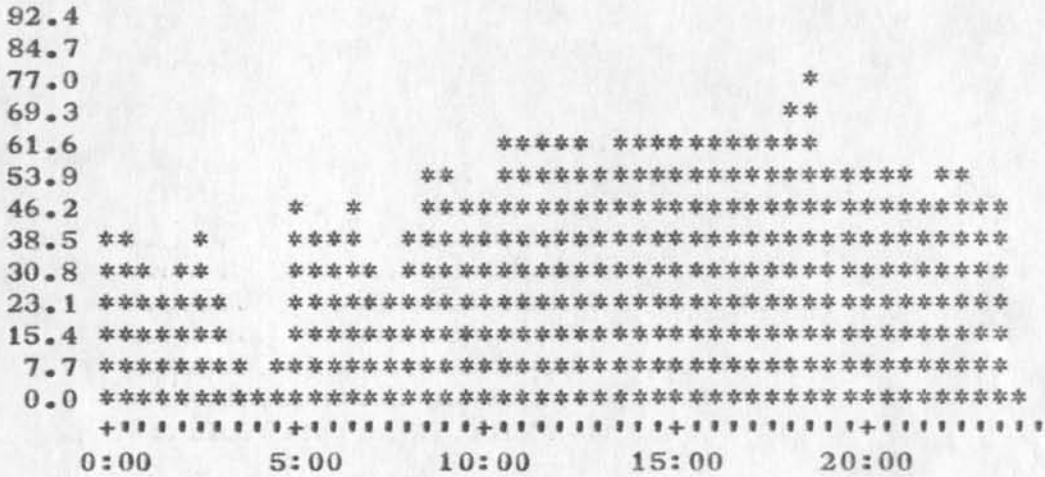
1



1a

TIME PLOT OF AVERAGE PER CENT OF CPU TIME CHARGED TO USER ACCOUNTS
FOR WEEK OF 8/13/73
x axis labeled in units of hr:min, xunit = 30 minutes

2

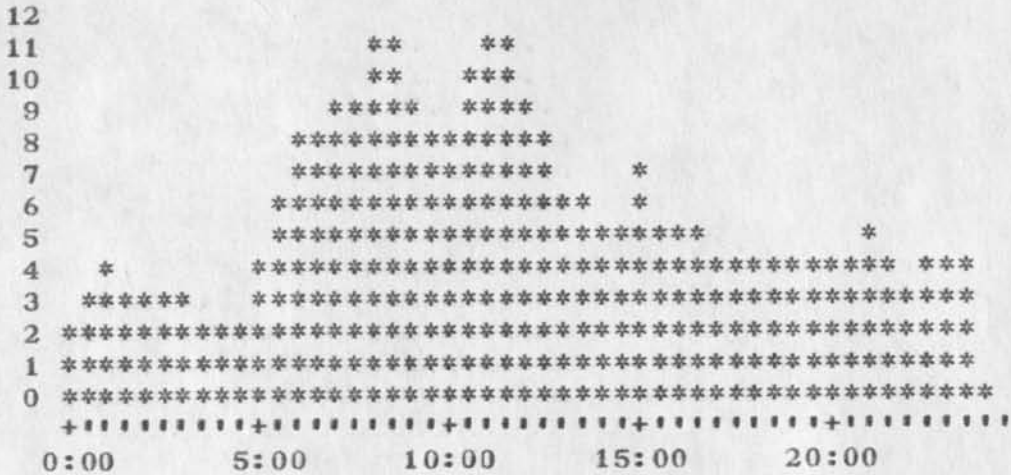


2a

Superwatch Average Graphs for Week of 8/13/73

TIME PLOT OF AVERAGE NUMBER OF NETWORK USERS FOR WEEK OF 8/13/73
x axis labeled in units of hr:min, xunit = 30 minutes

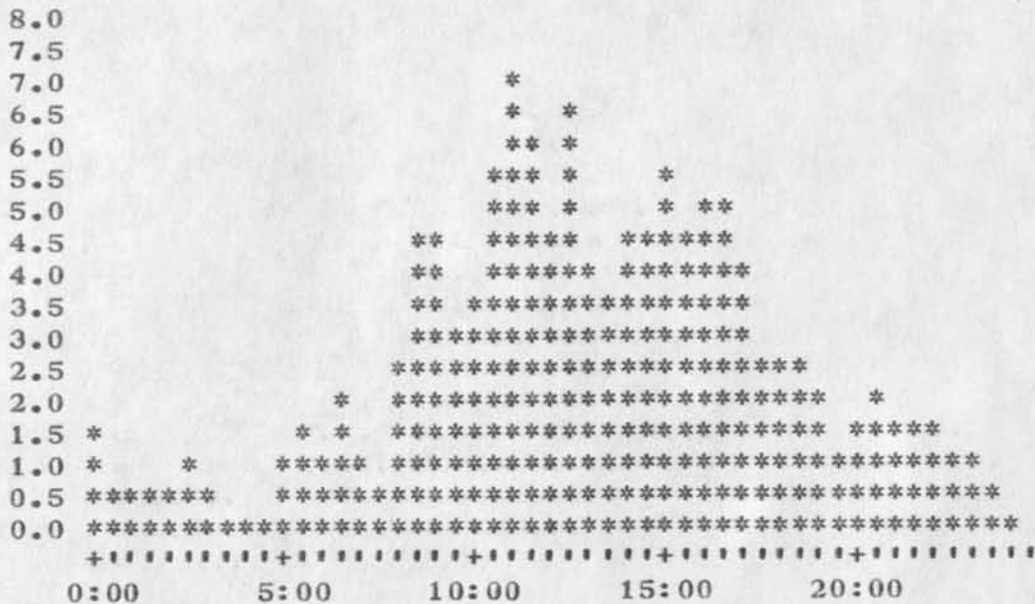
3



3a

TIME PLOT OF AVERAGE NUMBER OF GO JOBS FOR WEEK OF 8/13/73
x axis labeled in units of hr:min, xunit = 30 minutes

4

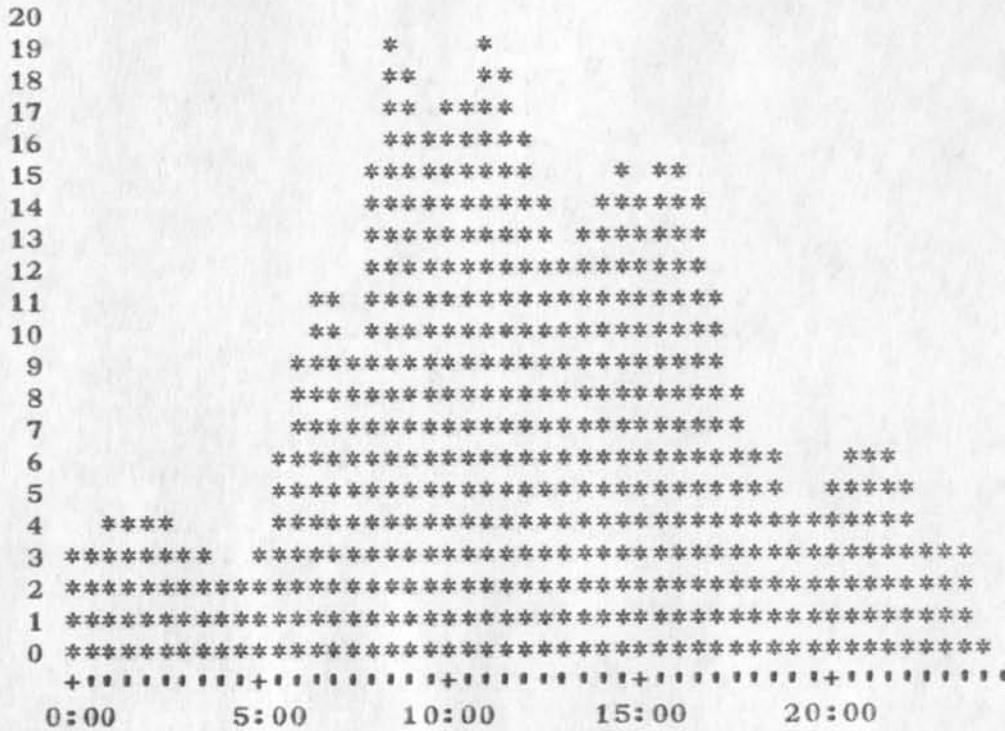


4a

Superwatch Average Graphs for Week of 8/13/73

TIME PLOT OF AVERAGE NUMBER OF USERS FOR WEEK OF 8/13/73
 x axis labeled in units of hr:min, xunit = 30 minutes

5

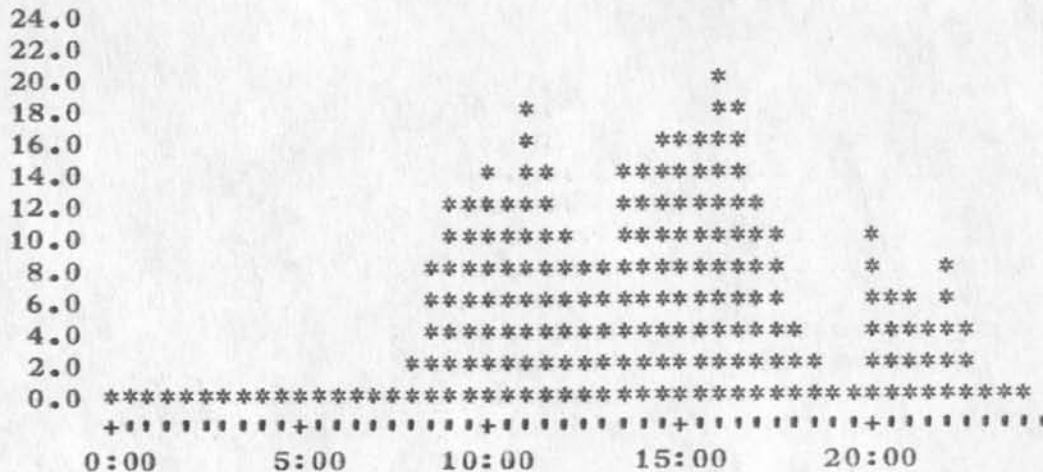


5a

TIME PLOT OF AVERAGE PER CENT OF SYSTEM USED IN DNLS FOR WEEK OF 8/13/73

x axis labeled in units of hr:min, xunit = 30 minutes

6



6a

18615 Distribution

James C. Norton, Richard W. Watson, Douglas C. Engelbart, Paul Rech,
Donald C. (Smokey) Wallace, Jeffrey C. Peters, Dirk H. Van Nouhuys,
Elizabeth J. (Jake) Feinler, Charles F. Dornbush, Kirk E. Kelley,
Duane L. Stone, Beauregard A. Hardeman,

Superwatch Average Graphs for Week of 8/13/73

(J18615) 22-AUG-73 11:23; Title: Author(s): Susan R. Lee/SRL;
Distribution: /JCN RWW DCE PR DCW JCP DVN JAKE CFD KIRK DLS BAH;
Sub-Collections: SRI-ARC; Clerk: SRL;
Origin: <LEE>WEEK8/13GRAPHS.NLS;2, 22-AUG-73 11:19 SRL ;

FORM 30

01R's							1a
FY75 \$	title	task sec MY		FY74 \$	MY		1b
	Math Tech Anal & Des Comp	02 ISIM	127,959	.2 127,959	.2		1c
	Large Scale Info Sys	02 ISIM	96,763	.5			1d
	DM-1 Err Anal/Maint	02 ISIM	7,113	.2			1e
	Jovial Valid Sys (JCVS)	12 ISIS	23,210				1f
	Statistics on Jovial Lang	12 ISIS	6,728				1g
	Jovial Imple Tool (JOCIT)	02 ISIS	86,073				1h
	AKW Evaluation	02 ISIM	53,972	.1			1i
	Info Retr Res Support	02 ISM	25,000				1j
	Modeling of Data Mang Sys	02 ISIM	62,623	.25			1k
	Comp Perform & Measure Sty	12 ISIS		63,550			1l
	GCOS/Multics File Tran Fac	02 ISIM		48,456	.2		1m
	Auto Verification Sys	02 ISIS	82,816	82,817			1n
	Proj 5581 TDR Funds	02 ISI	4,800	4,800			1o
	TDY (proj form & mgt)	02 ISI	40,000	40,000			1p
	Rental of BR-700	02 ISIM	17,388				1q
	Proj 5581 Hard Main	02 ISF	110,000	110,000			1r
	Computer Rental & Main	02 ISF	1,350,000	1,350,000			1s
	Leased Comm & Main	02 ISF	70,000	70,000			1t
	Computers Supp & Equip	02 ISF	37,000	37,000			1u
	Mod 300 Term Lease & Main	02 ISF	21,600	21,000			1v
	Auerbach Manual Update	02 ISF	2,640				1w

FORM 30

New Starts							1x
Computer Security Tech Sty	02	ISIM	23,500		.2		1y
Jovial Imple Tool (JOCIT)	02	ISIS	90,000				1z
AHI Line Printer	02	ISIM	24,000	.1			1a@
AKW LINE PRINTER							1a@1

This effort is for the procurement of a reliable medium speed, good quality line printer for outputting draft and final copies of documents created in NLS. It will be directly connected to the TIP, via a special hardware interface. 1a@1a

Beehive Terminals	02	ISIS	2,900				1aa
Ext Harvard Ecl Prog Sys	12	ISIS	50,000				1ab
Large Scale Info Sys	02	ISIM	125,000	.5	300,000	1.0	1ac
NLS Service	02	ISIM	150,000	.1	50,000		1ad
NLS SERVICE							1adi

Program \$1.0 Million ReleasednT8b7y@20The approach will be to solicit NLS service from available sources. At this time it is expected to be SRI, who will subcontract (probably to Tymshare Inc.) for the basic computer time. Of partic 1adia

The approach will be to solicit NLS service from available sources. At this time it is expected to be SRI, who will subcontract (probably to Tymshare Inc.) for the basic computer time. Of particular interest will be the reliability and consistency of the service. It has been shown during initial use of NLS that the motivation to use the system and the speed with which one can learn to use the system is directly affected by the availability of the system. 1adib

FORM 30

	New Starts (Overceiling)				1ae
AKW Terminals	02 ISIM 50,000	.4			1af
AKW TERMINALS					1af1

This effort will continue to monitor the commercial developments in the terminal field as they apply to AKW technology. Of particular interest will be inexpensive CRTs and graphics output devices. SRI has constructed a terminal with all the textual capabilities of the IMLAC, and feels it should be commercially available for under \$5K. Since preliminary evaluation here at RADC has revealed the superiority of DNLS over TNLS, we will be purchasing a number of these units if it passes SRI's evaluation. 1af1a

DM-1 Software Main	02 ISIM 45,000	20,000		1ag
Associative Tech for DM	02 ISIM 50,000	45,000		1ah
Secure Data Mang	02 ISIM 50,000			1ai
GCOS Investigations	02 ISIM 30,000	45,000		1aj
NLS/IDS Interface	02 ISIM 30,000	1.1 40,000		1ak
IDS/NLS INTERFACE				1ak1

The objective of this effort will be to create a data management system accessible through NLS. 1ak1a

To complete the evaluation of AKW technology in an organizational environment, some reasonably sophisticated data management capability is needed to support the IS organization. The philosophy of the ARPANET and economics dictate that software/hardware facilities be used where they exist. Data management capabilities and expertise exist at RADC. Only elementary data management capability exists under NLS at SRI. By FY-74 protocol should be available for shipping files over the ARPANET. Therefore, data management capabilities will not be replicated at SRI, but interface packages will be constructed between NLS and RADC's data management software to allow easy transfer of files and data between SRI and RADC over the ARPANET. This will allow economic access to a data management system and also test the ability of the ARPANET to facilitate data transfer between two dissimilar hard/software facilities. 1ak1b

Software Modeling Studies	14 ISIS 136,000	136,000		1al
---------------------------	-----------------	---------	--	-----

FORM 30

Semanol J-73	12	ISIS	99,000			1am
Compiler Optimization Sty	02	ISIS	90,000			1an
Auto Jovial Converter	02	ISIS	30,000	60,000		1ao
Software Reliability Study 60,000	02	ISIS		86,600		1ap
Semanol/Cobol, Fortran	12	ISIS	-	150,000		1aq
S/W Relia Data Repository	02	ISIS	-	100,000		1ar
Impl Jovial Stat Coll	12	ISIS	30,000	60,000		1as
Distributed Data Bases	02	ISIM		80,000	.2	1at
Data Structure Facility	02	ISIM		90,000	.2	1au
Graphics Interface for DMS .2	02	ISIM			75,000	1av
Automated Test Tools	02	ISIM		95,000	.2	1aw
O/S Enhancements for DMS	02	ISIM		90,000	.2	1ax

FORM 30

In-house					1ay
Data Mgt Sys (DMS) Dev	02	ISIM			1az
MULTICS DMS	02	ISIM	1.5	1.5	1b@
GCOS Investigation for DMS 1.5	02	ISIM	1.5		1ba
Assoc Proc/DMS Experiments 1.0	02	ISIM	1.0		1bb
AKW Training	02	ISIM	.2		1bc
Adv Manag Techniques	02	ISIM	.8		1bd
AKW Evaluation	02	ISIM	1.1		1be

*****PROJECT 9339*****

1bf

Data Hand Sup Air Staff 01 ISIM

.2

.2

1bg

FORM 30

*****PROJECT 0967*****

1bh

01R's

1bi

Net Info Ctr & Comp Aug 01 ISIM 817,484 .2

1bj

New Starts

1bk

Net Info Ctr & Comp Aug 01 ISIM 750,000 .1 1,8000,000
.4

1bl

NLS Utility 01 ISIM 400,000 .2 480,000 .2

1bm

FORM 30

*****PROJECT 5550*****

					1bn
Program \$1.0 Million Released					1bo
63728F	Advanced Computer Technology				1bp
OIR's					1bq
Large Scale Info Sys Syr U (F30602-72-C-0281)	01 ISC	91,377	0.1		1br
Maint Concept for Assoc Proc WW Gaertner(F30602-72-C-0462)	01 ISC	71,000	0.1		1bs
SIMDA Procurement TI Inc.	01 ISC	25,000	0.1		1bt
DM-1 Remote Query Auerbach(F30602-73-C-0165)	04 ISI	147,800	0.6		1bu
DMS Eval Methodology Sys Architects, Inc(F30602-73-C-0250)	04 ISI	15,215	0.2		1bv
DMS Test Methods (F30602-73-C-0223)	04 ISI	- - -	0.2		1bw
Imbedded S/W Monitors (F30602-73-C-0198)	04 ISI	- - -	0.2		1bx
	TOTAL		350,392		1by
NEW STARTS					1bz
Terminal Rentals for Assoc Proc	01	ISC	2,472		1c@
Spares & Test Equip for Assoc Proc 0.1		01 ISC	36,136		1ca
Assoc Proc Applications Sty 20,000 (Boeing)	01 0.2	ISC	73,000	0.3	1cb
S/W Cert Rel & Timeliness (MITRE)	08 ISI	195,000	0.3		1cc
S/W First Design Concept (MITRE)	08 ISC	50,000	0.5		1cd
Project Travel		12,000			1ce

FORM 30

TDRs	1,000				1cf
ADP Sys Security(PD to ESD)	09		280,000	(ESD)	1cg
	TOTAL		649,608		1ch
	GRAND TOTAL		1,000,000		1ci

PROGRAM WITH ADDITIONAL \$1.9 MILLION FY-74 FUND RELEASED ON
1 JAN 74 1cj

NEW STARTS 1ck

Assoc Proc Display Interface	04	ISC	40,000	0.3		1cl
50,000	0.3					
S/W Error Data Collection	08	ISI	40,000	0.1		1cm
(Aerospace)						
Structured Prog Sys	08	ISI	190,000	1.0	150,000	1.0
J-73 Compiler	08	ISI	250,000	1.0	600,000	2.5
ADP Sys Sec (PD to ESD)	09		620,000		(ESD)	1cp
Rad Hard Comp(PD to AFAL)	11		335,000		(AFAL)	1cq
Airborne C&C Display Con	14	ISC	50,000	0.5	180,000	0.5
(DF 74-1-5550)						1cr
Transferability Aids(PD to ESD)				*ISI	375,000	1cs
(ESD)						

Additional FY-74 TOTAL 1,900,000
980,000 FY-75 OIRs 1ct

IN-HOUSE EFFORTS 1cu

A.P. Cost Study	01	ISC	8.6	8.6		1cv
DMS for RAC	04	ISI	2.0	0.5		1cw
WWMCCS Software Support	04	ISI	1.5	1.7		1cx

*Area of possible RADC participation 1cy

FY-74 OVERCEILING 1cz

Assoc Proc Sig Processing Sty	01	ISC	90,000			1d@
-------------------------------	----	-----	--------	--	--	-----

FORM 30

Assoc Proc Library Routines	01	ISC	50,000		1da
Assoc Proc Applications (MITRE)	03	ISC	160,000		1db
S/W Relia Error Anal (MITRE)	08	ISI	50,000		1dc
S/W Error Data Coll (Aerospace)	08	ISI	35,000		1dd
S/W First Des Concept (MITRE)	08	ISC	40,000		1de
ADP Sys Security (PD to ESD)	09		130,000	(ESD)	1df
Secure DMS Sty	09	ISI	100,000		1dg
Simulation Tools Eval (PD to ESD)	09		100,000	(ESD)	1dh
Fusion Usage Sty	11		50,000	RADC/IR	50,000 1di
CDC 6600 Netting (PD to ESD)		*ISC	100,000	(ESD)	1dj
Auto Reqmt's Anal (PD to ESD)			150,000	(ESD)	1dk
Eng Stds Develop (PD to ESD)			108,000	(ESD)	1dl
FY-75 PROGRAM					1dm
OIRs				1,000,000 4.5	1dn
New Starts					1do
Term Rent for Assoc Proc	01	ISC	2,500	0.5	1dp
Assoc Proc Data Manipulator 0.5	01	ISC		147,500	1dq
DMS Modeling	04	ISI	355,000	2.5	1dr
S/W Reliability (MITRE)	08	ISI	75,000	0.1	1ds

FORM 30

S/W Structure Testing (MITRE)	08	ISI	75,000	0.1	1dt
S/W First Imple	08	ISC	600,000	1.5	1du
ADP Sys Security (PD to ESD)	09	ESD	1,600,000		1dv
Reqt's Analysis (PD to ESD)	10	ESD	420,000		1dw
Rad Hard Comp (PD to AFAL)	11	AFAL	525,000		1dx
			4,800,000		1dy
FY-75 OVERCEILING					1dz
Assoc Proc Sig Proc Demo	01	ISC	90,000		1e@
AWACS Appl Sty(II)	01	ISC	180,000		1ea
Large Scale Info Proc (Syracuse Univ)	01	ISC	100,000		1eb
Wired Organization	06	ISI	500,000		1ec
Secure DMS Imple	04	ISI	200,000		1ed
Assoc Proc Applications	01	ISC	160,000		1ee
.138					1ef
					1eg
Large Scale Info Proc (Syracuse Univ)	01	ISC	100,000		1eh
Secure DMS Imple	04	ISC	200,000		1ei
Assoc Proc Applications (MITRE)	01	ISC			1ej

form30

(J18616) 22-AUG-73 11:34; Title: Author(s): Duane L. Stone/DLS;
Distribution: /FJT EJK; Sub-Collections: RADC; Clerk: DLS;
Origin: <STONE>FORM30.NLS;2, 22-AUG-73 11:21 DLS ;

form30

<TOMAINI>FORM30.NLS;1, 3-JUL-73 09:14 FJT ;

Filename completion

Charles -- Concerning the upcoming change to NLS user interface, besides very much liking the trend towards 'predictability' and tightness of organization, I anted to check on / suggest the following:

Filename completion, as in Tenex.

--dave

18617 Distribution
Charles H. Irby,

Filename completion

(J18617) 22-AUG-73 13:44; Title: Author(s): David H. Crocker/DHC;
Distribution: /CHI; Sub-Collections: NIC; Clerk: DHC;

Scheduled Network Changes and IMP Downs

There are several recently scheduled changes to the network which may be of interest. Some of these involve retrofits to existing machines, which will require that they be removed from service for one or two days. Others are the scheduling of additional Host interfaces or other additional equipment. (All addresses given below are decimal numbers.)

The London TIP is still not connected to the network; the date of connection is currently unclear.

The Tymshare machine will be delivered as a TIP rather than as an IMP. The TIP's address will be 171.

Aberdeen and Belvoir will be taken down (one at a time) on August 27 for retrofits. Belvoir will gain a second Host interface (address 71).

The Ames IMP (#15) will be down for several hours starting at 6pm (Pacific Time) on August 31 for a retrofit.

LBL will be down on September 4 for a retrofit.

Utah will be changed to a TIP on September 6-7. It will be down during the change-over. The TIP address will be 132.

Aberdeen will be down on September 13-14. (The current 316 IMP will be replaced by a 516 IMP.)

Sometime after September 20, at the discretion of the site personnel, the address of the MULTICS machine will be changed from 6 to 44.

A TIP will be installed at Wright-Patterson AFB on October 11. The TIP's network address will be 175.

The University of Michigan will be added as a Very Distant Host on the Case IMP on or after October 4. The network address will be 77.

A Very Distant Host interface (address 95) will be added to CCA on December 6.

A Very Distant Host interface (address 130) will be added to SRI on December 6.

Scheduled Network Changes and IMP Downs

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Scheduled Network Changes and IMP Downs

(J18618) 22-AUG-73 15:19; Title: Author(s): Alex A. McKenzie/AAM;
Distribution: /NLG NSAG NAG; Sub-Collections: NIC NLG NSAG NAG; Clerk:
AAM;

18618 Distribution

Derek Leslie Arthur Barber, Tjaart Schipper, Richard M. Van Slyke, E. M. Aupperle, Hubert Lipinski, Robert F. Hargraves, C. D. (Terry) Shephard, Maurice P. Brown, Robert L. Ashenhurst, Linda M. Webster, Anita L. Coley, Carol J. Mostrom, Harold F. Arthur, Peter R. Radford, Wayne R. Robey, Joshua Lederberg, Connie Hoog, Leonard B. Fall, James A. Blunke, David Hsiao, Michael L. Marrah, Vinton G. Cerf, Richard G. Powell, Gerald L. Kinnison, Paul Baran, Henry Chauncey, J. T. Sartain, Robert N. Lieberman, Ralph Alter, Nils Maras, Philip H. Enslow, Robert M. Dunn, Joseph B. Reid, William T. Misencik, Toshiyuki Sakai, Louis Pouzin, Yngvar Lundh, Robert H. Hinckley, Marvin Zelkowitz, Don D. Cowan, Louis F. Dixon, Michael O'Malley, Peter Kirstein, David J. Farber, Dave Twyver, Art J. Bernstein, Dave E. Liddle, A. Kenneth Showalter, D. D. Aufenkamp Nancy C. Thies, Robert Silberski, Marcia Lynn Keeney, Margaret A. (Maggie) Bassett, J. A. Smith, Leina M. Boone, Diana L. Jones, Nancy J. Neigus, Terry Sack, Frances A. (Toni) McHale, Lucille C. (Lucy) Gilliard, Ed J. Collins, Gary Blunck, John F. Heafner, Kathy Beaman, David J. King, C. Jane Moody, Sue Pitkin, Jerry Fitzsimmons, Gregory P. Hicks, Gloria Jean Maxey, Roberta J. Peeler, Craig Fields, Ermalee R. McCauley, Margaret Iwamoto, Dee Larson, Robert E. Doane, Brenda Monroe, Jeanne B. North, Pam J. Klotz Cutler, Barbara Barnett, Stan Golding, Steve G. Chipman, John P. Barden, Martha A. Ginsberg, Shirley W. Watkins, Janet W. Troxel, Connie D. Rosewall L. Peter Deutsch, John Davidson, Thomas O'Sullivan, Sol F. Seroussi, Scott Bradner, Robert H. Thomas, Michael J. Romanelli, Ronald M. Stoughton, A. D. (Buz) Owen, Robert L. Fink, Jeanne B. North, Steve D. Crocker, Thomas F. Lawrence, John W. McConnell, James E. (Jim) White, A. Wayne Hathaway, Patrick W. Foulk, Richard A. Winter, Harold R. Van Zoeren, Alex A. McKenzie, Abhay K. Bhushan, B. Michael Wilber, Edward A. Feigenbaum, Robert T. Braden, James M. Pepin, John T. Melvin, Peggy D. Irving, Roy Levin, M. P. McCluskey, Pitts Jarvis, Barbara A. Nicholas, Jacquie A. Priest, Terence E. Devine, Paul M. Rubin, Paula L. Cotter, O. A. Hansen, Dan Dechatelets Tom P. Milke, Alan H. Wells, Chuck R. Pierson, Carl M. Ellison, Robert P. Blanc, Jay R. Walton, Terence E. Devine, David J. King, William L. Andrews, Milton H. Reese, Kenneth M. Brandon, Lou C. Nelson, Jeffrey P. Golden, Richard B. Neely, Dan Odom, Ralph E. Gorin, Robert G. Merryman, P. Tveitane, Adrian V. Stokes, David L. Retz, Reg E. Martin, Gene Leichner, Jean Iseli, James E. (JED) Donnelley, William Kantrowitz, Michael S. Wolfberg, Yeshiah S. Feinroth, James Hurt, Anthony C. Hearn, Eric F. Harslem, Robert M. (Bob) Metcalfe, Bradley A. Reussow, Daniel L. Kadunce, George N. Petregal, Michael B. Young, Michael A. Padlipsky, Schuyler Stevenson

the new larger ports on 893-3214-8 work just fine. I guess there is still some unreliability in the transmission, but now we can get a full line of data in at 300 baud. Many thanks to all concerned.
Mike Leavitt

1

18619 Distribution

Susan S. Poh, David C. Wood, Jean Iseli,

(J18619) 23-AUG-73 08:16; Title: Author(s): M. R. Leavitt/MRL;
Distribution: /SSP DCW2 JI; Sub-Collections: NIC; Clerk: MRL;

18620 Distribution

Edmund J. Kennedy, John L. McNamara, Frank J. Tomaini,

TPO 11-FINAL FORMAT

This is reformatted TPO 11, according to the official format..took about an hour to redo, which is equivalent to a retyping job.

TPO 11-FINAL FORMAT

3.11 Technology Planning Objective No. 11 - SOFTWARE SCIENCES
TECHNOLOGY

3.11.1 GENERAL OBJECTIVES:

The general objectives of this TPO are to develop techniques to improve the reliability, reduce the cost and increase the usefulness of computer systems to the Air Force.

3.11.2 SPECIFIC GOALS AND TECHNICAL APPROACHES:

The overview chart (Fig. 3.11-2) illustrates the plan for meeting the general objectives. The objectives are a distillation of requirements of the systems listed on the right side of the chart. These systems 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 supports data reduction activities in practically all other systems. To support these systems, the three areas of effort in this IPO are oriented toward the major goals or products shown on the overview chart. Each of the areas of effort will be discussed in the order indicated on the overview chart.

3.11.2.1 SOFTWARE TECHNOLOGY - The goal of this Technical Area is to develop a methodology for quality control of computer Higher Order Languages (HOLs) and procedures for the generation of cost effective error free software systems.

The goals of the HIGHER ORDER LANGUAGES DESIGN TOOLS effort are to produce tools to test Higher Order Language compilers, and to produce high quality compilers in an expedient, low cost manner so that they will be more readily available for Air Force use.

The development of compiler validation systems is one part of this effort. A compiler validator for JOVIAL/J3 called JCVS has been developed and augmented to a degree where it is the most complete single test of a compiler in existence. The success of this tool has prompted the development of a similar system for JOVIAL/J73 compilers. An evaluation of compiler validators already in the field for COBOL and FORTRAN is also underway. A BASIC compiler validator is under development in-house, and a follow-on is planned to utilize modern "theorem-proving" techniques to build an "absolute" compiler validator.

In an attempt to capitalize on state-of-the-art compiler building techniques, a compiler building tool called JOCIT will be completed in FY-74 for JOVIAL/J3, which will produce high quality transferrable JOVIAL compilers with reduced cost and effort. The first

TPO 11-FINAL FORMAT

compiler will be ready for use by the WWMCCS community by November 73, as can be seen from the milestone chart. Again looking at the chart, it is apparent that a follow-on effort to develop a JOCIT system for JOVIAL/J73 will be completed in FY-76.

There are also efforts in the program which will provide the Air Force with the ability to evaluate its applications with respect to which HOL and/or compiler will meet its needs, and the ability to better specify the HOL or compiler.

The results of this program are directed toward giving the Air Force a measure of control over the HOLs it uses. The first effort undertaken was to develop a HOL, called JOVIAL/J73, that is more responsive to Air Force needs. The specification of this HOL was completed in FY-73 as shown by the milestone chart.

The problem of multiple interpretations of programming languages, arising from incomplete, ambiguous specifications, was attacked by the development of a system called SEMANOL which enables one to precisely specify and check out the syntax and semantics of a HOL. SEMANOL was applied to JOVIAL/J3 in FY-73 with satisfying results and will be utilized to "debug" the JOVIAL/J73 specification mentioned above in FY-74. Future plans include the application of this system to other Air Force standard HOLs such as FORTRAN and COBOL.

In order to collect proper data on HOL use in the Air Force so that constructive changes can be added, statistics gathering packages for JOVIAL and BASIC are being developed. These packages will utilize information available to HOL compilers to provide the data which was drastically lacking in the past when HOL or compiler updates were attempted.

Other work in this area includes studies into HOL requirements of specific Air Force systems such as DAIS (Digital Avionics Information System), the comparison of all Command and Control HOLs in use by DOD, the development of one Extensible Language as a contrast to the Air Force's support of several disjoint HOLs, and the development of a translator which will automatically rewrite computer programs from older JOVIAL dialects to the new dialect, J73, thus saving programming costs and easing the transition.

The last product on the milestone chart, in FY-77, represents the gathering of the tools and technology developed from the Compiler Technology and Language Control area into one neat package which will give the Air Force complete control over any HOL it chooses to use.

The goals of the RELIABLE SOFTWARE DESIGN TOOLS

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effort are to investigate and develop techniques to reduce the time and cost of procurement and increase the reliability of complex system software.

16

The development of complex software systems necessitates the need for increasingly more reliable techniques for designing and controlling the software development process. Study efforts completed during FY-73 demonstrated that structured programming technology may significantly increase programmer productivity and software reliability. Contractual efforts have accordingly been initiated in FY-74 which will attempt to develop a complete environment for software production. A detailed set of guidelines will be produced that will serve to transfer present technology in structured programming (SP), top-down programming, chief programmer team (CPT) and programming support libraries (PSL) to the Air Force for further application. Areas to be investigated include: the development of SP language standards for COBOL, FORTRAN, JOVIAL J3 and J73; analysis of data structuring methods, and development of requirements for a CPT and PSL. Other aspects of software quality architecture and software quality engineering will also be explored including the metrics of software quality.

17

Another aspect of software that currently requires vast expenditures of manpower and computer resources is the area of testing. Because of the size and complexity of current software systems, it has become virtually impossible to certify system software performance. To increase software reliability, automated verification systems (AVS) are being increasingly employed. A contractual effort was initiated in FY-74 to explore the feasibility of developing verification tools for use on software written in JOVIAL. Future versions will also be able to process software written in other HOLs, such as FORTRAN and COBOL.

18

AVS systems allow segmentation of source code into user defined segments and based upon a given set of input data, the program produces counts on the number of times each segment is executed (if at all). Cumulative statistics are collected over many test cases to determine the efficiency and thoroughness of testing. Concurrent in-house evaluation of existing AVS designs will be performed to further assess the merit of such systems for eventual transfer to other Air Force commands.

19

Initial design of a centralized software data file on software reliability models, statistics, and software error data was initiated in FY-73. Several contractual efforts were also initiated in FY-73 to study the nature of software reliability modeling, software errors, their classification and number, their removal during testing and correction, the prediction of their occurrence, and techniques for writing low error content software. An effort was also initiated in FY-73 to study existing methods of detecting and evaluating software

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failures during testing and operational phases of large Command and Control Software Systems. 20

3.11.2.2 MANAGEMENT INFORMATION SYSTEMS - The goals of this Technical Area are to develop for users the ability to manipulate large data bases for Command and Control and Air Force Management Systems with particular emphasis on multi-level security; and develop on-line computer tools, which directly aid the Air Force knowledge worker (commander/manager). 21

The goals of the DMS DESIGN TOOLS effort are to develop and exploit new data management concepts, to improve the performance of existing systems and to provide specifications for future systems. The approach consists of examining the data management requirements of the Air Force, assessing currently available software to meet these requirements and utilization of advanced operating systems, new computer architectures and networking techniques. 22

RADC is completing the first implementation of a data management system DM-1 (Data Manager). This system is extremely flexible in design, is programmed in JOVIAL and its overall design contains the best features of many other systems incorporated into one system design. From DM-1 will come many of the items that will aid in future Data Management System acquisition, such as: complete separation of logical and physical files and a library service which will allow application program generation from a pool of common processes (subroutines). 23

In in-house effort to investigate the potential of the ARPA sponsored MULTICS operating system as a host for data management system development has been highly successful. It has produced a set of primitive tools for the construction of a DMS in the Multics environment. The tools provide a development framework in the DMS functional areas of storage management, process control, access control and related maintenance operations. One of the products of this work is a GCOS Multics File Transfer Facility being built for the Data Services Center using these functions. This effort is expanding in conjunction with ESD/MCI in producing a secure data management system within a modified, secure MULTICS. 24

Another effort involves analysis of various GCOS functions that could be exploited by data management systems. Functions under investigation are; transaction processing, priority dispatching and network processing. In addition, this work will study capabilities which could be added to GCOS to support advanced DMS concepts. Exploratory efforts are also beginning to assess the feasibility of distributed data management using the ARPA network. Functions to be analyzed include remote transactions, concatenation of logically identical data bases and provision for data base interrelations to span

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system boundaries. An effort to study the effects of associative processing on data management requirements and capabilities is underway. The purpose is to conduct experiments and studies which will determine the most effective way to utilize the associative processor to handle DMS operations which are presently performed inefficiently by conventional systems. File searches, index searches, updates and field comparisons are some of the DMS operations to be examined.

25

The goal of the AUGMENTED WORKSHOP IMPLEMENTATION effort is to implement and evaluate the cost-effectiveness of providing the Air Force knowledge worker (commander, manager, staff, worker) with a computer based augmentation system to assist him in his daily work.

26

The efforts in this area are based on the Augmented Knowledge Workshop (AKW) technology developed at Stanford Research Institute (SRI) under ARPA sponsorship over the past 10 years. RADC personnel have monitored this program for the past 5 years and are convinced that the feasibility of significant job performance improvement in a knowledge work environment is indeed possible.

27

SRI has developed an On Line System (NLS) through a "bootstrapping" process where the system's capabilities at any particular instance in time are used to further develop the system. The augmentation capabilities of the system have evolved through the individual, to the team, to the organization stage, and are now approaching the community stage via use by individuals and teams around the ARPANET. This evolutionary interplay between development and evaluation is the approach being used at RADC to adapt the technology to Air Force needs.

28

The activity during FY-72 was concentrated on acquiring the necessary physical plant for use and evaluation of the SRI AKW system. RADC was connected to the ARPANET via a Terminal Interface Processor (TIP). Internal lines were acquired to connect terminals to the TIP. Six portable teleprinters, three CRT display terminals, and four digital cassette recorders were purchased. By the end of FY-72 the AKW research group at RADC (3 people) had progressed to the point where they were doing the bulk of their daily work using the system.

29

The FY-73 activity was concentrated on training the rest of the ISIM section, procuring additional terminals and defining and refining procedures for use of the system. The need for a calculator capability was identified and programmed into the system. Comparisons of the text editing capability were made with other similar systems and pilot work performance tests were given. In addition, attitude questionnaires and surveys were made. By the end of FY-73 there were 20 people using the system on a daily basis; including managers, engineers and secretaries.

30

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The activity in FY-74 will consist of training 20 additional people in the ISI branch, procuring additional terminals, NLS service and a line printer and conducting work performance tests. Development activity will be concentrated in three areas; building a forms generation package, interfacing NLS with a data management system and adding a Computer Aided Instruction (CAI) package. The CAI package will be SCHOLAR, developed by BBN and supported by ESD. These development activities will be significantly enhanced by the use of others' research work via the ARPANET.

31

The evaluation of a system as complex as AKW must be conducted over an extended period of time, on an extended set of jobs, and across a representative sample of Air Force people to allow the results to be generalized to other environments. The evaluation at RADC will cover a two-year period, and include engineers, secretaries, administrators, and managers at three levels in the chain of command. The measures currently used in the evaluation include:

32

Psychometric--questionnaires, surveys, and interviews given in a controlled experimental environment.

33

Performance--whenever a working group, section, or branch is charged with a specific job their performance will be compared with that of an equivalent organizational unit. Data will be collected on elapsed time, manhour time, and the subjective judgements of the quality of the work made by the two units' common manager. Comparisons will be made between the AKW system and other available systems with comparable capability in specific areas; eg. text editing.

34

Cost/Benefit--A running systems analysis will be conducted over the two year period to enable detailed specification of the cost/benefit trade-offs which can be made in implementing portions of the general system in other environments.

35

During FY-75 and 76 it will be possible (based on the evaluation activity under 6.2 and 6.3 conducted in previous years) to specify and refine the design of a prototype AKW for a larger population. It is planned to expand the use of the system to the IS Division at RADC (about 100 people) and to implement it at ESD/MCI (about 50 people). This will allow a practical test of the AKW concepts on a large scale basis and for the first time test its utility for remote collaboration, prior to introduction into segments of Air Staff or other large organizations.

36

The goal of the PERFORMANCE TEST and EVALUATION STANDARDS effort is to provide the Air Force with procedures and standards for specifying and evaluating Data Management Systems.

37

In the data management testing area, RADC & JTSA

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are jointly supporting research to develop data management evaluation tools. The activity has two facets:

38

1) The user and source selection boards need a technology to assess the GDMS capabilities being requested by the user and/or being offered by the vendor. A handbook as well as some method of benchmarking or validating the vendor's software is anticipated. Also an ability to translate the users' needs into a feasible set of GDMS needs is required. The current program is addressing these needs.

39

2) In addition, once the user selects a particular computer, he is faced with a set of choices as to which data structures fit his problem. Currently, a user is forced to assess the systems on a parameter basis. Not until he has implemented the system, does he find out its deficiencies. A second chance is too costly. It is the goal of this area to develop a Simulation Facility where the user can analytically and empirically experiment with his problem and various DMS alternatives prior to a commitment to a specific system. Basic research indicates the feasibility of building a set of models and simulation tools which could be used to guide the system designer in his design decisions. For instance, a simulation model has been built for GCOS. RADC will experiment with this model in house and use this in conjunction with other research at RADC and at various other DOD agencies to build this facility.

40

3.11.2.3 SECURITY TECHNOLOGY - The goal of this Technical Area is to develop the ability to share EDP systems and the information therein with the assurance that classified information stored and processed will receive appropriate protection.

41

The purpose of the AFDSC SECURE FACILITY effort is to technically support the Air Force Data Services Center in the acquisition, installation and implementation of a Multics system. The system is required to provide on-line, time sharing and batch computer services to a broad community of users. These users will have differing levels (secret and top secret) of clearance. The technical support to be provided applies to the areas of Multics acquisition, testing of software enhancements, performance evaluation and system engineering. The support will be provided in two phases. Phase One covers the period from the present to the completion of System Acceptance Testing (SAT). Phase Two involves providing continuing support for software enhancements, performance upgrades and extended applications.

42

The goal of the OPEN COMPUTER SYSTEM effort is to provide Air Force users with the ability to share EDP systems and the information therein with the assurance that classified information stored and processed will receive appropriate protection.

43

Recent theoretical work has developed a

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generalized model for protection systems. It has been shown that the two-dimensional vertical memory addressing scheme of the Multics system is a special case of this protection system model. The approach is to build on the Multics vertical memory foundation. Since this approach is based on concepts already shown to be technically and economically feasible, the planned development concentrates on applying them to satisfy USAF computer security requirements. Areas of investigation include: the central computer and its operating system, front end processor/crypto-multiplexor, secure terminals and application engineering.

44

This effort will provide technology that can be used to satisfy the security requirements of a number of planned Air Force systems that are now technically infeasible. In addition, it will assure the certification of EDP systems security controls and eliminate costs of current dedicated computer usage to achieve computer security.

45

3.11.3 RELATED EFFORTS:

46

The following efforts are related to work being pursued under this TPO. In general, compiler-compiler efforts being pursued by industry involve "many-to-many" language-to-computer configurations. This is different from RADC's "one-to-many" approach in JOCIT, which it is felt should produce higher quality compilers. In addition, the JOCIT effort is the only known effort producing compilers for the JOVIAL language.

47

AVS efforts under investigation by other organizations are principally concerned with the FORTRAN language, hence no developments are being pursued along this line other than transfer of a FORTRAN test tool to RADC. Development of an AVS type capability for JOVIAL is required.

48

In the area of data management software, industry is now producing generalized data management software hence the emphasis of this program is shifting from large scale developments to tools for specifying, selecting and tuning generalized data management software. In security, ARPA sponsored work at MIT on Multics will be used directly in the development of a long range solution to the security problem. In the tools to knowledge workers area, the ARPA sponsored research at Stanford Research Institute is being exploited directly and other related research is being followed closely. There is no other major activity in this area where a subset of an organization is attempting to systematically exploit sophisticated on-line computer tools.

49

All other software efforts are being considered either complementary to work being pursued at RADC, or are serving as a baseline upon which further advancements are being made. None of the efforts below are considered duplicative in any way.

50

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3.11.3.1 SOFTWARE TECHNOLOGY - NASA presently has a contract with McDonnell Douglas (Contract No. NASA-27202) to design a compiler-compiler capable of producing compilers for all HOLs which NASA uses, or plans to use, such as FORTRAN, SPL, CLASP, etc.

51

NELC has a contract with Intermetrics Corporation (Contract No. N00123-73-C-1177) to design a HOL for the AADC computer. This effort is under Project W3150, Program Element 63202N.

52

The U. S. Army Electronics Command is developing a Compiler Generation Tool for TACPOL, a PL-1 Command and Control Subset. This work is being performed in-house under System Software Program Element 627703, Program Element 15662703A327, Task Element 03, Work Element 361C8.

53

IBM Federal Systems Division, Owego, is working on a compiler-compiler to handle several DOD HOLs.

54

Boeing Corporation is performing an analysis of present HOLs for B-1 follow-on implementations. At the present time, JOVIAL/J73 is the strongest contender.

55

Univac of Minneapolis is using IRE&D funds to develop translators between the Command and Control HOLs in use by DOD, namely JOVIAL, CMS-2, and TACPOL.

56

AFAL has a program entitled the Digital Avionics Information System (DAIS) under the TPO-S1 which is attempting to choose a HOL for Avionics programming. They are seriously considering JOVIAL/J73 for the follow-on system.

57

NASA/MSD has implemented an AVS for FORTRAN programs written for the Univac 1108 as part of the Mission Trajectory Control Program and the Skylab Activities.

58

Software Reliability studies at Carnegie-Mellon University, University of Wisconsin and MIT in Common Base Languages (Dennis) and NSF sponsored work at SRI and University of California at Irvine are also on-going government sponsored programs.

59

Air Force sponsored work on the Attack Assessment Program for SAMSO includes provisions for collection and analysis of software error data.

60

U.S. Army and Navy sponsored work at PIB (Shoeman) involves software error collection/analysis and procedures for software modeling and reliability prediction.

61

The Air Force is currently AVS testing FORTRAN

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programs on the IBM 360/370 and Assembly Code on the IBM 7090 written as part of the Minuteman Program. 62

The Army is investigating the problem of verifying Safeguard Software at Huntsville, Alabama. 63

The Navy is investigating the software verification problem in support of system software activities at NEL. 64

Projects employing Structured Programming and Chief Programmer Teams and Top Down Programming include government sponsored programs such as: Safeguard (PAR Program), AWACS/JOVIAL Support, RTCC/Skylab Real Time Computing Complex); Systems 7, 370/EMS (Energy Management System), NMCS and NIPS System 360 FFS (National Intelligence Processing System 360 Formatted File System). 65

3.11.3.2 MANAGEMENT INFORMATION SYSTEMS - ARPA is sponsoring data management activities in conjunction with the development of the CONSISTENT System at MIT. The data management system base for this effort is JANUS. This DMS is founded on a set theoretic approach to the problem of managing large files for the behavioral scientist. 66

The Joint Technical Service Agency (JTSA) is working with Honeywell in the area of DMS development for the WWMCCS Honeywell 6000 computer. 67

ARPA is sponsoring work in the area of secure DMS at RAND Corporation. This work is exploring issues of user data base privacy. ARPA is also sponsoring work in the area of data management systems at USC/ISI. This effort is examining the flexibility and integration of several management information systems within the context of a large organization. 68

SAC has initiated an effort, SAC On Line Interactive Controller (SONIC), designed to meet their on line and interactive user applications using the WWMCCS Honeywell 6070 computer system. 69

The Joint Technical Service Agency (JTSA) is actively involved in the testing of WWMCCS and its associated software packages. 70

DIA has sponsored research for the development of a GCOS simulator written in Simscript and operational under IBM Operating System 360. 71

ESD has an effort with Case Institute to model the military security requirements within the Multics operating system. 72

TPO 11-FINAL FORMAT

ESD is currently conducting a test and evaluation of the performance characteristics of the Air Force Data Services Center's Multics implementation. 73

Air Force Data Services Center is currently developing a test plan to evaluate the DM-1 system with respect to meeting their DMS requirements. 74

The Air Force Design Center is currently evaluating the transfer of the Air Force On Line Data System (AFOLDS) from the Burroughs 3500 to the Honeywell 6000 computer. 75

There are a number of other ARPA sponsored efforts in related areas such as; On-line Conferencing, Technological Forecasting and DELPHI; FORUM-Institute For the Future, Information Sciences Institute and UCLA. 76

3.11.3.3 SECURITY TECHNOLOGY - DIA has conducted studies of security in the DIAOLS System, which has exposed weaknesses but does not provide positive direction for development of an open secure system. 77

NSA is investigating a number of computer related security problems and is particularly involved in the communication security problem. 78

ARPA sponsors research in new computer architecture for security and is funding teams that attempt to penetrate existing systems. 79

3.11.4 REQUIREMENTS: 80

In addition to the overall objectives indicated on the overview chart, this TPO is responsive to the following requirements: 81

SOFTWARE TECHNOLOGY 82

REQUIREMENT ID	TITLE	TPO APP.	
CCIP-85	AF C&C Info Processing/1980's	Signif.	82b
TN-ESD-24-71-110	Software Test Est. & Control	Signif.	82c
TN-ESD-24-72-104	Software Verification Tech	Signif.	82d

MANAGEMENT INFORMATION SYSTEMS 83

CCIP-85	AF C&C Info Processing/1980's	Signif.	83a
TN-ESD-24-69-02	Associative Proc. Tech & App	Applic.	83b

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TN-ESD-24-69-06	Struct. Large Data Bases for DM	Signif.	83c
TN-ESD-24-71-15	Man-Computer Communication	Signif.	83d
TN-ESD-24-71-111	Software Development-Network Tech.	Signif.	83e
TN-ESD-24-72-17	Security/Multi-User Comp Sys	Signif.	83f
PMD R-R3=020-(1)	S&T Intel Predict & Manage Sys	Applic.	83g
PMD R-R-2-105-(1)	Improved Indication & Warning	Applic.	83h
RADC-TR-73-108	Intell Functional Require	Signif.	83i
TN-ESD-71-108	Comp Selection Simulator	Signif.	83j
TN-ESD-71-110	Software Test Est & Control	Signif.	83k
SECURITY TECHNOLOGY			84
CCIP-85	AF C&C Info Proces-1980's	Signif.	84a
TN-ESD-24-72-17	Security-Multiuser Comp Sys	Signif.	84b
PMD-56	AF Data Services-Multics Imp	Essent.	84c

TPO 11-FINAL FORMAT

(J18620) 23-AUG-73 09:22; Title: Author(s): Duane L. Stone/DLS;
Distribution: /EJK JLM FJT; Sub-Collections: RADC; Clerk: DLS;
Origin: <STONE>TPO.NLS;3, 23-AUG-73 08:54 DLS ;

18621 Distribution

Ray S. Tomlinson,
 Paul R. Johnson, Milton H. Reese, Nancy J. Neigus, Ric Werme, Alex A.
 McKenzie, Peter Kirstein, Bradley A. Reussow, Michael A. Padlipsky,
 Robert H. Thomas, Robert G. Merryman, James M. Pepin, L. Peter
 Deutsch, Michael D. Kadlick, John D. Day, Robert D. (Bob) Bressler,
 Neal D. Ryan, Richard A. Winter, Richard W. Watson, Gregory P. Hicks,
 James E. (Jim) White, Stephen M. Wolfe, Kenneth T. Pogran, A. Wayne
 Hathaway, Robert C. Clements, Marc S. Seriff, Thomas F. (Tom) Knight,
 Abhay K. Bhushan, Robert T. Braden, Arvolo Chan, Steve D. Crocker,
 Eric F. Harslem, John F. Heafner, Jerry Fitzsimmons, John T. Melvin,
 Robert M. (Bob) Metcalfe, Jonathan B. Postel

Date: 23-AUG-73 1649-EDT
From: CLEMENTS at BBN-TENEX
Re: SNDMSG, MAIL and MLFL
- - - -

A number of people have complained about failings of using MAIL instead of MLFL in TENEX's SNDMSG and MAILER. I have a version of SNDMSG almost working which uses MLFL. However, it turns out that the new FTP and MAIL protocols do not specify MLFL as even existing, and in particular the CCN server doesn't accept MLFL. So I can't immediately put the new version into service anyway.

Among the problems are: line editing done on telnet connection by MULTICS, TENEX server's arbitrary limit of a few hundred characters

on a line in its TELNET receiver (violated by users of the NIC who never

seem to type carriage return), and loss of

information at end of line (linefeed vs cr-lf). There may be others.

Suggestions on where to go in the near term would be appreciated.

I'd like to avoid special case checking for hosts which don't

accept MLFL. Again the vagueness of FTP reply code numbers

has hurt: The User NETML is provoked by a 504 reply from MULTICS;

read the description of 504. CCN returns 500 to a MLFL request instead

of 506. I feel frustrated. Any helpful suggestion will be appreciated.

/Rcc (CLEMENTS@BBN)

24

25

(J18621) 23-AUG-73 13:53; Title: Author(s): Robert C. Clements/RCC
; Distribution: /FTPIG ; Sub-Collections: NIC FTPIG; Clerk: RCC;

Date: 23-AUG-73 1649-EDT
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Re: SNDMSG, MAIL and MLFL
- - - -

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/Rcc (CLEMENTS@BBN)

24

25

18622 Distribution

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Paul R. Johnson, Milton H. Reese, Nancy J. Neigus, Ric Werme, Alex A.
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Robert H. Thomas, Robert G. Merryman, James M. Pepin, L. Peter
Deutsch, Michael D. Kudlick, John D. Day, Robert D. (Bob) Bressler,
Neal D. Ryan, Richard A. Winter, Richard W. Watson, Gregory P. Hicks,
James E. (Jim) White, Stephen M. Wolfe, Kenneth T. Pogran, A. Wayne
Hathaway, Robert C. Clements, Marc S. Seriff, Thomas F. (Tom) Knight,
Abhay K. Bhushan, Robert T. Braden, Arvolo Chan, Steve D. Crocker,
Eric F. Harslem, John F. Heafner, Jerry Fitzsimmons, John T. Melvin,
Robert M. (Bob) Metcalfe, Jonathan B. Postel

(J18622) 23-AUG-73 13:55; Title: Author(s): Robert C. Clements/RCC
; Distribution: /FTPIG ; Sub-Collections: NIC FTPIG; Clerk: RCC;

Cost of Text Insertion with NTNLS

For your information, comments and suggestions.

Cost of Text Insertion with NTNLS

COST OF TEXT INSERTION WITH NTNLS

Susan:

Let us get to the core of this question of cost of text insertion with NTNLS.

As I understand it, the problem has the following elements.

Marginal Text insertion Cost

The marginal CPU time required to insert one character with NLS (local) is of the order of 3 msec under normal daytime load average and under normal typing conditions.

To insert one additional character (the marginal cost) via the ARPANET takes almost twice as much CPU time, i.e., roughly 6 msec.

This compares to the local marginal insertion time under very slow typing conditions which is also around 6 msec per character.

Thus, a first conjecture:

C1 : Transmission delays via the network seem to cause more page faulting which is responsible for the higher marginal insertion cost.

And a question:

Q1 : Is there another cause, in addition to greater page faulting, why more CPU time is required to insert an additional character with NTNLS as compared to TNLS?

Transmission Costs

A conjecture first.

C2 : In full duplex, it takes two kilopackets to insert 1,000 characters with NTNLS via the ARPANET (one per character and one for its echo).

I understand that the transmission costs of the ARPANET are of the order of 30 cents per kilopacket (although Doug told me that it might be as high as \$3).

Q2 : What are the real transmission costs of the ARPANET?

Cost of Text Insertion with NTNLS

Thus, the transmission cost for inserting 1,000 characters with NTNLS might be 60 cents (and \$3 if Doug is right).

Total Text Insertion Costs with NTNLS (1,000 characters)

(in dollars)	NTLS	NTNLS
CPU time	.30	.60
Transmission Costs	--	.60
Total	.30	1.20

And, if Doug is right, it could cost as much as \$3.60.

Action

Let us check the preceding conjectures and answer the questions I have raised.

We can repeat all the measurements with half duplex instead of full duplex setting. What is the effect on the user?

Can we have anyone from the Network Measurement Group (Lou Nelson?) who could measure for us how many packets we actually need to insert 1,000 characters via the NET under the different operating conditions we are considering?

Can we estimate how much this would affect the cost of using NLS via the network if we assume a utilization mix similar to the ARC one (see Jacques' statistics about command utilization)?

What conclusions can we draw?

What recommendations can we make?

I feel these questions are important for both the "NLS Utility" and Development, which would have to do something about it should the results prove to be very bad. Let us do this analysis.

18623 Distribution

James C. Norton, Richard W. Watson, Douglas C. Engelbart, Charles H. Irby, Susan R. Lee, Michael D. Kudlick, Don I. Andrews,

Cost of Text Insertion with NTNLS

(J18623) 23-AUG-73 14:08; Title: Author(s): Paul Rech/PR;
Distribution: /JCN RWW DCE CHI SRL MDK DIA; Sub-Collections: SRI-ARC;
Clerk: PR;
Origin: <RECH>NTNLS.NLS;2, 23-AUG-73 14:01 PR ;

copies of some rfc's

Marica -- special favor:

Could you sned copies of:

RFC 493 (NIC -- 15358,)
RFC 285 (NIC -- 8271,), and
RFC 553 (NIC -- 17810,)

to: E.H. Reitan, Jr.
Engineering Computer Services
ITT Gilfillan
7821 Orion Avenue, P.O. Box 7713
Van Nuys, Calif 91409

??? -- thanks. --dave

18624 Distribution
Marcia Lynn Keeney,

copies of some rfc's

(J18624) 23-AUG-73 14:34; Title: Author(s): David H. Crocker/DHC;
Distribution: /MLK; Sub-Collections: NIC; Clerk: DHC;

Reply to sndmsg concerning Resource Notebook scenarios

I. CONVERSATION WITH PICKENS

I called John Pickens on two occasions and left my number, but he did not return my calls. On 8/22 I finally got in touch with him. We discussed the project being carried out at UCSB Computer Systems Lab. Their approach is similar to ours in that they are trying to help a user actually INTERACT with a program - not just access it.

I explained that our mission is more formal than theirs, and that we are attempting to DOCUMENT enough information to make resource access and use easy for the user, and we are also trying to provide follow-up references and contacts so that a user can find his way through the resources available.

A large part of what Pickens is attempting to do (which will be useful to the Resource Notebook indirectly) is to point out to the sites being investigated, areas in which the user has serious interface problems. The ultimate goal, as I understand it, is to get either the whole network or the individual sites to clean up areas tht confuse or confound the users. This could take the form of program changes, documentation, fixing system problems, fixing network problems, supplying reliable consultants, or whatever.

2. ACTION TAKEN

- Made above phone call
- Asked for copies of Minimens which will be sent
- Asked to be on distribution for future work
- Asked for user feedback on the Resource Notebook. (Picken's people are using it extensively.)
- Asked to share data colleted. (Pickens is more than willing to share data collected with the NIC.)

3. RECOMMENDATIONS FOR FUTURE ACTION

- I believe we should call a meeting of Pickens, Jim Calvin, Mike Kudlick, and myself (others?) to discuss the whole concept of documenting programs and processors at the various sites. This would be a tight working group to come up with a plan for obtaining and storing program information. My feeling is that such a system should be interactive and user oriented. It should

more or less build itself and should not need major editing. Also, it should provide the user with a tutorial program scenario

if one is desired. The database input could be structured so that prompts would be automatically supplied to anyone adding data.

Reply to sndmsg concerning Resource Notebook scenarios

This would help to keep the database consistent and would supply

proper query access headings automatically.

3a

- After such a plan is formulated we should submit it to Liaison and ARPA personnel for approval and comment.

3b

- A revised version should then be sent out for general user comment.

3c

- Finally, it should be implemented and widely advertised.

3d

The NIC role would be that of co-ordinator and we would use our facilities to handle the data and keep up the momentum (hopefully). The users themselves would supply the actual data and send BUG messages back and forth to each other where problems exist. The NIC would design the system that could handle the information, provide editing and checking of the database, and provide an offline index to the various programs for inclusion in the hardcopy Resource Notebook. Yearly we could ask for contributions, feedback, etc., and implement changes where warranted.

3e

18625 Distribution

Richard W. Watson, Michael D. Kudlick,

Reply to sndmsg concerning Resource Notebook scenarios

(J18625) 23-AUG-73 15:54; Title: Author(s): Elizabeth J. (Jake)
Feinler/JAKE; Distribution: /RWW MDK(fyi); Sub-Collections: SRI-ARC;
Clerk: JAKE;
Origin: <FEINLER>PICKENS.NLS;3, 23-AUG-73 15:47 JAKE ;

One Persons solution

I have recently returned from about a week and a half vacation that really cleared my head as to the continuing frustration of using the computer system here at ARC. After fighting the system for about three weeks now I have come to the following conclusion. The system is essentially unusable except for reading ones mail (both sndmsg and journal). I worked very hard on the group allocation scheme in the hope that it would regulate both the load and the working hours of all here at ARC, but I guess this was just another of the continuing stream of pipe dreams here at ARC. I am really very tired of having to work wierd hours to get even the most mundain of tasks done(I dont beleive I am alone in this regard). Therefore I will not use the system from 8am to 5pm until the problem is resolved. This does not mean that I intend to work in the middle of the night. I fully understand this makes it impossible for me to perform my job function here at ARC. I will attempt to "do the best I can" but will only work "extra" hours if I think is nessecary.

1

One Persons solution

(J18626) 23-AUG-73 17:02; Title: Author(s): Donald C. (Smokey)
Wallace/DCW; Distribution: /; Sub-Collections: SRI-ARC; Clerk: DCW;

18626 Distribution

Reply to sndmsgs

Bob, I checked with Jim White and as far as he can tell FTP works fine on that file. One suggestion might be that you did not include the whole file name (ucla-ccn.txt;l rather than ucla-ccn). If this is not the problem we would have to have a more specific diagnosis of what went wrong before we could give you further help. As far as the 'file not found' message when accessing the Resource Notebook through NIC/query I think what happened was one of the following: Either you did not type 'r[esource notebook] CR (to access the right directory) or you typed 's[how] ucla-ccn' instead of 'b[ring] ucla-ccn'. The bring command loads a file and the show commands accesses parts of a file. If one of these was not the problem, let me know. JAKE

1

18627 Distribution
Robert T. Braden,

Reply to sndmsgs

(J18627) 23-AUG-73 17:04; Title: Author(s): Elizabeth J. (Jake)
Feinler/JAKE; Distribution: /RFB; Sub-Collections: SRI-ARC; Clerk: JAKE;

Suggestion re Calculator Format Option Treatment

Here are some suggested changes to the calculator format treatment... from a calculator user..just to get them out for your consideration.

1

The format changing interrogation mode slows me down at times. I'll admit that I would also like to keep the interrogate option, but not have it be thrust upon me. I would rather be able to change commas only, for instance, without being dragged screaming thru the rest of the options. If I had a lot of format changes, then I would want to use the interrogate mode.

1a

I would like to be able to create and save special formats, so that they become my personal default until I change them (other than temporary session changes) to be a different set for default.

1b

What's the chance of these things getting into the design soon?
Jim

1c

18628 Distribution

Diane S. Kaye, Elizabeth K. Michael, Charles H. Irby, Paul Rech, Dirk
H. Van Nouhuys, Duane L. Stone, Richard W. Watson,

Suggestion re Calculator Format Option Treatment

(J18628) 23-AUG-73 17:41; Title: Author(s): James C. Norton/JCN;
Distribution: /DSK EKM CHI PR DVN(for info) DLS(for info) RWW(for info);
Sub-Collections: SRI-ARC; Clerk: JCN;

REQUEST FOR LATEST NETWORK TOPOLOGY

ALEX: THANKS FOR THE NOTE ON NETWORK CHANGES. ANY CHANCE OF GETTING A NEW TOPOLOGY OF THE NET. SCHELONKA HAS NOT YET RESPONDED TO A SIMILAR REQUEST AND I THOUGHT YOU MIGHT BE ABLE TO SUPPLY SUCH A THING.
THANKS. VINT

1

18629 Distribution
Alex A. McKenzie, Edward P. Schelonka,

REQUEST FOR LATEST NETWORK TOPOLOGY

(J18629) 23-AUG-73 18:03; Title: Author(s): Vinton G. Cerf/VGC;
Distribution: /AAM EPS; Sub-Collections: NIC; Clerk: VGC;

O D E T

I just got your message today - I was on vacation. If you still need someone to try O D E T for you let me know.

1

18630 Distribution
Dirk H. Van Nouhuys, Gary L. Bockweg,

O D E T

(J18630) 24-AUG-73 06:24; Title: Author(s): Gary L. Bockweg/GLB;
Distribution: /DVN GLB; Sub-Collections: NIC; Clerk: GLB;
Origin: <ARPA>REPLY.NLS;1, 24-AUG-73 06:22 GLB ;

Silent Connections to Host 2

This 2 pp document represents an attempt to deal with some of the problems we have been having at RADG getting into Host 2.

Silent Connections to Host 2

Due to a number of "silent connections" during the past week or so, I contacted Mckenzie at BBN who had previously offered to help with any seeming Net problems. The response is below indicating that the problem is one with the host.

BBN Message

Date: 23-AUG-73 1028-EDT

From: NEIGUS at BBN-TENEX

Re: trouble with host 2

- - - -

Alex McKenzie passed your message on to me. In the future if you have problems of this nature you should contact me (Nancy Neigus) or gripe to the NCC via the TIP news facility.

If you were able to get an open connection from your site to host 2,

even though you didn't get the tenex header, then theimps were

doing their job correctly. The problem sounds like a host problem,

one that we have seen with sri before. They were quite sick yesterday.

When a host has trouble with their interface to the net (which is what often causes these "silent connections") there is little we, at BBN, can do. Your best bet is to complain to the host and, if they don't give you any reasonable answers, then come to us.

Just in case this problem is larger than we think, I need some more information from you. Did the trouble just occur yesterday morning, or has it been going on for a while? How long? Did

1

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2p

2q

2r

Silent Connections to Host 2

it clear up yesterday, today? What exactly were the symptoms
you experienced?

2s

2t

If you stil need help, contact me again with the details. Nancy
Neigus

2u

Response to Neigus

3

The problem has occurred at random times over the past several
months. It has not been of any magnitude, and has cleared itself
up, until this week.

3a

The symptoms are a LOGGER, T R OPEN, and then nothing. No
characters will get a response from the host, and there is no
Tenex header. The only alternative is to close the connection and
try again. There is usually some success after several tries,
although I have not been able to get through at all on occaisions.

3b

This seems to be related to the problem of lost connections as
well, which usually leave hung jobs at SRI. The recent rash of
these necessitated taking down Tenex to release the jobs. The
jobs could not be attached to mainly because they were not
detached.

3c

During the intermittant incidence of these problems, there was no
indication of any hardware -- software difficulty, except for some
thunderstorms out West -- these accounted for only a few days. I
hope this helps, Jim Bair

3d

Silent Connections to Host 2

(J18631) 24-AUG-73 06:37; Title: Author(s): James H. Bair/JHB;
Distribution: /WRF JEW AAM NJN JCN RADC((For your information);
Sub-Collections: RADC; Clerk: JHB;
Origin: <BAIR>PROB.NLS;1, 24-AUG-73 05:46 JHB ;

18631 Distribution

Ferg R. Ferguson, James E. (Jim) White, Alex A. McKenzie, Nancy J. Neigus, James C. Norton, Donna R. Robilotta, David L. Daughtry, Richard H. Thayer, Frank J. Tomaini, Mike A. Wingfield, Edmund J. Kennedy, Ray A. Liuczi, Richard Calicchia, John W. Johnson, Donald Van Alstine, Dean F. Bergstrom, William P. Bethke, Frank S. LaMónica, William E. Rzepka, Rocco F. Iuorno, Frank P. Sliwa, Thomas J. Bucciero, Robert E. Doane, David A. Luther, Roger B. Panara, John L. McNamara, Joe P. Cavano, Duane L. Stone, Marcelle D. Petell, Josephine R. Stellato, Robert K. Walker, Thomas F. Lawrence, James H. Bair,

We Don't Need your Help with the Printer, Thanks

● responds to 18630

We Don't Need your Help with the Printer, Thanks

For the moment BBN believes the printer problem was in the tip and they are working on it, so we don't need you help. Thanks anyway. I will let you know if the problem bounces back to our court.

1

18632 Distribution
Gary L. Bockweg, Elizabeth K. Michael,

We Don't Need your Help with the Printer, Thanks

(J18632) 24-AUG-73 08:34; Title: Author(s): Dirk H. Van
Nouhuys/DVN; Distribution: /GLB EKM(fyi); Sub-Collections: NIC IC ;
Clerk: DVN;

Errata in 17511

In (jjournal,17511,4a) I erroneously identified George Lucas as "George Wilson. and in <jjournal,17511,16> I erroneously identified Joe Passafiume as Joe Levin.

1

My appologies to all concerned.

1a

18633 Distribution

Joseph J. Passafiume, Douglas C. Engelbart, Laura E. Gould, Mario C.
Grignetti, Nancy J. Neigus,

Errata in 17511

(J18633) 24-AUG-73 10:14; Title: Author(s): Dirk H. Van Nouhuys/DVN;
Distribution: /JJP2 DCE LEG MCG NJN; Sub-Collections: SRI-ARC NIC;
Updates Document(s): 17511; Clerk: DVN;

INWG & X3S37

Unfortunately neither myself nor anyone else from NBS will be able to attend the INWG meeting in Sussex. However, I want to re-emphasize our serious interest in this group. We will have people in attendance at the Hawaii meeting and hopefully the Stockholm meeting also. Thank you for the documentation which came from the NIC. Also, X3S37 of which I am a member is interested in liasing with your group. I will be chairman of the ad hoc task group of X3S37 concerned with packet switching. I hope many of the American members of INWG will help out on this project. Marc Kaufman who was at the X3S37 meeting can tell you more.

1

18634 Distribution
Vinton G. Cerf,

INWG & X3S37

(J18634) 24-AUG-73 08:42; Title: Author(s): Ira W. Cotton/IWC;
Distribution: /VGC; Sub-Collections: NIC; Clerk: IWC;

AAM 22-AUG-73 15:19 18618
Scheduled Network Changes and IMP Downs
Location: (MJOURNAL, 18618, 1:w)

18635 Distribution
Jeanne B. North, Susan S. Poh, Edward P. Schelonka, Michael B. Young,

(J18635) 24-AUG-73 09:11; Title: Author(s): Jean Iseli/JI;
Distribution: /JBN(jeanne, can you please put this in updaste to news -
good poop from alex and would like to support.) SSP(for your
information) EPS(FYI) MBY(FYI); Sub-Collections: NIC; Clerk: JI;

(July)

4

isc confessions

11

lab activity report due

isf confessions

16

program/tpo dry run for is

18

lab activity report due

isi confessions

20

RADC history inputs due

r & t selection of the month

25

lab activity report due

26

program/tpo pitch

27

newsbrief

31

(June)

18

back to work - fulltime

21

1

1a

1a1

1b

1b1

1b2

1c

1c1

1d

1d1

1d2

1e

1e1

1e2

1f

1f1

1g

1g1

1h

1h1

1i

2

2a

2a1

2b

confessions	2b1
topics; ids, printers, akw, directories, akw evaluation, training	2b1a
25	2c
mac on leave for two weeks	2c1
roc on tdy for one week	2c2
27	2d
program meeting isi - discussion of line items	2d1
28	2e
program meeting isc - as above	2e1
29	2f
program meeting	2f1
(May)	3
8	3a
out of hospital	3a1
(April)	4
3.	4a
meeting on Lab Director's funds - 1400 in Conf room 1a	4a1
9.	4b
Mustang returned from repairs at stockholm	4b1
10.	4c
pinto delivered - finally	4c1
11.	4d
Jim home from hospital in temporary backbrace.	4d1
12.	4e

ed totals his volvo - no apparent injuries. we hope	4e1
21.	4f
ruptured appendix -sick,sick,sic	4f1
(March)	5
8.	5a
DLS dry run for the SAB Pitch 1030, if system is up.	5a1
12.	5b
meeting on Lab Director's Funsl400 in Conf Room 1a	5b1
13.	5c
Scientific Advisory Board visit.	5c1
14.	5d
SAB visit and pitch.	5d1
15.	5e
confessions isi	5e1
20.	5f
ieee meeting and demonstration of AHI	5f1
28.	5g
Meeting with dls in AM - Subject - Manpower Accounting	5g1
meeting not held due to conflict with Col danielian visit	5g1a
1000 am Demo in Facility by Ossman on the Beehive and the Super Bee Terminals.	5g2
col.daniellian visit	5g3
29.	5h
col.daniellian visit	5h1
Briefing by Col Daniellian on results of br700 evaluation in Airlift function.	5h2

(august)

1

col. larsen white paper - software r & d program
accomplishment report due

13

frank tomaini should call mr. homenko - esd/dir of adpe

15

pitch to proj. 5550 steering group

6

6a

6a1

6a2

6b

6b1

6c

6c1

18636 Distribution

(J18636) 24-AUG-73 09:31; Title: Author(s): Edmund J. Kennedy/EJK;
Distribution: /; Sub-Collections: RADG; Clerk: EJK;

NDM 24-AUG-73 09:42 18637

The Augmented Knowledge Workshop

by
Douglas C. Engelbart
Richard W. Watson
and
James C. Norton

AUGMENTATION RESEARCH CENTER
Stanford Research Institute
Menlo Park, California 94025

ARC Journal Accession Number: 14724
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Paper presented at the National Computer Conference in New York City,
June 1973

NDM 24-AUG-73 09:42 18637

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CONTOURED-LEVEL CONTENT VIEW

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18637 Distribution

NDM 24-AUG-73 09:42 18637

COM print file: NCC Paper-Intro

(J18637) 24-AUG-73 09:42; Title: Author(s): N. Dean Meyer/NDM;
Distribution: /; Sub-Collections: COM ; Clerk: NDM;
Origin: <MEYER>NCCINTRO.NLS;4, 15-AUG-73 13:08 NDM ;