

What happened to the JOURNAL ???

how (or is it when?) can i get journalized stuff back on line ? i
want 24459 !!! --jon.

1

JBP 17-MAR-75 01:16 25580

What happened to the JOURNAL ???

(J25580) 17-MAR-75 01:16;;; Title: Author(s): Jonathan B.
Postel/JBP; Distribution: /FEED([ACTION]); Sub-Collections:
SRI-ARC; Clerk: JBP;

Work on Calculator Tool, Elf Users' Guide, Cleaning up the Glossary:
 Informal Documentation Report

POOH:	1
began work on the calculator tool help data base	1a
made changes to the ELF Userguide	1b
edited part of the formatted glossary	
fought the frustrations of the slow systems	1c
interviewed a prospective employee	1d
DVN production markedly slowed by slow system response,	2
NSW Documentation	2a
Made a Fourth NSW Work Breakdown and Schedule (25568,)	2a1
Final Report	2b
Miscellaneous Editing,	2b1
Small Trailing NLS-8 Documents	2c
Preface to NLS: Waiting for Application's Review	2c1
TNLS Addressing: It is on me to repond to RWW's review,	2c2
COM:	2d
We received the first proofs of a short trail file from the Glossary. There were problems, but it looked good.	2d1
The revised command summary awaits POOH's attention for COM printing,	2d2
The TNLS-8 Primer awaits my attention for COM printing,	2d3
Marin Hardy's paper Microprocessing Technology awaits my attention for small revisions befor final COM run,	2d4
We gave up the plan of printing the Resource Notebook Through COM, I will report on the problems separately,	2d5
KIRK	3
Received and analyzed the Glossary COM test. Edited part of the Garbage out of the Glossary. Wrote this weekly repo9t,	3a

Work on Calculator Tool, Elf Users' Guide, Cleaning up the Glossary:
Informal Documentation Report

(J25581) 17-MAR-75 12:07;;; Title: Author(s): Dirk H. Van Nouhuys,
Ann Weinberg, Kirk E. Kelley/DVN POOH KIRK; Distribution: /JOAN([
ACTION] dirt notebook please) DIRT([INFO-ONLY]) ; Sub-Collections:
SRI-ARC DIRT; Clerk: DVN;

Half Helpless at BBN [No <CTRL-Q>]

<CTRL-Q> doesn't work to get help or anything else at BBN. It seems as if it never reaches NLS. Likewise, by the way, with <CTRL-T> I was working thought the Elf when I found this problem.

1

Half Helpless at BBN [No <CTRL-Q>]

(J25582) 17-MAR-75 12:19;;; Title: Author(s): Dirk H. Van
Nouhuys/DVN; Distribution: /FEED([ACTION]) POOH([INFO-ONLY])
KIRK([INFO-ONLY]) HGL([INFO-ONLY]) KEV([INFO-ONLY]) JCP([INFO-ONLY]) JDH([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk:
DVN;

'string too long', chapter 2

(i believe i messed up the previous message by hitting the carriage-return.) anyhow, when i attempt to read my mail, either with print journal, or by printing the branch and trying to load and print from the journal file, i get the message "nis internal error, string too long". this must be happening to everybody at bbn=b, but just in case i was the first to mention it ...kirk sattley

1

KS 17-MAR-75 17:01 25583

'string too long', chapter 2

(J25583) 17-MAR-75 17:01;;; Title: Author(s): Kirk Sattley/KS;
Distribution: /FEEDBACK([ACTION]) ; Sub-Collections: NIC FEEDBACK;
Clerk: KS;

bug: force character for text input forced lowercase

i have just noticed that in printing out the message that all my uppercase characters appear to be lowercase, when originally typed only the first charctter was not echoed as uppercase, i would think that this must relate to the no raise and lowercase ccommands at the tenex level (maybe).

bug: force character for text input forced lowercase

it seems that the first letter typed after a "t:" prompt (at least in two cases- jump word next and insert statement) does not allow uppercase letters as the very first character. that is the first character is forced to be lower case even if typed as an uppercase letter. this is at bbnb tenex.

bug: force character for text input forced lowercase

(J25584) 17-MAR-75 18:39;;; Title: Author(s): Robert N.
Lieberman/RLL; Distribution: /FEED([ACTION]) JCN([INFO-ONLY])
JHB([INFO-ONLY]) JDH([INFO-ONLY]) ; Sub-Collections: SRI-ARC;
Clerk: RLL;

Dan Lynch's Timing Measurements

1

14-MAR-75 17:17:46-EDT,1916;000000000000
 Mail from BBN-TENEX rcvd at 14-MAR-75 1717-EDT
 Mail from SRI-AI rcvd at 14-MAR-75 1706-EDT
 Date: 14 MAR 1975 1405-PDT
 From: LYNCH at SRI-AI
 Subject: NCP timing data
 To: licklider at ISI, stubbs at ISI, blue at ISI,
 To: carlson at ISI, walker at ISI, russell at ISI,
 To: mclindon at ISI, heart at BBN, walden at BBN,
 To: mckenzie at BBN, sutherland at BBN, burchfiel at BBN,
 To: elgelbart at OFFICE-1, norton at OFFICE-1,
 To: watson at OFFICE-1, stone at OFFICE-1, strollo at BBN,
 To: tomlinson at BBN, postel at BBN, lynch at SRI-AI

2

In order to give everyone a look at the data that has been collected concerning the various times to do simple I/O to one's own IMP and back, I have collected the following representative data in the last 12 hours. The program that collects the data is at [sri-ai]<lynch>impsuk.sav and the source file is .mac. It is a very short program and will run on any TENEX and requires no special capabilities. The first column gives the time in milliseconds for the send (bout) to return from the monitor and the second column gives the time from that point to the time the character is received by the program (bin). The program will loop forever, so a "c" is the way to stop it.

3

	bbna	bbnb	bbnc	office-1	sri-ai	isia	isib						
4	22	0	150	3	70	0	200	5	21	5	93	6	52
4	25	0	50	2	97	0	650	8	61	3	114	3	58
4	31	0	250	2	72	0	150	3	23	5	356	5	54
4	47	50	50	-1	59	0	350	10	20	2	252	6	55
4	25	0	1500	2	78	0	900	5	23	4	170	6	38
4	34	0	100	2	38	0	100	4	26	3	160	6	44
4	25	0	50	0	51	0	400	5	25	5	234	8	60
2	26	0	50	2	42	0	200	4	33	41	131	6	42
2	17	0	50	3	68	0	200	4	24	18	40	5	42
4	26	0	150	2	136	0	300	4	24	4	74	7	36

4

5

Note that it appears that bbnb and office-1 have broken millisecond clocks. Also, that bbnc has a peculiar bias in its clock? All of the above data was taken during periods of light to medium (1-3) load, -----

6

Dan Lynch's Timing Measurements

(J25585) 17-MAR-75 21:37;;; Title: Author(s): Jonathan B.
Postel/JBP; Distribution: /NPG([INFO-ONLY]) ; Sub-Collections:
SRI=ARC NPG; Clerk: JBP;

Answer to 'NSW Directories' questions from Rick Schantz

17-MAR-75 00:53:08-EDT,893;000000000000

Date: 17 MAR 1975 0053-EDT

From: POSTEL

Subject: NSW Directories (in response to Rick's Questions)

To: Schantz at BBNA, Warshall, Millstein, Carlson at ISI, JWhite,

To: Postel

1

Rick:

1) My working assumption is that there is some fixed number of TENEX directories owned by the NSW WM for the purpose of running tools and that the major purpose is to prevent undesirable tool interaction,

2

2) The WM will have to supply directory name and password at tool initiation time. The WM as the owner of the directories does have the the problem of storing the directory passwords,

3

3) When a tool is finished the directory must be cleaned out the WM will make a call on the TBH for this action. [RE: our phone conversation on the two functions of the file package (1) managing the stored files of the WM, and (2) managing the directories used by tools,]

4

--jon,

5

JBP 18-MAR-75 03:14 25586

Answer to 'NSW Directories' questions from Rick Schantz

(J25586) 18-MAR-75 03:14;;; Title: Author(s): Jonathan B.
Postel/JBP; Distribution: /JEW([INFO-ONLY]) ; Sub-Collections:
SRI-ARC; Clerk: JBP;

More Measurements from Dan Lynch.

17-MAR-75 02:18:17-EDT,3841;000000000000
 Mail from BBN-TENEX rcvd at 17-MAR-75 0218-EDT
 Mail from SRI-AI rcvd at 17-MAR-75 0212-EDT
 Date: 16 MAR 1975 2309-PDT
 From: LYNCH at SRI-AI
 Subject: MORE TIMING TESTS
 To: LICKLIDER at ISI, STUBBS at ISI, BLUE at ISI,
 To: CARLSON at ISI, WALKER at ISI, RUSSEL at ISI,
 To: MCLINDON at ISI, DALE at ISIB, HEART at BBN,
 To: WALDEN at BBN, MCKENZIE at BBN, SUTHERLAND at BBN,
 To: BURCHFIEL at BBN, STROLLO at BBN, HGM at CCA,
 To: ENGELBART at OFFICE-1, NORTON at OFFICE-1,
 To: WATSON at OFFICE-1, STONE at OFFICE-1, TOMLINSON at BBN, To:
 POSTEL at BBN, VICTOR at BBN, ELLISON at UTAH-10,
 To: PEPIN at ECL, LYNCH at SRI-AI

The following data were all collected on Sunday evening in order to try to ascertain what the "maximum" unloaded throughput that each TENEX site could provide in its current mode of operation. A few comments are in order:

- 1) All sites were very lowly loaded. By that I mean that the load averages were below 1.0 in all cases except for CCA.
- 2) The ?? marks for ISIB are due to the silly times received back from the system that gives the process accumulated runtime.
- 3) ISIB and ECL are KI-TENEX machines, running KI-TENEX version 131 as modified by Rainer Schultz.
- 4) Running 133 TENEX were BBNA, BBNB, BBNC, SRI-AI and ISIC.
- 5) Running 132 TENEX were ISIA and CCA.
- 6) Running 131 TENEX were OFFICE, UTAH and the two KI systems.

An explanation of the program that generated these data are in order:

The program is a short assembly language program that was written by Hal Murray at CCA and modified (trivially) by Dan Lynch at SRI-AI to be able to run at any site. The program simply shoves data at itself through its own IMP and times all the events. It is quite a flexible program and may be obtained as:
 [SRI-AI]<LYNCH>WHIZZ,MAC . The ANONYMOUS login will work at SRI-AI for anyone who wants to look at the program. Also, All the raw data taken tonight exists in a file called
 [SRI-AI]<LYNCH>TELNET,15-MAR-75-NET-MEASUREMENTS .

More measurements from Dan Lynch,

An explanation of the columns in the table is in order; 9a

1) The bits/sec (realtime) column is the true number of bits that travelled from the program out to its own IMP and back to the program divided by the amount of real time it took to do it. Thus it is a measure of human being time. 10

2) The cpu-time (ms) is the number of milleseconds that TENEX charged the program for doing all the work. It does not include the very low level IMP interrupt code time (which is never measured [for the user] by TENEX). 11

3) the cpu% column is simply the ratio of time that the program got while doing the transfers divided by real time. Thus it is a measure of both the "efficiency" of the Network Control Program and the ability of individual Schedulers to rapidly switch to and from "high priority" programs. 12

4) The bits/cpu=Sec (process-time) is really a measure of the efficiency of the NCP program and the speed of the CPU. 13

SITE NAME	BITS/SEC REALTIME	CPU-TIME MS	CPU%	BITS/CPU=SEC PROCESS=TIME	
TEST ONE -- BIG TRANSFERS USING STRING I/O FOR 220 36 BIT WORDS 14a					
BBNA	59000	4200	24	240000	
BBNB	39000	3700	14	275000	
BBNC	42000	3800	16	260000	
OFFICE	20500		3500	7	280000
UTAH	20000	4300	9	235000	
SRI-AI	27500		4300	11	234000
ISIA	20500	5300	10	190000	
ISIB	27500	??	??	??	
ISIC	25000	3800	9	260000	
ECL	24000	2700	6	375000	
CCA	44000	3500	15	288000	15

TEST ONE -- BIG TRANSFERS USING STRING I/O FOR 220 36 BIT WORDS 14a

SITE NAME	BITS/SEC REALTIME	CPU-TIME MS	CPU%	BITS/CPU=SEC PROCESS=TIME	
TEST TWO -- SINGLE CHARACTER THROUGHPUT AS IN TELNET OR TIP USE 15a					
BBNA	225	16950	38	590	
BBNB	118	11000	12	900	
BBNC	80	10300	8	970	
OFFICE	35		5800	2	1700
UTAH	60	12200	7	820	
SRI-AI	200		16300	33	610
ISIA	100	25550	24	390	
ISIB	175	??	??	??	
ISIC	100	9300	9	1125	

TEST TWO -- SINGLE CHARACTER THROUGHPUT AS IN TELNET OR TIP USE 15a

More Measurements from Dan Lynch.

ECL	75	11500	9	850	
CCA	125	9500	11	1060	16
-----					17

More Measurements from Dan Lynch.

(J25587) 18-MAR-75 03:23;;; Title: Author(s): Jonathan B.
Postel/JBP; Distribution: /NPG([INFO-ONLY]); Sub-Collections:
SRI-ARC NPG; Clerk: JBP;

Response to Irby's Message (by Dave Walden)

17-MAR-75 11:17:39-EDT,4090;000000000000
 Mail from BBN-TENEX rcvd at 17-MAR-75 1117-EDT
 Mail from BBN-TENEX rcvd at 17-MAR-75 0748-EDT
 Date: 17 MAR 1975 0735-EDT
 From: WALDEN at BBN-TENEX
 Subject: REPONSE TO IRBY'S MESSAGE
 To: network performance group:, engelbart at OFFICE-1,
 To: norton at OFFICE-1, watson at OFFICE-1, stone at OFFICE-1, To:
 heart, walden, mckenzie, sutherland, burchfiel, strollo, To:
 mclindon at ISI, carlson at ISI, blue at ISI, stubbs at ISI, To:
 licklider at ISI, russell at ISI, walker at ISI

1

RE THE OPEN LINES ON THE TYMSHARE TIP, I WISH TO
 MEASURE THE EFFECTS OF THIS
 IN A CONTROLLED TEST TODAY. WE HAVE A PATCH
 IN THE TYMSHARE IMP NOW TO MEASURE ITS "LOAD AVERAGE"
 AND I WOULD LIKE TO SEE THE EFFECTS ON THE
 LOAD AVERAGE OF BOTH ONE AND TWO 4800BAUD
 MODEMS RUNNING OPEN WITH AND WITHOUT AN OPEN
 CONNECTION. BEN BARKER AND ERNIE HISCOX OF BBN
 WITH TAKE THE INITIATIVE IN THESE MEASUREMENTS TODAY
 AND I ASSUME THE HELP OF SOMEONE AT OFFICE-1 TO LOOK
 AT THE MLC LIGHTS AND SOMEONE
 AT SRI TO TURN POWER ON AND OFF ON THE LINE PROCESSOR,

2

RE THE IMP READY FOR NEXT HOST BIT LIGHT GOING OFF,
 WE HAVE WORKED UP A PATCH WHICH IS THE IMP
 TO WHICH BBNB IS CONNECTED WHICH DISPLAYS
 IN THE IMP LIGHTS 16 REASONS
 WHY THE IMP MIGHT BE BLOCKING THE HOST FOR A HALF-SECOND
 EVERY SO OFTEN. OUR OBSERVATION (BRIEFLY OVER THIS
 PAST WEEKEND) IS THAT THE IMP IS READY TO TAKE FROM
 THE HOST THE VAST MAJORITY OF THE TIME, BUT IT
 DOES NOT TAKE FOR THE ONE-HALF SECOND NOTED BY HARDY
 EVERY SEVERAL SECONDS (E.G., MAYBE 5% OF THE TIME).
 WE WILL INVESTIGATE THIS FURTHER TODAY AND MAY WELL
 WANT SOMEBODY TO LOOK AT THE LIGHTS AT TYMSHARE
 WHILE WE DO THE SAME THINGS,

3

CHARLES' UNDERSTANDING OF PACKETS VS. MESSAGES IS PRETTY
 MUCH CORRECT (NOT PERFECT HOWEVER).
 WE HAVE LONG WANTED TO PUT IN THE
 HOST TO IMP CONTROL MESSAGE CHARLES
 SUGGESTS LETTING THE HOST ASK THE IMP FOR THE NECESSARY
 RESOURCES SO THE INTERFACE DIDN'T HAVE TO GET BLOCKED,
 BUT WE HAVE ALWAYS BEEN SERVICING A HIGHER PRIORITY INTERRUPT, WE
 HAVE ALL KNOWN FOREVER THAT HOSTS SHOULD BE ABLE
 TO HAVE MORE THAN ONE MESSAGE OUTSTANDING AT ONE TIME,
 BUT THIS WOULD REQUIRE A HOST/HOST PROTOCOL CHANGE

Response to Irby's Message (by Dave Walden)

EVERYWHERE. NOTE, THE TIP MAG TAPE OPTION DOES USE MULTIPLE MESSAGE OUTSTANDING AT A TIME AND A SPECIAL HOST LEVEL RETRANSMISSION PROTOCOL ON TOP OF HOST-TO-HOST PROTOCOL AND TELNET. BETWEEN TENEXS, FOR INSTANCE, A SIMILAR AD HOC PROTOCOL COULD BE USED FOR FILE TRANSFERS. (NOTICE, THE LINK ZERO BLOCKING PROBLEM WAS A PROBLEM WITH NOT ENOUGH MESSAGES OUTSTAND AT A TIME -- WE WERE GOING TO USE THOSE EXTRA FOUR MESSAGE ID BITS TO KEEP THINGS IN ORDER, ALTHOUGH IN THE CASE OF ALLOCATE, THIS CAN BE DONE WITHOUT THE KNOWLEDGE OF THE RECEIVER.) BY THE WAY, IF WHAT IS BEING DONE IS JUST TERMINAL OUTPUT (E.G., PAINTING A SCREEN), THEN WHY NOT JUST MODIFY TENEX SO UNDER THESE CIRCUMSTANCES IT DOESN'T WAIT FOR A BLOCKED LINK TO UNBLOCK BEFORE SENDING THE NEXT MESSAGE. THE SUBNET DOESN'T LOSE MESSAGE VERY OFTEN. DON'T WORRY ABOUT RETRANSMISSION IN THE RARE CASE IT DOES TO CRT TERMINALS. JUST LET THE SCREEN GET PAINTED OVER AGAIN CORRECTLY THE NEXT TIME. THE NETWORK TOPOLOGY SHOULD BE CHANGE SO THE GREATEST DISTANCE IS SAY 6 HOPS. ALL THE NETWORK ALGORITHMS WERE DESIGNED ORIGINALLY WITH SUCH AN ASSUMPTION IN MIND. THERE IS NOT ENOUGH STORAGE IN THE IMPS, THE TIMING ARE ALL WRONG (E.G., THE 1/4 SECOND ALLOCATE GIVE BACK TIME), ETC. WITH THE PRESENT NETWORK TOPOLOGY, (I DON'T KNOW WHAT CHARLES THINKS THE DIFFERENCE BETWEEN "HOST MESSAGES" AND "IMP MESSAGES" IS; IN THE STORAGE AND FORWARD NETWORK THEY ARE ALL BROKEN DOWN INTO PACKETS AND PACKET TAKE 50MSEC

4

PER PACKET! TO TRAVERSE EACH HOP.)

5

RE. PAGE TRANSFER TIMES AT OFFICE-1, ARE THERE ANY SIMILAR MEASUREMENTS ON BBNB. REMEMBER MY SPECULATION OF A FEW DAYS AGO THAT THE BBNB VIRTUAL DRUM WAS OVERFLOWING.

6

RE TIMING OF CHARACTER ECHOING AND TIMING OR TENEX TO IMP TO TENEX, LET'S RUN THE EXPERIMENTS AGAIN WITH US TRACING WHAT IS GOING ON IN THE IMPS IN QUESTION.

7

REGARDS,
DAVE

8

JBP 18-MAR-75 03:31 25588

Response to Irby's Message (by Dave Walden)

(J25588) 18-MAR-75 03:31;;; Title: Author(s): Jonathan B.
Postel/JBP; Distribution: /NPG([INFO-ONLY]); Sub-Collections:
SRI-ARC NPG; Clerk: JBP;

Answers to Doug Wells on PCP & DPS.

17-MAR-75 16:23:12-EDT,1866;000000000000
Date: 17 MAR 1975 1623-EDT
From: POSTEL
Subject: ANSWERS TO QUESTIONS ON DPS
To: DMW at MIT-MULTICS
cc: POSTEL, JWHITE

1

DOUG:

2

1) THE sCHAR IS A SHORT FORM OF "N s M CHAR" WHERE N IS A LOWER LIMIT AND M IS A UPPER LIMIT, IN THE CASE OF THE SHORT FORM THE LOWER LIMIT IS ZERO AND THE UPPER LIMIT IS INFINITY. IN THE PCP TXT DOCUMENT THE LOWER LIMIT SHOULD BE SPECIFIED AS 1, SO LINE 3B1D SHOULD BE INTEGER ::= 'I ['-] 1s DIGIT

3

2) OOPS CLEARLY THE SOCKET NUMBERS HAVE TO BE 32 BITS, SO WE WILL PROBABLY REQUIRE THAT AN INTERGER BE 32 BITS.

4

3) I AM ALMOST SURE THAT "OFFICIAL" HOST NAMES ARE TO BE RECOGNIZED INDEPENDENT OF CASE,

5

4) I THINK THAT THE DATE AND TIME SHOULD BE HUMAN READABLE AND SHOULD BE IN A SPECIFIED FORMAT, PERHAPS WE NEED TO ADOPT A STANDARD DATE-TIME FORMAT FOR NSW/ DPS. (YOUR SUGGESTION ?)

6

5) IT IS OUR INTENTION THAT THE USERID OF THE CALLER BE COMMUNICATED TO THE CALLEE AS SOON AS POSSIBLE, OUR SCENARIO FOR A MULTICS LIKE SYSTEM WOULD BE:
THE CALLERS PCP IPC LEVEL STUFF ICPS TO THE CALLEES SOCKET 25 THE CALLEES DISPATCHER GETS THE THE IPC REQUEST AND COMPLETES THE IPC, THE FIRST INFORMATION TO COME DOWN THE NEW CONNECTIONS IS THE USERID, THE DISPATCHER VERIFIES THIS STUFF AND CREATES A PROCESS, CONNECTING THE NEW CONNECTIONS TO THE CREATED PROCESS.

7

NOTE THAT THE DISPATCHER DOES THIS AS ITS END OF LOWLEVEL IPC ROUTINES THAT NO "PACKAGES" ARE INVOLVED.

8

WE ARE TRYING TO GET THE INTRA HOST CASE WORKING FIRS SO CONCENTRATING ON PCPB36 FORMAT, THE ELF GUYS AT ADR MAY BE WORKING ON PCPTXT, I AM TRYING TO COME UP WITH A PCPB8 FORMAT TOO.

9

PLEASE NOTE THAT PCP AND PSP ... ARE EVOLVING AS WE COMPLETE OUR IMPLEMENTATION, IF YOU WANT WE COULD SEND RECENT SOURCE LISTINGS WE ARE NOT ABLE KJUST NOW TO KEEP THE DOCUMENTS CURRENT.

10

--JON,

11

Answers to Doug Wells on PCP & DPS.

(J25589) 18-MAR-75 03:35;;; Title: Author(s): Jonathan B.
Postel/JBP; Distribution: /JEW([INFO-ONLY]); Sub-Collections:
SRI-ARC; Clerk: JBP;

Including WUC works at BB&N, But Gives Error Messages

when my NLS comes up, TENEX says "No Such Directory/undefined
Global/VSRIND 557536/" but the WUC works fine

1

Including WUC works at BB&N, But Gives Error Messages

(J25590) 18-MAR-75 11:39;;; Title: Author(s): Dirk H. Van
Nouhuys/DVN; Distribution: /KIRK([INFO-ONLY]) ; sub-Collections:
SRI-ARC; Clerk: DVN;

Where to Find Me; Are FEED's Answers Fed to the Journal?

I just logged in to Office-1 and found a bunch of replies to items I'd sent to FEED. I don't log in there every day so if you want to reach me in any kind of time, you should send me a journal item or message at BB&N.....Are your replies, dear FEED, also going out as Journal items where they will be cataloged properly for future study? If they are not I think the failure is a serious omission in the system.

1

Where to Find Me; Are FEED's Answers Fed to the Journal?

(J25591) 18-MAR-75 12:28;;; Title: Author(s): Dirk H. Van
Nouhuys/DVN; Distribution: /FEED([ACTION]) JCN([INFO-ONLY]) JHB(
[INFO-ONLY]) DCE([INFO-ONLY]) SLJ([INFO-ONLY] journal fed
fodders future feeders of America) ; Sub-Collections: SRI-ARC; Clerk:
DVN;

Response to Beck's question on attendees at training courses

These are just my 'off the top of my head thoughts'. However this might be an important part of the transfer of technology procedure, minor as it is.

Response to Beck's question on attendees at training courses

I don't know any good way to to insure separation of people at a course. Possibly if two trainers are present (or other staff member) you can split the group. In some sense this is part of the architect liason or marketing domain.

1

Of course, some people present might insist that they want to sit-in on the actual training course (managers for example who want to get a feeling of exactly what is going on.),

2

The other option is to 'kick' them out by asking those not really here to receive training to wait until another time or another staff member comes down to visit.

3

I guess the first step is to clearly specify who is expected to attend from our point of view.

4

It might be a good policy to have someone like JCN, DCE, or myself (RLL) talk to people at a new site before actual training begins. Does anyone have a suggestion or support this one??

5

The problem is one of determining what is a new site. I guess this means any place or organizational group that is new, independent of its slot relationship.

5a

Response to Beck's question on attendees at training courses

(J25592) 18-MAR-75 15:23;;; Title: Author(s): Robert N.
Lieberman/RLL; Distribution: /JCN([INFO-ONLY]) JHB([INFO-ONLY])
RH([INFO-ONLY]) SGR([INFO-ONLY]) DCE([INFO-ONLY]) JMB([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk: RLL;

Accepting your kind invitation,

(Journal) Journal documents (most recent first)

1

DVN 14-MAR-75 20:16 25568
 Fourth NSW Work Breakdown and Schedule
 Location: (IJOURNAL, 25568, 1:w)

1a

DVN 14-MAR-75 19:35 25571
 Invitation To DIRT Distribution
 Location: (JOURNAL, JRNL26, J25571:gw)
 *****Note: [ACTION] *****

1b

Message:

1b1

A journal distribution group and subcollection called DIRT (Documentation Instigation and Review Team) has existed for a long time at ARC. These days it consists of the people in Development writing user documentation and other people who are interested in keeping up on what's happening in this area. To it are addressed weekly reports e. g. (25403,) planning documents e. g. (25395,) and sometimes discourses and polemics e. g. (22714,). At present the documentation work in the Development group is of interest to NSW with a few minor exceptions. Therefore I suggest to the following people might want to join the DIRT distribution: WEC LAC KS SW. We will add them to the list only if they tell us positively they want to. We welcome suggestions for others involved in NSW who should receive this information.

1b1a

yes, thank you, I'd be pleased to be added to the DIRT distribution. Speaking for Steve Warshall [SW], who's out of town -- I'm sure he'd rather not be on any more mailing lists. But since my office is next to his, I'll bring to his attention anything I think he should see (including your invitation). My compliments to KIRK on having such a fine first name. There aren't many of us. -- Kirk Sattley, Computer Associates.

2

KS 18-MAR-75 16:26 25593

Accepting your kind invitation,

(J25593) 18-MAR-75 16:26;;; Title: Author(s): Kirk Sattley/KS;
Distribution: /DVN([ACTION]) ; Sub-Collections: NIC; Clerk: KS;
Origin: < SATTLEY, KS,NLS;3, >, 13-MAR-75 13:38 KS ;;;####;

Third-pass L10 List Data Type Design

Preface

1

This document is a third cut at defining a list data type for L10 and L1011; see (25430,) for the previous pass. I would appreciate comments/recommendations from the NLS programmers group (and anyone else who may be interested). DIA has agreed to modify the compiler in accordance with this or a better design, and I the run-time package. Both the PCP and NLS-backend implementations ultimately await action on this memo.

1a

Introduction

2

An L10 list is an ordered set of L10 data structures called "elements". For each element, the list run-time package (LRTP) maintains a "list element descriptor" (LED) which contains:

2a

1) the element's type; EMPTY, INTEGER, STRING, LIST, (arbitrary storage) BLOCK, and any others we care to define,

2a1

2) the element's value, if representable in 18 bits, or its address otherwise,

2a2

3) a bit indicating whether the LED contains the element's value or address,

2a3

4) a bit indicating whether or not the element resides in storage allocated by the LRTP, which must be released whenever the element is replaced or deleted.

2a4

If the element is itself a list, any allocated storage associated with IT must be released as well, and so on to arbitrary depth.

2a4a

Associated with every list is an upper bound M on the number of elements in the list, which is assigned either at compile time, if the list is declared, or at allocate time, if space for the list is obtained via the storage allocator. At any point in time, every list is also characterized by another number L, which is the current number of elements in the list. The elements of a list are subscripted one through L.

2b

Element Manipulation

3

Read

3a

When used on the right-hand side of an assignment statement:

3a1

#list# [i] and LED #list# [i]

3a1a

Third-Pass L10 List Data Type Design

denote either the value (for types EMPTY and INTEGER) or address (for types STRING, LIST, and BLOCK) of the *i*th element of list "list"; and the element's LED; respectively.

3a2

Write

3b

Assuming $i \leq L$:

3b1

#list# [*i*] = structure and LED #list# [*i*] = led

3b1a

replaces the current *i*th element of list "list". In the former case, the compiler constructs a LED for structure "structure" (EMPTY, integer, *string*, or #list#) which the LRTP stores in the list. In the case of a string or list, or of an integer unrepresentable in 18 bits, the LRTP first allocates storage for and makes itself a copy of the element, modifying the LED accordingly. In the latter case, the LRTP simply accepts the LED "led" provided by the programmer.

3b2

Note that the statement:

3b3

LED #listA# [*i*] = LED #listB# [*j*] := 0

3b3a

moves the indicated element from listB to listA.

3b4

Create

3c

If $i > L$, the assignment operations (above) are interpreted as:

3c1

#list# !- EMPTY, EMPTY, ..., structure

3c1a

#list# !- EMPTY, EMPTY, ..., =LED led

3c1b

respectively, where the number of EMPTYs is given by: $i-L-1$. The append operator (!-) and the "=LED" notation are described later.

3c2

List Manipulation

4

For the remainder of this document, "elem" will be used as shorthand for "either structure or LED led".

4a

Delete

4b

The statement:

4b1

#list# - ;

4b1a

Third-Pass L10 List Data Type Design

is logically equivalent to:

#list# [i] - ... #list# [L] - EMPTY

L - 0

4b2

4b2a

4b2b

Append

4c

The statement:

4c1

#list# !- [=LED] elem1, ..., [=LED] elemN

4c1a

where brackets surround optional elements, is logically equivalent to:

4c2

[LED] #list# [BUMP L] - elem1

4c2a

...

4c2a1

[LED] #list# [BUMP L] - elemN

4c2b

Write

4d

The statement:

4d1

#list# - elem1, ..., elemN

4d1a

is logically equivalent to:

4d2

#list# - ;

4d2a

#list# !- elem1, ..., elemN

4d2b

Sublist Manipulation

5

Read

5a

when used on the right-hand side of an assignment statement:

5a1

#list# [i, j]

5a1a

is logically equivalent to:

5a2

LED #list# [i] := 0, ..., LED #list# [j] := 0

5a2a

Note that therefore:

5a3

#listA# - #listB# [i, j]

5a3a

Third-Pass L10 List Data Type Design

is NOT logically equivalent to: 5a4

#temp# = LED #listB# [1] := 0, ..., LED #listB# [j] := 0 5a4a

#listA# = #temp# 5a4b

Write 5b

The statement: 5b1

#list# [i, j] = elem1, ..., elemN 5b1a

is logically equivalent to: 5b2

#list# = 5b2a

-LED LED #list# [1], ..., -LED LED #list# [1-1], 5b2a1

elem1, ..., elemN, 5b2a2

-LED LED #list# [j+1], -LED LED #list# [M] 5b2a3

Length Manipulation 6

The current M and L for list "list" are denoted, respectively, by: 6a

list.M and list.L 6a1

Both attributes are read-only by programmer convention. It is in general unsafe, for example, to perform: 6b

list.L = 0 6b1

to null a list (as one might do with an L10 string), since allocated storage blocks may be lost track of in the process. 6c

List Declaration 7

A list is declared at compile-time with a declaration statement of (for example) the following form: 7a

LOCAL LIST list [length] 7a1

This statement creates a local variable called "list" of type LIST, and sets: 7b

M=length and L=0 7b1

The alternate declaration form: 7c

Third-Pass L10 List Data Type Design

LOCAL LIST list = elem1, ..., elemM 7c1

is logically equivalent to: 7d

LOCAL LIST list [M] 7d1

#list# = elem1, ..., elemM 7d2

Corresponding declaration statements exist of course for non-local lists, 7e

Internal format 8

The internal PDP-10 format of a list is: 8a

XWD M,,L 8a1

led1 8a2

... 8a2a

ledM 8a3

(ledr) RECORD %list element descriptor% 8b

ledval [18], %address/value of element% 8b1

ledtyp [9], %element type 8b2

EMPTY=0 INTEGER=1 STRING=2 LIST=3 BLOCK=4% 8b2a

ledimd [1], %ledval contains value if TRUE% 8b3

ledalo [1], %element space allocated if TRUE% 8b4

Third-Pass L10 List Data Type Design

(J25594) 18-MAR-75 19:19;;; Title: Author(s): James E. (Jim)
White/JEW; Distribution: /NPG([ACTION]) RWW([INFO-ONLY]) ;
Sub-Collections: SRI-ARC NPG; Clerk: JEW; Origin: < JWHITE,
LSTDSGN3,NLS:4, >, 18-MAR-75 19:04 JEW ;;;;####;

You Are In DIRT

I suppose by accident you sent me in <ijournal,25593,> the journal branch of your initial file. Any old NLS user has had that happen atleast once. I gather from the title you want to be in DIRT and I have put you there. I hope what you get proves interesting and useful.

You Are In DIRT

(J25595) 18-MAR-75 23:00;;; Title: Author(s): Dirk H. Van
Nouhuys/DVN; Distribution: /JOAN([ACTION] dirt notebook please) KS([
INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk: DVN;

Archive Retrieval from [bbnb]<arcdocumentation> Fails

18-MAR-75 1809-EDT OPERATOR: Files retrieved from archive
Distribution: VANNOUHUYS
Received at: 18-MAR-75 18:09:26-EDT

1

[BBNB]<ARCDOCUMENTATION>NSFAPP,NLS;2 not retrieved from 1st
archive tape. Will try 2nd.

[BBNB]<ARCDOCUMENTATION>HARDYFREP,NLS;1 not retrieved from 1st
archive tape. Will try 2nd.

[BBNB]<VANNOUHUYS>EDPROGS,NLS;5 not retrieved from 1st archive
tape. Will try 2nd.

1a

18-MAR-75 1830-EDT OPERATOR: Files retrieved from archive
Distribution: VANNOUHUYS
Received at: 18-MAR-75 18:30:15-EDT

2

[BBNB]<ARCDOCUMENTATION>NSFAPP,NLS;2 not retrieved - file not
found on either archive tape

[BBNB]<VANNOUHUYS>EDPROGS,NLS;5

[BBNB]<ARCDOCUMENTATION>HARDYFREP,NLS;1 not retrieved - file not
found on either archive tape

2a

Archive retrieval from [bbnb]<arcdocumentation> Fails

(J25596) 18-MAR-75 23:11;;; Title: Author(s): Dirk H. Van
Nouhuys/DVN; Distribution: /FEED([ACTION]) JCP([ACTION]) MEH([
INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk: DVN;

Reference Documentation for NLS-8: KWAC Notebook

Historical info only: will be updated as soon as manpower can be acquired.

Reference Documentation for NLS-8: KWAC Notebook

REFERENCE DOCUMENTATION FOR NLS-8

The purpose of this notebook is to serve as a reference for all the relevant documentation to NLS usage that presently is available, and to provide an on site repository for document updates,

	1
Locator to Online Userguides and Journal Indexes.....	1a
TNLS Primer.....	1b
Line Processor Userguide and Microprocessor Tech. Paper.....	1c
DEX Userguide.....	1d
DEX Primer.....	1e
NLS Command Summary.....	1f
TNLS Cue Card.....	1g
TENEX User's Guide.....	1h
User Guide to the Terminal IMP.....	1i
Workstation Reference Manual.....	1j
User Programs Guide.....	1k
L10 User Guide.....	1l
Output Processor Userguide (pending).....	1m
Coordinated Information Services Paper.....	1n
Augmented Knowledge Workshop Paper.....	1o
TNLS Graduated Courses.....	1p
DNLS Graduated Courses (pending).....	1q
Application Tutorials (pending).....	1r

Reference Documentation for NLS-8: KWAC Notebook

(J25597) 19-MAR-75 02:17;;; Title: Author(s): James H. Bair/JHB;
 Distribution: /JHB([INFO-ONLY]) DCE([INFO-ONLY]) JCN([
 INFO-ONLY]) RLL([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk:
 JHB; Origin: < BAIR, CONTENTS.NLS;6, >, 20-FEB-75 11:28 JHB
 ;;;#####;

response to Charles' request for reaction to the service at BBN-B,

The following people were ask about BBN-B's service to date: 1

POOH EKM DSM KJM DVN JEW KEV JLP KIRK RLB2 1a

COMMENTS ON BBN-B itself 2

If network and stability problems with ELF are discounted the service at BBN-B seems OK with the following comments: 2a

The service is as good as, or better than the ARC ten for essentially cpu or i/o (non-network) bound jobs such as the compilers or the output processor. KIRK finds that the operators are prompt and courteous. 2a1

Responsiveness seems to vary greatly within short time intervals, independently of the system in use, for example TECO vs. NLS vs EXEC. 2a2

Users have been denied login when a SYS indicates that fewer than 40% of the users are from our group. 2a3

Someone here should be able to enable. 2a4

We must be able to re-attach to disconnected NLS jobs in a reliable way. It is not reasonable for the display to turn up somewhere else than your terminal. 2a5

However, access is a problem: 2b

Delays in command feedback and screen recreation have destroyed productivity. For example, DVN has kept track of the cpu time charged vs. his connect time. For comparable periods of use at similiar tasks, his percentage has dropped from 17% to 5% during quiet evening conditions. We certainly cannot live with a loss of 75% productivity. 2b1

Data lost by ELF prohibits satisfactory command type ahead. A similiar but less pronounced problem exists at AI. 2b2

Overall hardcopy throughput is unsatisfactory. We need to be able to spool our own printer. 2b3

ELF stability is unsatisfactory. ELF crashes, coupled with the inability to re-attach a line processor sucessfully, are anti-productive. 2b4

The differences in keyboards and connection procedures (tip,ELF,AI ...) are confusing. 2b5

Response to Charles' request for reaction to the service at BBN-B.

(J25598) 19-MAR-75 18:09;;; Title: Author(s): Robert Louis
Belleville, Jonathan B. Postel/RLB2 JBP; Distribution: /CHI([ACTION]
) RWW([INFO-ONLY]) DCE([INFO-ONLY]) ; Sub-Collections: SRI-ARC;
Clerk: RLB2; Origin: < BELLEVILLE, BBNB-POLL,NLS;1, >, 19-MAR-75
18:01 RLB2 ;;;;####;

Comments from Schantz on Directories

19-MAR-75 15:51:19-EDT,3349;000000000000
 Mail from BBN-TENEXA rcvd at 19-MAR-75 1551-EDT
 Date: 19 MAR 1975 1546-EDT
 Sender: SCHANTZ at BBN-TENEXA
 Subject: Clarifying comments of 11 March
 From: SCHANTZ at BBN-TENEXA
 To: Millstein at BBNB, Jwhite at BBNB, Postel at BBNB, Carlson at
 ISI, Bolduc at BBNB, Warshall at BBNB, Schaffner at BBNB Cc: Schantz
 Message-ID: <[BBN-TENEXA]19-MAR-75 15:46:27-EDT,SCHANTZ>

1. I was referring more to the instantaneous overload on the NSW supported directories, rather than the long term problem which arises when instantaneous overload occurs frequently. Surely we are not proposing to have nearly as many TENEX directories as potential NSW users. If there is a run on TENEX tools, are you going to queue the request, tell the user to try again later, tell him to go away, or what? I assume that since WM is managing the directories in question, there will not be occasion for any WM (or any process posing as a WM) to ask to have a tool placed in a directory that is already occupied without expecting disastrous results. This problem becomes more acute, if the WM handles the dispatching of directories, when (if) there are multiple WMs.

2. In the TBH dispatcher managed directory allocation scheme passwords need not be used at all because of the potential for connecting/logging to directories without password by privileged processes. The remote WM is obviously not such a process, and even if it were, the privilege is with respect to the system on which it is running. One might suggest that when the dispatcher do things for the WM as its privileged representative, but then we are replacing one problem with that of identifying when an ICPing process is in fact a WM, and should I trust a WM. A strategy which says that the ICPing process supplies a name and password to identify itself puts us back in the same boat: the TBH file system must rely on the WM host system file access control to the WM source/save files (or where ever these passwords are stored) for the integrity of the TBH file system.

I am now investigating the possibility of using the TENEX group mechanism for avoiding having to store clear text passwords in the code. However, I get the feeling this is self defeating (e.g. it introduces the potential for a malicious tool to get at other NSW directories, which could be handled by trapping, but then the whole directory partitioning would probably be superfluous). Actually, I just realized that even if the dispatcher manages the directory space, it would still need to verify that it was the WM (or another tool, if that is possible) that is requesting creation of a new process. The only alternative to passwords that

Comments from Schantz on Directories

readily comes to mind is the use of protected sending sockets to initiate the ICP, and serve as verification of the sending process.

4

3. The point I was raising was the mechanism to be used in clearing the tool directory of non-NSW files (i.e. ones which the WM may not be aware were created). Jon has suggested a procedure call (naturally) which would blindly get rid of everything in the directory. Is this what the WM intended to use? If so, I hadn't seen it documented anywhere and was unaware of its existence.

5

Rick Schantz

6

7

Comments from Schantz on Directories

(J25599) 19-MAR-75 18:20;;; Title: Author(s): Jonathan B.
Postel/JBP; Distribution: /JEW([INFO-ONLY]); Sub-Collections:
SRI-ARC; Clerk: JBP;

user options fixed

You did it! Escape now works for me in TNLS. Thanks Muchly. --jon,

1

user options fixed

(J25600) 20-MAR-75 00:27;;; Title: Author(s): Jonathan B,
Postel/JBP; Distribution: /DSM([INFO-ONLY]) POOH([INFO-ONLY]) ;
Sub-Collections: SRI-ARC; Clerk: JBP;

Intelligence Community

The "intelligence community" consists of:	1
FBI - Federal Bureau of Investigation	1a
CIA - Central Intelligence Agency	1b
NSA - National Security Agency	1c
DIA - Defense Intelligence Agency (Pentagon)	1d
BIR - Bureau of Intelligence and Research (State)	1e
A-2 - A-2 (Air Force)	1f
G-2 - G-2 (Army)	1g
ONI - Office of Naval Intelligence (Navy)	1h

Intelligence Community

(J25601) 20-MAR-75 00:43;;; Title: Author(s): Jonathan B.
Postel/JBP; Distribution: /EKM([INFO-ONLY]); Sub-Collections:
SRI-ARC; Clerk: JBP;

proposed mouse button or option character change

with the advent of 133 tenex we no longer have the ability to enter control characters via the mouse and keyset. i therefore propose that either the option character be changed to one of the existing mouse button characters (perhaps escape = 101 down and up), or that one of the mouse button characters (say 101 down and up) be changed to input a control-U.

1

proposed mouse button or option character change

(J25602) 20-MAR-75 10:52;;; Title: Author(s): Kenneth E. (Ken)
Victor/KEV; Distribution: /SRI-ARC([INFO-ONLY]) ; Sub-Collections:
SRI-ARC; Clerk: KEV;

so you want to print something with directives...

The best way (for now) to print something with directives through the printer in room 2018 is to use the Output Terminal File command,

Give a file name followed by <CA>

Type an "N" for the next three questions and then <CA> for "GO"

When this is done, use the procedure described by KIRK and JLE in <25572,>.

In order to eliminate the dash that automatically appears at page breaks, you need to include a special directive in the origin statement. The directive is ' ' what appears after the apostrophe is a space followed by a semi-colon,

1

1a

1b

1c

1d

so you want to print something with directives...

(J25603) 20-MAR-75 13:27;;; Title: Author(s): Ann Weinberg/POOH;
Distribution: /JOAN([ACTION] dpcs notebook please) SRI-ARC([INFO-ONLY]) DPCS([INFO-ONLY]) ; Sub-Collections: SRI-ARC DPCS;
Clerk: POOH;

Hostnames for ARC ELF hosts

I have given the name SRI-ARC11 to host 130 dec (host 2/Imp 2) with nickname ARC and Jim White as Liaison. If anyone strongly objects to any of the above please let me know before Monday what changes you would like to have. Also Joe Ehardt and I tentatively selected ARC-DEV for second machine. Acceptance or rejection with alternative greatly appreciated. Jake

Hostnames for ARC ELF hosts

(J25604) 19-MAR-75 23:33;;; Title: Author(s): Elizabeth J. (Jake)
Feinler/JAKE; Distribution: /GSG([ACTION]) SRI-ARC([INFO-ONLY])
; Sub-Collections: SRI-ARC; Clerk: JAKE;

Second try, for practice.

...You're right, of course -- I hit 'F' instead of 'B'. Since there is a little additional information in the original note, as well as for practice, I'm trying again to send it. Thanks for adding me to DIRT.

Second try, for practice,

Yes, thank you, I'd be pleased to be added to the DIRT distribution. Speaking for Steve Warshall [SW], who's out of town -- I'm sure he'd rather not be on any more mailing lists. But since my office is next to his, I'll bring to his attention anything I think he should see (including your invitation).

1

[PS, WED 19 MAR: SW confirms the above arrangement.]

2

My compliments to KIRK on having such a fine first name. There aren't many of us. -- Kirk Sattley, Computer Associates.

3

KS 20-MAR-75 17:17 25605

second try, for practice.

(J25605) 20-MAR-75 17:17;;; Title: Author(s): Kirk Sattley/KS;
Distribution: /DVN([ACTION]) KIRK([INFO-ONLY]) ;
Sub-Collections: NIC; Clerk; KS;

PI-Write-up, Farber-2

Computer Network Security
1974 ARPA Project Summary

1

Prepared for: ARPA IPT Principal Investigators Conference
San Diego, Mar. 12-14, 1975

2

Prepared by: David J. Farber
University of California at Irvine
Department of Information and Computer Science
Irvine, California 92664

3

The charter of this research group is the study of a new protocol for networks in which the transmitting and receiving processes designate each other by the use of mutually agreed upon algorithms. This protocol is to be investigated and documented on the UCI distributed computer system (DCS). We are developing and will implement, evaluate, and document an internetworking protocol for the DCS based on traffic flow security, which can be applied to other computer networks such as the ARPA Net. The project is currently focusing on two research areas. The research team includes Ken Larson and John Pickens.

4

AREA 1. PROTOCOL DESIGN AND TESTING

5

A protocol based on dynamic process renaming has been developed which provides the basic elements of a security system. The protocol scheme is based on the creation of a chain of names. In one method, a predetermined algorithm specific to the user is used to encode within each message a return address which is the new name of the sending process. Without knowledge of this algorithm, a message may not be returned to the sending process. In an alternative method, two communicating processes use a predetermined algorithm to generate a sequence of names by which they can identify each other. The names used can be generated by a pseudo-random number generator or other suitable scheme. Multiple use of a name can be prevented by maintaining a list of names in use. This simple protocol scheme does not allow for the loss of a message or the introduction of noise into a message. To handle these possible problems, the protocol has been extended to include a backup means of reestablishing the communications link if the names are altered or destroyed. A scheme has also been developed to prevent these errors from influencing the generation of names by cluttering the list of names in use. A difficulty in such a scheme is the initial creation of the chain of names. To strengthen this aspect of the protocol a procedure for dynamic user identification has been developed.

6

PI-Write-up, Farber-2

To test the protocol, name generation, and user identification procedures we have developed a simulation of the system. The initial design is being implemented on a conventional system and is designed around a control terminal. A system consisting of two hosts will be simulated. The control terminal will be used to simulate user entries and logons from as many as ten terminals on each host. The control terminal will also be used to destroy or alter messages on the network. This flexibility will allow us to fully exercise the protocols.

7

To test the protocol in an asynchronous environment, we will then transfer the simulation to the Distributed Computer System network at the University of California, Irvine. The design of the current implementation is specifically chosen so this change can be easily accomplished. The same flexibility will be maintained in the new simulation, but two separate machines will be used to simulate the two hosts, and files representing pseudo-terminals will be used to maintain operation at reasonable speeds. The initial simulation includes no use of encryption techniques; however, the design of the protocol specifically allows for this option if desired.

8

AREA 2. SECURITY DETECTION, DEBUGGING, AND MONITORING

9

The goal of this effort is to create descriptive and control mechanisms which enable the observability and verification of distributed process behavior. Security detection, debugging, and monitoring with distributed processes all have the following attributes in common:

10

- 1) Monitoring hooks must be placed either statically or dynamically in key locations,
- 2) Intra-module communications must be observable and describable at a high level,
- 3) The sequential and/or parallel behavior of a set of modules must be observable and describable at a high level,
- 4) Arbitrary behavioral attributes must be observable and describable at a high level.

10a

Additionally, in the case of debugging, it may be desired to invoke breakpoints and DDT-like operations internal to modules as a function of externally observable conditions.

11

PI-Write-up, Farber-2

This effort has been developed into four phases. In the first, a meta-language is being developed which may be used to describe the syntax and semantics of single logical message channels between processes. Some of its key attributes are: 1) the language is a human engineered BNF with facilities for structured editing and macro programming, and 2) metarules within the BNF may be made dependent upon external conditions (such as the state of a program graph or other communication channels). In the second phase the mechanisms for describing the sequential/parallel behavior of a group of distributed modules are being investigated. Past and present work on graph models has been examined, and a modified model is being created which is better suited for use in the context of this effort. In the third phase all the levels of potential monitoring/debugging will be integrated into a single consistent system. Constructs for controlling these tools and passing smoothly from one level to the next will be outlined. In the fourth and final phase two potential implementations will be mapped out. The first will consider the Distributed Computer System network and the second will consider the ARPA network. In both cases the problems of obtaining effective monitoring taps will be considered, and the requirements upon host operating systems (if any) and/or programming conventions will be outlined.

JAKE 20-MAR-75 17:25 25606

PI-write-up, Farber-2

(J25606) 20-MAR-75 17:25;;; Title: Author(s): Elizabeth J. (Jake)
Feinler/JAKE; Distribution: /ACM([INFO-ONLY]) ; Sub-Collections:
SRI-ARC; Clerk: JAKE; Origin: < PI, FARBER-2,NLS;4, >, 27-FEB-75
18:09 JAKE ;;;; ####;

PI-Write-up, Shoup

Research on Automated Speech Analysis
1974 ARPA Project Summary

Prepared for: ARPA IPT Principal Investigators Conference
San Diego, Mar, 12-14, 1975

Prepared by: Drs. June Shoup-Hummel, David Retz, and
John Markel
Speech Communications Research Laboratory
800 A Miramonte Drive
Santa Barbara, California 93109

1. Natural Speech Analysis - J. E. Shoup-Hummel

The primary goal of this task is to determine how the utterances of natural speech are divergent from carefully enunciated "dictionary" pronunciation in an effort to formulate generalizations and rules about the phonetic strings of natural speech.

The major accomplishment in this area during 1974 was the building of an extensive computerized natural language data base and the formulation of computer programs for automatically analyzing this data base for phonological phenomena. When the ARPA SUR project was initiated some three years ago there were virtually no large collections, transcriptions, nor analysis programs of speech material available anywhere. For system development and for speech research it is essential that such a data base exist and that it be analyzed extensively and rapidly. SCRL has transcribed orthographically and ARPAbetically 31,055 words from a total of 32 speakers and has developed a package of processing and analyzing computer programs to obtain certain phonological results of interest to the SUR project. This data base not only is useful for phonological study, but can also be used by system builders and researchers for acoustic information if the recordings are digitally stored, extracted with relevant acoustic measures, and then related by time frames to the ARPAbetic transcriptions.

2. ELF System Development - D. L. Retz

The objective of this task is to develop an operating system (called ELF) as a flexible interface to the ARPANET, using the PDP-11 computer. The system provides terminal facilities for user access as well as special-purpose support functions. ELF is a multiprogrammed system with rich process synchronization and inter-communication capabilities.

PI-Write-up, Shoup

A number of subtasks have been accomplished. The system has been designed to provide for the continued development of a virtual memory structure, allowing programs to run in the PDP-11 and utilize resources available in the network. A Network Control Program is included in the system, allowing communication with other network computers using the standard ARPANET Host-Host protocol. In addition, a set of system calls are provided for the development of experimental protocols; this facility is being used in the transmission of packetized speech in the ARPANET. A user interface called the EXEC has been developed to allow programs to be run under the system. One such program is User-Telnet, which allows users to establish terminal connections to various sites on the network. ELF is being used to provide a network interface to a number of special-purpose digital signal processors (SPS-41's) which provide signal processing capability for speech research applications, but are structurally unsuited to direct connection to the network. An ELF System Programmer's Guide which describes the internal structure of the system has been completed and is now available.

9

3. Finite Word Length Problems in Linear Prediction - J. D. Markel

10

The objectives of this task have been (1) to determine how algorithms (programs) used in linear prediction speech compression systems are affected by numerical accuracy in their computation and (2) to develop algorithms for use in the Network Speech Compression (NSC) program. Both objectives have been accomplished.

11

A rather complete theoretical and experimental computer roundoff noise analysis of the most important portions of linear prediction speech transmission systems has been performed. The results have shown, for example, which forms of synthesizer filters are best suited for computer implementation. The results of these studies led to the definition of a complete linear prediction speech compression program. This program is now being implemented in the SPS-41 computers at several sites as the NSC system for speech compression on the ARPANET (the SCAN system).

12

PI-Write-up, Shoup

(J25607) 20-MAR-75 19:34;;; Title: Author(s): Elizabeth J. (Jake)
Feinler/JAKE; Distribution: /ACM([INFO-ONLY]) ; Sub-Collections:
SRI-ARC; Clerk: JAKE; Origin: < PI, SHOUP,NLS;5, >, 23-FEB-75
03:35 JAKE ;;;; #####

PI-Write-up, Doyle

Internetworking Research
1974 ARPA Project Summary

Prepared for: ARPA IPT Principal Investigators Conference
San Diego, Mar, 12-14, 1975

Prepared by: Michael L. Dertouzos
Project MAC
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139
(617) 253-2145

In 1974 Project MAC continued work under ARPA support in the areas of
Automatic Programming, Automation of Programming Technology,

ARPANET RELATED ACTIVITIES, AND THE MATHEMATICAL LABORATORY.

A. Automatic Programming

The principal goal of this work is to seek a long-term solution to the high-cost of software by automating the process of program generation from high-level descriptions of desired tasks. We are well underway in the planning and development of our prototype called PROTOSYSTEM-I which is an expert system in many aspects of the design problem to be solved. This system helps the human designer to express his solution in terms of methods already known to the system, and in a very high-level language. Using this information and knowledge of the environment in which the system being designed will run, PROTOSYSTEM-I finds an efficient way of implementing the specified system and produces the required software. PROTOSYSTEM-I also stands ready to explain the design and its behavior, for future maintenance purposes in a natural language familiar to the system maintainer.

In 1974, several experiments were done on a data base query system; modules for operations management were implemented; heuristic algorithms for designing IBM-370 PL/I files were tested; the number of data items generated in PROTOSYSTEM-I was studied; the OWL system for building expert problem-solving systems was redesigned and its implementation was begun. In addition, a conceptual framework was produced for automatically programming micro computers from a very high-level language.

B. Automation of Programming Technology

PI-Write-up, Doyle

The goal of this work, which is part of our Automatic Programming effort, is to increase programmer productivity through a system and associated tools that make possible the creation, debugging and documentation of programs. During 1974, a version of ABSTR, an automated abstractor, was made operational; a sophisticated message system was completed; CALICO the system with over 2,000 well-documented subroutines was completed and generalized to MUDDLE (higher-level language) subroutines. In addition, an initial TENEX MUDDLE was completed along with several additional projects in graphics. With these various subsystems it is now possible to augment a programmer's ability to specify, retrieve, prepare, test, debug, validate, document and update programs in an effective way.

10

C. Arpanet Activities

11

During 1974, the ARPANET was successfully connected to the MULTICS development machine, thereby making possible through this second connection a variety of testing, modification and diagnostic procedures. In addition, several hardware and software interface related activities were carried out and buffering strategies were revised leading to 40,000 useful data bits per second, end-to-end file transfer rates via standard ARPANET protocols.

12

D. Mathematical Laboratory

13

This system, one of the most advanced operational expert programs continues to become progressively more important as a research tool for people who need expertise in symbolic manipulation. During 1974, work was completed on the use of the Hensel Lemma in algebraic manipulation; power series and poisson series packages were completed; new algorithms were developed for inverting matrices with symbolic entries; and new versions of the reference manual were produced. In addition, much time was devoted to user interaction. We are hopeful that in 1975, we will be able to offer this unique program to many more researchers through a consortium arrangement.

14

JAKE 20-MAR-75 19:44 25608

PI=Write-up, Doyle

(J25608) 20-MAR-75 19:44;;; Title: Author(s): Elizabeth J. (Jake)
Feinler/JAKE; Distribution: /ACM([INFO-ONLY]) ; Sub-Collections:
SRI-ARC; Clerk: JAKE; Origin: < PI, DOYLE,NLS;3, >, 27-FEB-75
14:47 JAKE ;;;; #####;

DVN 20-MAR-75 22:44 25609

Retrieval from [BBNB]<arcdocumentation> Still Doesn't Work.

<arcdocumentation>hardyfreep is the source for a paper we need to reprint.

Retrieval from [BBNB]<arcdocumentation> still Doesn't work,

20-MAR-75 1353-EDT OPERATOR: Files retrieved from archive

Distribution: VANNOUHUYS

Received at: 20-MAR-75 13:53:39-EDT

1

[BBNB]<ARCDOCUMENTATION>NSFAPP,NLS;2 not retrieved from 1st
archive tape. Will try 2nd.

[BBNB]<ARCDOCUMENTATION>HARDYFREP,NLS;1 not retrieved from 1st
archive tape. Will try 2nd.

1a

20-MAR-75 1418-EDT OPERATOR: Files retrieved from archive

Distribution: VANNOUHUYS

Received at: 20-MAR-75 14:18:14-EDT

2

[BBNB]<ARCDOCUMENTATION>HARDYFREP,NLS;1 not retrieved - file not
found on either archive tape

[BBNB]<ARCDOCUMENTATION>NSFAPP,NLS;2 not retrieved - file not
found on either archive tape

2a

DVN 20-MAR-75 22:44 25609

Retrieval from [BBNB]<arcdocumentation> still doesn't work.

(J25609) 20-MAR-75 22:44;;; Title: Author(s): Dirk H. Van
Nouhuys/DVN; Distribution: /FEED([ACTION]) JCP([ACTION]) JCN([
INFO-ONLY]) MEH([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk:
DVN;

Questioning the SOURCE

Not to waken sleeping dogs, but I think we should seriously consider replacing SOURCE in NSW documentation with WHEREFROM, DESTINATION with WHERETO, and CONTENT with WHAT.

1

questioning the SOURCE

(J25610) 21-MAR-75 00:06;;; Title: Author(s): Dirk H. Van
Nouhuys/DVN; Distribution: /JOAN([ACTION] dirt notebook please) DIRT(
[INFO-ONLY]) ; Sub-Collections: SRI-ARC DIRT; Clerk: DVN;

Trial File for NLS-8 Glossary goes to DDSI

Just now I spun off the most recent trial run of the NLS-8 Glossary
as formatted for COM <com,(kirK)gtest.com;1> at ISI onto tape 120.

1

Trial File for NLS-8 Glossary goes to DDGI

(J25611) 21-MAR-75 00:14;;; Title: Author(s): Dirk H. Van
Nouhuys/DVN; Distribution: /JOAN([ACTION] dpcs and dirt notebooks
please) KIRK([INFO-ONLY]) POOH([INFO-ONLY]) JHB([INFO-ONLY])
SGR([INFO-ONLY]) RWW([INFO-ONLY]) ; Sub-Collections: SRI-ARC
DPCS DIRT; Clerk: DVN;

New Version of NLS at BBNB

Viewspec capital Q has been implemented (indent relative to statement you are in when viewspec l or g is on). Move or Copy file now increments the version number (fixes a bug with Move Message command). Output Quickprint File can now be copied to ELF printer with headers, etc, looking right. Various other bug fixes.,.,

1

KIRK 21-MAR-75 00:32 25612

New version of NLS at BBNB

(J25612) 21-MAR-75 00:32;;; Title: Author(s): Kirk E. Kelley/KIRK;
Distribution: /SRI-ARC([INFO-ONLY]) ; Sub-Collections: SRI-ARC;
Clerk: KIRK;

Notes On A Distributed Programming System

Introduction

The Distributed Programming System (DPS) being used in the construction of the National Software Works is intended to be an environment for the creation of programs that span across individual computers. This allows the programmer to make use of the facilities of an appropriate set of computers accessible within the framework of the DPS.

The initial setting of the DPS is the Advanced Research Projects Agency's (ARPA) Computer Network (ARPANET). This collection of over 50 heterogenous computing systems provides a challenging test bed for the DPS concept.

The National Software Works (NSW) is an ARPA sponsored program to deliver to Defense Department agencies the software production technology previously developed under ARPA sponsorship. The NSW itself consists of a overall executive (implemented on a PDP 10 Tenex), a interactive front end (implemented on a PDP 11 Elf) and several applications programs (implemented on a variety of systems).

Our concept of a DPS is that it allows a programmer to call on functions or procedures in several computers as easily as he calls on procedures in one computer. To be able to do this there must be a standardized calling mechanism (both between machines and within each machine). As a first cut at such a mechanism we have defined a Procedure Call Protocol (PCP) [1]. Let us emphasize that we are still experimenting here and need and welcome advice on the specifics of this mechanism.

Past Protocol Design Approaches

Several ARPANET applications protocols have been designed and implemented since the Host-Host Protocol was adopted in 1970. Most have been bootstrapped from lowerlevel applications protocols. For example, the File Transfer Protocol (FTP) was built upon Telnet, and the Remote Job Entry Protocol (RJE) upon both Telnet and FTP. The highestlevel protocol shared by all such bootstrapped protocols is Telnet.

Although the bootstrapping principle seems a sound basis for Network protocol development, we believe that Telnet, providing little more of use than a character set, is NOT the most appropriate foundation for a large class of applications protocols.

Notes on a Distributed Programming System

Bootstrapping at a Higher Level

We contend that a Procedure Call Protocol (PCP) -- a Network-standard mechanism for invoking arbitrary named, argument-driven and result-producing procedures in a remote process -- is a much more appropriate and powerful foundation for many applications protocols. We believe that the adoption by the Network community of a PCP as the basis for most applications protocols would have at least the following effects:

- 1) expedite the specification of applications protocols by permitting their documentation to have a functional, rather than a syntactic orientation,
- 2) largely eliminate the need for separate, application-specific user processes,
- 3) reduce the cost of making large, existing software systems available as Network servers by allowing a Network interface more compatible with their internal organization,
- 4) provide the basis for a more natural interface between local and remote procedures, and therefore
- 5) encourage the sharing of software, by making procedures on remote hosts as accessible to the programmer as local ones.

Procedure Call Protocol and Multi-Process Systems

The procedure Call protocol (pCP) is an inter-process and/or inter-host protocol that permits a collection of processes within one or more ARPANET hosts to communicate at the procedure call level. In effect, it makes the component procedures of remote software systems as accessible to the programmer as those within his own system. PCP defines the distributed programming system and the inter-process exchanges that implement it.

At the highest level, PCP is the specification of a virtual programming environment in which remote procedures are assumed to operate. The model specifies the manner in which remote procedures gain and relinquish control, the kinds of data structures with which they can be expected to deal, and so forth. One of the tasks of the PCP implementer, therefore, is to provide a mapping between his real programming environment and the virtual one defined by PCP.

At a slightly lower level, PCP is the specification of the

Notes on a Distributed Programming System

interchanges between two connected processes which implement the virtual programming environment,

PCP is intended to be suitable for interlinking two processes within a single host, as well as processes on different hosts,

A multi-process system whose construction PCP makes practical and of which the NSW is an example, consists of collections of "procedures" and "data stores" called "packages", in "processes", interconnected in a tree structure by "channels". Procedures within a process have free access to the procedures (and data stores) of each process adjacent to it in the tree structure, and may call upon them as if they were local subroutines. Superimposed upon the tree structure is a more general set of interconnections which give non-adjacent processes in the tree the same kind of access to one another.

A multi-process system is implemented by:

- 1) low-level protocols which provide the basic, inter-process communication (IPC) facilities by which channels are implemented: an inter-host IPC protocol, an inter-Tenex-fork IPC protocol, and data structure format specifications for both connection types,
- 2) PCP proper, which largely defines the DPS (especially, the procedure call and return mechanism) and specifies the inter-process control exchanges required to implement it,
- 3) a set of system packages, implemented within each process, provide mechanisms by which user procedures can: call remote procedures (implemented by the Procedure Interface Package, PIP), manipulate remote data stores (implemented by the PCP Support Package, PSP), and interconnect processes (implemented by the Process Management Package, PMP).
- 4) user packages in each process,

The Procedure Call Protocol can be viewed as a set of system primitives provided by the collection of computer operating systems cooperating in the DPS.

Besides a mechanism for calling procedures a programmer needs the capability to group related procedures together and to institute the execution of groups of procedures as processes. Operating systems also require the identification of their users for access control and accounting purposes. We do not expect a DPS to be

Notes on a Distributed Programming System

exempt from such requirements: we provide for such identification at process creation time. Another aspect of a DPS is the requirement for a standard set of data types for use as arguments to and results of procedure calls.

Initially the programmer will be creating all the procedures involved in a multi-process system, but as time goes by we envision that the procedures developed for one application will be used in others. Eventually there could be PCP callable libraries of procedures. In fact we believe that such "procedure packages" as UCLA's BMDs, or IBM's Scientific Subroutine Package should be PCP callable procedures.

References:

[1] White, J.E. "The Procedure Call Protocol / PCP Version 2," NIC 24459, Augmentation Research Center, Stanford Research Institute, Menlo Park, California, 22-NOV-74.

JEW JBP 21-MAR-75 00:37 25613

Notes On
A Distributed Programming System

15-MAR-75

James E. White

Jonathan B. Postel

Augmentation Research Center
Stanford Research Institute
Menlo Park, California 94025

A Distributed Programming System provides a programming environment for the construction of multi-process systems utilizing the resources of several hosts in a computer network.

JEW JBP 21-MAR-75 00:37 25613

Notes On A Distributed Programming System

(J25613) 21-MAR-75 00:37;;; Title: Author(s): James E. (Jim) White,
Jonathan B. Postel/JEW JBP; Distribution: /SRI-ARC([INFO-ONLY]) ;
Sub-Collections: SRI-ARC; Clerk: JBP; Origin: < POSTEL,
NOTES-ON-DPS,NLS;12, >, 21-MAR-75 00:25 JBP ;;;;###;

Current Standing of the Editorial Processing Center Project

Lee Revens
1133 Avenue of the Americas
New York, New York
10036

1

Dear Mr. Revens,

2

This is to inform you of the standing of the Editorial Processing Center project for your planning purposes. I also enclose the revised proposal.

3

The technical people of NSF have recommended that SRI be awarded the contract. The next step, which has been hanging since I spoke with you, is for NSF to initiate contract talks. We understand that they are thinking of somewhat different financial arrangements (between them and us) than they originally requested. Because the contract involves cost-sharing which in turn involves SRI planning, it is possible that their new conditions would be unacceptable to SRI, but that seems to me unlikely.

4

The upshot of all this is delay, and it seems clear that work will not begin for at least 6 weeks and might be delayed until July 1.

5

Let me assure you I will let you know the moment I have concrete dates and look forward to doing something really interesting and useful at ACM. In the meantime, feel free to ask questions about the project or the material I have enclosed.

6

Sincerely

Dirk H. van Nieuhuys

7

DVN 21-MAR-75 13:55 25614

Current standing of the Editorial Processing Center Project

(J25614) 21-MAR-75 13:55;;; Title: Author(s): Dirk H. Van
Nouhuys/DVN; Distribution: /JOAN([ACTION] dpcs notebook please) DPCS(
[INFO-ONLY]) ; sub-Collections: SRI-ARC DPCS; Clerk: DVN;
Origin: < VANNOUHUYS, REVENSLISTER.NLS;2, >, 21-MAR-75 13:33 DVN
;;;####;

Task and Manpower requirements to cleanup the line processor terminal configuration,

On Pouring glue into the line processor

1

If the line processor had been designed as a fixed, hardwired controller there would now be no question about our future evolution in the low cost terminals; however, it was not. As a result, several additional tasks must be completed before the line processor can be considered a finished product,

1a

Line processor maintenance

1a1

Maintaining the line processor firmware is a tricky and subtle expense. The usual flow of modifications, additions, and corrections needed to keep the line processor viable will probably be 2 to 4 man weeks per year AFTER all development is cut off. (applications)

1a1a

In addition, a clear mechanism is needed to insure that the precise hardware configuration, and the exact version of the firmware is maintained for each site. The new line processor error reporting and collecting mechanism needs to be included in the overall maintenance mechanism. (2 man weeks - applications)

1a1b

Documentation for the line processor itself, the supported a/n displays, graphics equipment, cassette drives and any other associated hardware needs to be collected with all of the firmware listings and stored in one place. (1 man week - applications)

1a1c

The cassette/line processor dilemma

1a2

The DNLs workstation consisting of a display, Lp, mouse, keyset and cassette drive finds application in the "off-line" entry of text material.

1a2a

Before line processor development can be frozen the parties involved in this problem must come together to describe and define the problem, find solutions and finally implement and DOCUMENT the result. (2 man months - applications and development)

1a2b

Line processor Protocol

1a3

Both the protocol between the line processor and host and host and line processor needs review and finalization.

1a3a

Recent experience indicates that, for example, external processor and line processor character traffic is too

Task and Manpower requirements to cleanup the line processor terminal configuration.

verbose. Additionally new protocols may need to be added to identify the input from the copy printer receiver, handle cursor resolution, and possibly control the cassette interface. Several protocols such as screen sharing and literal collection may be impractical and should be dropped. (1 man month - development)

1a3b

Line processor selfcheck and line tests

1a4

The non-graphic line processors have sufficient memory space to accommodate some form of self test, as well as transmission line checks. Code should be implemented to check the major elements of the line processor as well as cooperate with transmission line checking routines. Documentation should be produced and distributed. These self checks would build user confidence in the terminal configuration itself and prevent random reconfiguration of the line processors to isolate NLS based faults. (1 man month - applications)

1a4a

Graphics line processor hardware

1a5

The final form of the line processor configuration needs to be completed and documented. Final decision on the use of the footswitch and modification to the a/d converters is not yet complete. (1 man week - development)

1a5a

In all 4-6 man months of effort should be expended to finalize the line processor before we can pour glue into it and bolt on the top.

1a6

Task and Manpower requirements to cleanup the line processor terminal configuration.

(J25615) 21-MAR-75 18:55;;; Title: Author(s): Robert Louis
Belleville/RLB2; Distribution: /RWW([ACTION]) JCN([ACTION]) DCE(
[INFO-ONLY]) DIA([INFO-ONLY]) CHI([INFO-ONLY]) MEH([
INFO-ONLY]) JDH([INFO-ONLY]) DVN([INFO-ONLY]) ;
Sub-Collections: SRI-ARC; Clerk; RLB2; Origin: < BELLEVILLE,
LP-CLEANUP,NLS;1, >, 7-MAR-75 18:29 RLB2 ;;;;####;

Line Processor protocol document

A revised version of the line processor protocol document (lp,mcs4,protocol) is available for your review and comments. Don, please check the summary at the end to verify that the padding figures are correct.

Line Processor protocol document

(J25616) 21-MAR-75 19:02;;; Title: Author(s): Robert Louis
Belleville/RLB2; Distribution: /DIA([ACTION]) CHI([ACTION]) JDH(
[ACTION]) ; Sub-Collections: SRI-ARC; Clerk: RLB2;

In response to KEV's 25602 'proposed mouse button or option character change'

Rather than removing the ALT mouse chord, I would propose using the now defunct CTRL shift case with the keyset to mean certain special characters such as NULL, OPTION, and ^V which are otherwise unavailable from the mouse and keyset. This would be a quick interim patch until user-definable macro strings are implemented for the undefined mouse-keyset combinations. Unfortunately, ^C, ^T, ^H, and ^O would still not be available from mouse and keyset unless someone can figure out how to do interrupt characters. Even so, this would allow for more functions to be entered without removing existing ones.

1

KIRK 21-MAR-75 19:32 25617

In response to KEY's 25602 'proposed mouse button or option character change'

(J25617) 21-MAR-75 19:32;;; Title: Author(s): Kirk E. Kelley/KIRK;
Distribution: /SRI-ARC([INFO-ONLY]) ; Sub-Collections: SRI-ARC;
Clerk: KIRK;

Response to JAKE's 25604 "Hostnames for ARC ELF hosts"

I think ARC is a poor choice for the nickname of SRI-ARC11 because it is already being used as the nickname for the ARC development host computer (currently BBNB and maybe Office=2 in a few months). Perhaps A1 is not being used?

1

KIRK 21-MAR-75 19:56 25618

Response to JAKE's 25604 'Hostnames for ARC ELF hosts'

(J25618) 21-MAR-75 19:56;;; Title: Author(s): Kirk E. Kelley/KIRK;
Distribution: /SRI-ARC([INFO-ONLY]) ; Sub-Collections: SRI-ARC;
Clerk: KIRK;

Response to DVN's 25610 "Questioning the SOURCE"

Rather than replace the three meta-primatives LSEL, DSEL, and SSEL with three other "more intuitive terms", I would propose using only the two terms: POINT and TYPEIN. TYPEIN is a primitive term. For TNLS, the primitive "ADDRESS" would be better than POINT but we must write documentation which works for both DNLS and TNLS. The use of the one meta-primative POINT can replace the three we now use. So POINT in TNLS = ADDRESS. In DNLS, POINT = BUG/ADDRESS and [POINT] = BUG/[ADDRESS].

KIRK 22-MAR-75 00:32 25619

Response to DVN's 25610 "Questioning the SOURCE"

(J25619) 22-MAR-75 00:32;;; Title: Author(s): Kirk E. Kelley/KIRK;
Distribution: /DIRT([INFO-ONLY]) ; Sub-Collections: SRI-ARC DIRT;
Clerk: KIRK;

Glossary still being edited, a new test for applicants.

POOH:	1
Worked on getting COM version of the Command Summary ready to go	1a
Wrote a first draft of a test for potential knowledge workers in documentation or other areas	1b
edited part of the formatted glossary	1c
NSW Documentation	1d
Useroptions POOH<arcdocumentation,Useroptions,>	1d1
DRAFT Scenario DUE:April 25	1d1a
Scenario DUE:May 9	1d1b
DRAFT Data Base File DUE:April May 2	1d1c
Data Base File DUE: May 26	1d1d
DRAFT Introduction to NSW Useroptions DUE: April 28	1d1e
Introductiono NSW Useroptions DUE: May 11	1d1f
Caluculator POOH<help,calculator,>	1d2
Action: worked on data base file, met with EKM to discuss some of my questions and findings. will give her a list of the things we talked about	1d2a
DRAFT Scenario DUE:April 15	1d2b
scenario DUE:April 25	1d2c
DRAFT Data Base File DUE:March 28	1d2d
Data Base File DUE: April 28	1d2e
DRAFT Introduction DUE: April 4	1d2f
Introduction DUE: April 18	1d2g
Graphics POOH<arcdocumentation,graphics=terms,>	1d3
DRAFT Scenario on Making a Flow Chart DUE:April 25	1d3a
Scenario on Making a Flow Chart DUE: May 2	1d3b

Glossary still being edited, a new test for applicants.

DRAFT Data Base File DUE:April 4	1d3c
Data Base File DUE: April 11	1d3d
DRAFT Introduction DUE: April 18	1d3e
Introduction DUE: April 25	1d3f
NLS Editor <help,Editor,>	1d4
DRAFT scenario DUE:May 2	1d4a
Scenario DUE: May 16	1d4b
DRAFT Data Base File DUE:April 11	1d4c
Data Base File DUE: April 18	1d4d
DRAFT Introductionfor NSW audience DUE: April 25	1d4e
Introduction DUE for NSW audience: May 2	1d4f
NLS Environment File POOH KIRK <arcdocumentation,nlsum,>	1d5
DRAFT Data Base File DUE:May 2	1d5a
Data Base File DUE: 18pril 18	1d5b
Sequential I/O	1d6
POOH, a tutorial on how to use sequential I/O,	1d6a
DRAFT DUE *May 20	1d6a1
DUE *May 29	1d6a2
NSW Cue Card POOH	1d7
Draft DUE May 15	1d7a
DUE June 1	1d7b
DVN	2
NSW Documentation	2a
Made a Fourth NSW Work Breakdown and Schedule (25568,)	2a1
Final Report	2b

Glossary still being edited, a new test for applicants,

Miscellaneous Editing,	2b1
Small Trailing NLS-8 Documents	2c
Preface to NLS: Waiting for Application's Review	2c1
TNLS Addressing: It is on me to respond to RWW's review,	2c2
COM:	2d
We send new proofs of a short trail file from the Glossary to be picked up by DDSI on Friday,	2d1
The TNLS-8 Primer awaits my attention for COM printing,	2d2
I tried to recall Martin Hardy's paper Microprocessing Technology from archive at BBN and failed twice,	2d3
NSW Documentation	2e
DCPS DvN<arcdocumentation,dpcshelp,>	2e1
DRAFT Scenario formatting a file for COM DUE:April 11	2e1a
Scenario on formatting a file for COM DUE:April 25	2e1b
DRAFT Data Base File DUE:March 28	2e1c
Data Base File DUE: April 28	2e1d
DRAFT Introduction DUE: April 4	2e1e
Introduction DUE: April 18	2e1f
Front End/Works Manager DVN<arcdocumentation,fewm,>	2e2
Introduction	2e2a
DRAFT DUE April 11	2e2a1
Final DUE: April 25	2e2a2
Scenario logging into NSW and getting a tool,	2e2b
Draft DUE April 18	2e2b1
Final DUE May 2	2e2b2
DRAFT Data Base File DUE: April 7	2e2c

Glossary still being edited, a new test for applicants,

ACTION; Put a basic list of commands with rough grammar online, Needs reformatting,	2e2c1
Data Base File DUE: April 21	2e2d
Interface to Secretarial Functions	2e3
DvN, Introduction,	2e3a
DRAFT DUE *April 15	2e3a1
DUE *April 25	2e3a2

Glossary: Scrutiny mainly by Marcia Keeney, Rita Hysmith, and me found a lot of little problems in the glossary draft, mostly either copy proof errors or things needing further translation between online form and hardy copy form. None are difficult, but together they will run into next week to fix.

2f

KIRK

	3
Redid the edits on the glossary I made last week. Created a new print version,	3a
Redid the COM version of the Sample glossary. Now at DDSI.	3b
NSW stuff & nothing new &	3c
The NLS umbrella help description file, <help,nlsum,>	3c1
Tutorial on writing, editing, and viewing a document online,	3c2
very sketchy scenario at < hjournal, 25289, in>	3c2a
Letter tool (may be a sendmail command)	3c3
Help description <kelley,task=areas,letter>	3c3a
Discursive Introduction & not written & to online US postal letter generation.	3c3b
tutorial on writing and sending a U.S. postal letter. < hjournal, 25289, sending>	3c3c
Sendmail tool	3c4
Help description <help,sendmail,>	3c4a
Discursive Introduction to sending online mail.	3c4b

Glossary still being edited, a new test for applicants,

Tutorial on sending mail to a person in the IDENT file,	3c4c
Readmail tool	3c5
Help description <help,Readmail,>	3c5a
Discursive Introduction to reading mail online,	3c5b
Tutorial on reading your mail online,	3c5c
Programs tool	3c6
Help description file <help,Programs,>	3c6a
Discursive Introduction for Cobol users,	3c6b
Tutorial for [writing and] compiling Cobol programs,	3c6c
Discursive Introduction for L-10 user programming,	3c6d
Tutorial for writing, compiling and loading L-10 and CML programs.	3c6e
To be written by DvN	3c7
Getting into the NSW % nothing written % > A general introduction to NSW which will take the intelligent user to a point where he/she can continue to learn on her/his on with a tutorial on how to log in and call up the Editor tool. This will include such things as tip information and how to use Help.	3c7a
The NSW FE Help description file % nothing written %	3c7b

DVN POOH KIRK 22-MAR-75 01:03 25620

Glossary still being edited, a new test for applicants,

(J25620) 22-MAR-75 01:03;;; Title: Author(s): Dirk H. Van Nouhuys,
Ann Weinberg, Kirk E. Kelley/DVN POOH KIRK; Sub-Collections: SRI-ARC;
Clerk: KIRK;

Suggested RFC

441 :

Distribution: FEINLER
Received at: 20-MAR-75 06:46:15-EDT

1

Mail from SU-AI rcvd at 20-MAR-75 0646-EDT
Date: 20-MAR-75 12:13 AM PDT
From: Brian Harvey (BH @ SU-AI)
To: FEINLER @ BBN-IENEXB

- - - -
I would like to submit the following as an RFC or whatever, or if there is a committee, send it to them:
I propose that FTP servers, when processing the HELP command, conclude their output with "200 End of HELP", so that the user process knows when the help is done.
Thanks,

1a

JAKE 24-MAR-75 09:33 25621

Suggested RFC

(J25621) 24-MAR-75 09:33;;; Title: Author(s): Elizabeth J. (Jake)
Feinler/JAKE; Distribution: /JBP([ACTION]); Sub-Collections:
SRI-ARC; Clerk: JAKE;

CHI 25-MAR-75 13:44 25622

NPTG Findings: Daily Report 24-mar-75

sent via SNDMSG to Network Performance Technical Group (NPTG).

NPTG Findings: Daily Report 24-mar-75

This is a daily report of findings of ARC's contingent of the Network Performance Technical Group,

Office-1:

Disk transfer times:

We no longer have any reason for suspecting the disk system at Office-1 of unusual behavior. The measurements we we making made use of a TENEX-maintained count of the number of pages transferred to/from the disk. This number is not being properly updated in some circumstances and was thus giving us erroneous average transfer times. We will patch in our own counter and verify that the disks are behaving according to specs, however. Note also that Dan Lynch and Don Andrews suspect that by changing some parameters inside TENEX, the drum-disk relationship at Office-1 may work out a little better.

Tests on Friday:

A four hour test was conducted on Friday with the Office-1 system and the Network. We do not have any results from BBN as yet with regard to network behavior or any TENEX system they were observing. However, we were running superwatch at Office-1 at the time and have those statistics. In addition, Jim White's two-terminal watchdog program was running during the testing. The data from these programs was sent to Walden on Friday Afternoon. Ben Barker of BBN-network group sent out a survey of load averages on all TENEX's during the four hour test period. Some preliminary results follow:

The Load average for the Office-1 and BBNB TENEX's were significantly higher than all other TENEX's. A Graph is available. The difference here is really quite remarkable!

CHI plotted the instantaneous load, the time to echo a character to a local terminal, the time to echo a character to a TIP terminal, and the percentage of time the NCP was out of input buffers for the IMP against time on the same graph. The results were somewhat discouraging. Everything tracked each other. This means that when the load went high the NCP ran out of input buffers for the IMP and the echoing to local and remote terminals became correspondingly long. CHI is now trying to find out what caused the load to be so high. It should be noted that

NPTG Findings: Daily Report 24-mar-75

the load exceeded 18 at one point and was above 14 much of the time. It would be somewhat fruitless to pursue network problems with a TENEX that is this heavily loaded, although we should find out why it was so loaded and if this is typical. It should also be pointed out that during the four hour test, there were no occurrences of low load and long echo times. Jim White is modifying his watchdog program to ring the operator's terminal bell if this situation occurs (say load < 3 and delays > 1 second).

1a2a2

TENEX NCP MONITORING:

1a3

Ken Victor has completed his initial meters for TENEX NCP. They have been added to the source code and are now in the running SRI-AIC 1.33 system. Once we have determined that they are correct and cause no system problems we will try to get BBN to run them in the BBNB system so we can do some measurements there. With respect to Office-1, we can change the metering code to conform to the current 1.31 system or wait a couple of weeks until 1.33 is running there. We need guidance here (we know Tymshare is reluctant to bring up new monitors).

1a3a

Comparison of SRI-AIC to BBNB

1a4

Don Andrews is trying to compare these two TENEX's to make sure that the BBNB system has all the improvements that have been made to the SRI-AIC system. It should be noted that the SRI-AIC system seems very responsive to interactive jobs whereas BBNB does not.

1a4a

In doing some measurements of NLS page faulting characteristics on the SRI-AIC system, we found that in the middle of the day, in a pie slice of 11%, we could successfully run ten TELNET jobs and two Display NLS jobs. In earlier character echoing measurements we noticed that SRI-AIC with load averages in the 13.5 range would still echo characters in about 200 to 300 MS, whereas BBNB with much lower load average took from 1 to 4 seconds.

1a4a1

For anyone who cares, NLS 's working set varies from 20 to 50 pages. On the SRI-AIC system, where there were only two copies of NLS running and with the users doing very different tasks, the inter-fault average was about 17 MS.

1a4a1a

IMP blocking host=imp interface:

1a5

NPTG Findings: Daily Report 24-mar-75

We have not yet determined how to find out how often this is happening. Some of Ken's NCP metering may tell us, but we are not certain yet. We will pursue this further,

1a5a

TIP/ELF buffers:

1a6

The buffers in the ARPA and TYMESHARE TIP's as well as our local ELF system are now set so that multiple packet messages cannot be sent to them. We will continue to experiment with multi-packet messages to highspeed terminals but in the meantime felt it was best not to allow it.

1a6a

BBNB:

1b

As mentioned above, the NCP monitoring package is being developed for use at BBNB. In addition, some terminals have been looped back to allow the two-terminal watchdog program to run at BBNB. In addition we will ask BBN to install any improvements that Dan Lynch has made to the SRI-AIC system that are not now in the BBNB system and which Dan feels make a significant difference for interactive jobs.

1b1

OTHER:

1c

It was noted and reported to Dave Walden that the printer on our ELF system runs at full speed when being driven from the SRI-AIC system and when the ELF and SRI-AIC computers are plugged into the SAME IMP. However, we have twoimps (hooked together) at SRI and find that when we plug the ELF into one and the SRI-AIC TENEX into the other, the printer runs about half speed!!! This is about a 200 line-per-minute printer. Can one hop make that much difference??? This warrants investigation by BBN.

1c1

2

CHI 25-MAR-75 13:44 25622

NPTG Findings: Daily Report 24-mar-75

(J25622) 25-MAR-75 13:44;;; Title: Author(s): Charles H. Irby/CHI;
Distribution: /DCE([ACTION]) SRI-ARC([INFO-ONLY]) DLS([
INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk: CHI; Origin: <
IRBY, FINDINGS-24-MAR-75,NLS;1, >, 25-MAR-75 13:32 CHI ;;;;####;

The network is a bust!

I thought it might prove useful to chronicle my experiences this morning trying to submit the daily report requested by DCE in yesterday's ARC meeting. I got up early to type up the memo. I called the AMES TIP., BBNB was down (I tried repeatedly for some time). I went to Office-1, thinking I would use Victor's account there. The Load average was over 10.5. So I went To SRI-AIC. I used NLS there to type in the memo. At one point there was a power glitch and the tip hung up. At another point, the tip seemed to crash and never come back. So I dialed AI directly. I finished the memo (the load was now 10.5 on AI and I was not getting very good service) and created an sequential file to send to bbnb. Since I had no idea what my account number at bbnb was, I logged out of ai and used the tip to go to bbnb (this is when the tip crashed). I again went to ai to use telnet to go to bbnb. I ftp'd the file across and sent it via SNDMSG using QUEUED option. In trying to get it into NLS, I found I had filled my disk space with queued sndmsg files. I tried an expunge from nls and got an instruction trap. I went to SNDMSG to report this to hopper and victor. I kept getting long pauses where my input went down the rat hole for 20 to 30 seconds at a time. It took 25 mins to send a two line sndmsg. When I finally got to doing a copy sequential, I got a NLS SYSTEM ERROR message, although the file was complete and verified. I sent the file and while typing in this message the AI system crashed on me!

1

The network is a bust!

(J25623) 25-MAR-75 14:07;;; Title: Author(s): Charles H. Irby/CHI;
Distribution: /SRI-ARC([INFO-ONLY]) ; Sub-Collections: SRI-ARC;
Clerk: CHI;

DVN 25-MAR-75 22:28 25624

please add Larry Crane to DIRT

Responds to 25571.

Please add Larry Crane to DIRT

Marcia, please do. His ident is LAC.

Please add Larry Crane to DIRT

(J25624) 25-MAR-75 22:28;;; Title: Author(s): Dirk H. Van
Nouhuys/DVN; Distribution: /MLK([ACTION]) JOAN([ACTION] dirt
notebook please) LAC([INFO-ONLY]) DIRT([INFO-ONLY]) ;
Sub-Collections: SRI-ARC DIRT; Clerk: DVN;

DPCS vs DIRT

In connection with your suggestion <journal,32189,> that Beatty Finney be on the DIRT distribution, let me mention another distribution, DPCS (Documentation Production and Control system). Whereas DIRT has to do with user documentation developed at ARC, DPCS has to do with the use of NLS as a body of publications tools. I would be glad to see Beatty on either or both distributions, but I would expect her to be more interested in DPCS. Maybe that's only an accident of the contexts in which I have spoken with her.

1

DPCS vs DIRT

(J25625) 25-MAR-75 23:46;;; Title: Author(s): Dirk H. Van
Nouhuys/DVN; Distribution: /LAC([ACTION]) JOAN([ACTION] both dpcs
and dirt notebooks please) EFF([INFO-ONLY]) &DPCS([INFO-ONLY])
&DIRT([INFO-ONLY]) ; Sub-Collections: SRI-ARC DPCS DIRT; Clerk:
DVN;

DVN 26-MAR-75 00:16 25626

A Candidate for General Manager

I will send Barry Minikin a hard copy of this through the SRI mail.

A Candidate for General Manager

You may recall ARC discussed the job of Utility Manager with a friend of mine, Mike Plesset. His application is probably still around somewhere. As I remember ARC offered him the job but he turned it down for various reasons, one being that although he was quite interested in ARC and NLS, he did not see himself as a true believer, and thought that whoever took that job should be. I thought of him again when Doug commented that he did not want some one who would get too sucked into the system. I am going to L.A. this weekend, I called him in that connection, and mentioned this possibility to him. He said he was interested. If you people agree I will ask him to send Barry an up to date resume. I'm sure Mike is qualified and would work with a will if he got here. The problem with him is that he has been saying he is looking for another job but in fact staying in the same organization for a number of years now. The risk is that SRI would spend effort recruiting when he isn't really serious about wanting to move. I don't know what to say about that except that this job seems more appropriate to his course of increasing responsibility than was the job of Utility Manager.

A Candidate for General Manager

(J25626) 26-MAR-75 00:16;;; Title: Author(s): Dirk H. Van
Nouhuys/DVN; Distribution: /DCE([ACTION]) JCN([ACTION]) RWW([ACTION]) ; Sub-Collections: SRI-ARC; Clerk: DVN;

NPTG=ARC Findings for 25-Mar-75

Findings for 25-mar-75:

Office-1:

It was decided that KEV would not modify his NCP monitoring package for Office-1's 1,31 monitor, Instead we would wait for them to come up on 1,33. In addition, DIA and Dan Lynch should put off changes to the drum/disk stuff until after 1,33 is up at Office-1,

We should put a hardware probe on the IMP-READY-FOR-NEXT-HOST-BIT light on the IMP interface so we can give BBN some REAL numbers for how often it is off. I will discuss this with MEH.

More testing:

BBN ran some more tests yesterday from 10:00 to 2:00 PDT. We have not sent them our superwatch statistics yet and have heard nothing from them. Jim White could not run the two-terminal watchdog program in parrallel with the test because the loop-backed terminals were being used in trying to get his program to run on SRI-AIC with KEV's NCP measures. We still need the additional time measure which DIA is to provide, which will tell us when the fork is made runnable, as opposed to when it gets to run. This combination of programs gives us by far the most complete measure of total system performance.

The program sends a character out to a terminal attached to a TIP. This terminal is looped-back so the character comes right back to the job that sent it. On each round trip, we can get the real times that the character is handed to the monitor, when it is handed to the IMP (start and end of transmission to IMP), when NCP gets it back from IMP, when scheduler puts it into line buffer for the program (and sets it runnable), and when the program reads the character. The results of this should be forthcoming in the next day or so.

LEVEN from BBN-Network sent out an interesting log of troubles for the ARPA-TIP in response to complaints from users. There were many problems during the 35 minute period being examined. I will send a copy of the message to anyone who has not seen it and wants to.

There is no new data available for Office-1 behavior. We are turning our attention to BBNB for the time being (Until something new happens or 1,33 is up there).

NPTG-ARC Findings for 25-Mar-75

BBNB:

1b

BENCHMARK for NLS

1b1

We talked with Dan Lynch to find out how he does benchmarks for his lisp users. He uses RUNFIL and does his testing under low-load conditions. It seems we can do the same for NLS but will have to run several simultaneous copies of the benchmark because BBNB does not perform as well as a TENEX with a drum under low load conditions (the claim is that it is competitive under medium to high load conditions).

1b1a

NCP measurement package

1b2

KEY sent off his package to Clements to add to BBNB and perhaps other BBN TENEX's. In addition, I sent a note to Bob asking for his close cooperation in this effort (and for info on other 1.33 measurements that we might be able to use in analyzing NLS behavior at bbnb).

1b2a

Whether or not this approach works out will determine the need to fly Bob out here.

1b2a1

Drum/Disk measures

1b3

Dan Lynch suggested some interesting meters to add to BBNB. I sent them to Clements asking him to add them.

1b3a

Printer behavior:

1b4

BBN is looking into our report that our printer does not run full speed when two IMPs are between it and the sending host.

1b4a

OTHER:

1c

ELF stability:

1c1

Dave Retz, Frank Walden (ADR), and several people from ARC met yesterday to formulate a plan for increasing ELF stability. Joe Ehardt outlined what he believed the main problems were. Dave agreed to spend the next couple of days working on the serious one, Frank agreed to tackle some other problems (with Dave's guidance), and some will be handled by telling users how to avoid them. I left the meeting with the feeling that the crashes and hangs that we now see in ELF will not be occurring in two or three days time. This does not mean that new problems will not arise, however.

1c1a

NPTG-ARC Findings for 25-Mar-75

Mouse/keyset problems:

1c2

The reliability of mouse/keyset interactions, especially in type-ahead, has declined markedly. I personally find that working ahead of the system to be very dangerous now. I believe this to be a combination of two things (at least): 1) a software bug in NLS input routines or in the Line Processor that is causing "no such marker" and other such messages (this could be hardware or buffer overflow also) and 2) the difference in resolution of the mouse on alpha-numeric displays.

1c2a

This second point warrants further explanation. The coordinates of the mouse are input on both the down and up stroke of the mouse buttons. On a bug-selection, then, only the coordinates of the up stroke are used. On Tasker and IMLAC displays this made no difference since a slight difference in the coordinate value did not generally yield an erroneous selection (each character was several units wide). On the alpha-numeric display, however, characters are one unit wide. The mouse traversal is about the same as for Tasker and IMLAC displays but the user has no feedback to indicate that he is near a character boundary. Thus, any error in the coordinates being input can yield an erroneous selection. It is my belief that the coordinates of the down stroke should be used for selections, since that is the point in time when the user is being precise about the cursor location. This can be achieved in two ways: 1) don't send coordinates with up strokes (this greatly reduces the amount of traffic generated by the user) or 2) fix NLS to use only down-stroke coordinates for selections. To my knowledge, the only functional capability that would be lost by discarding up-stroke coordinates is (I don't think anyone uses this) that when changing viewspecs for multi-window situations, the user would not be able to pick up the viewspecs from one window, modify them slightly and deposit them in another window. This is currently possible because we get the coordinates with the down stroke(s) which tells NLS which window to use for initial viewspecs and we get the coordinates on the up stroke which tells NLS which window to store the updated viewspecs in.

1c2b

I would very much like to see RLB2 investigate and remedy this problem at once.

1c2b1

CHI 26-MAR-75 13:04 25627

NPTG=ARC Findings for 25-Mar-75

(J25627) 26-MAR-75 13:04;;; Title: Author(s): Charles H. Irby/CHI;
Distribution: /SRI-ARC([INFO-ONLY]) ; Sub-Collections: SRI-ARC;
Clerk: CHI; Origin: < IRBY, FINDINGS-25-MAR-75,NLS;2, >;
26-MAR-75 13:03 CHI :;;:####;

Pi-Write-up, Winston

Research in Artificial Intelligence
1974 ARPA Project Summary

Prepared for: ARPA IPT Principal Investigators Conference
San Diego, Mar. 12-14, 1975

Prepared by: Professor Patrick H. Winston
Massachusetts Institute Of Technology
545 Technology Square
Cambridge, Mass., 02139

EXPERT PROBLEM SOLVING

The debugging of electronic circuits is serving as a proving ground for the combination and testing of theories and programs developed at the AI Lab.

G. Sussman and R. Stallman have produced the first pass of a new kind of network analysis program, EL, for working out mode potentials in transistor amplifiers and the like. What is novel about this program is its humanoid approach to network analysis, and consequent ability to explain the basis of its deductions. The current version of EL can handle only DC bias analysis, with a crude transistor model at that, but the approach leads quickly to impressive results.

A. Brown and Sussman have designed another system, WATSON, for hierarchical and teleological description of electronic circuits. A subset of WATSON has been implemented in Brown's program "LOCAL".

D. McDermott is implementing the deduction-oriented algorithm for circuit design described in his recent thesis. The system, written in CONNIVER, does not use backtracking or multi-processing to get around uncertainties. Instead it uses the advice of internal experts to deduce which way to go.

MACHINE VISION AND SCENE ANALYSIS

Rapid progress in machine vision has continued over the past year. As the focus shifts from the constrained BLOCKSWORLD to complicated domains, our early, simple theories are being extended to deal with real-world problems.

Pi-Write-up, Winston

J. Hollerbach has finished his thesis on the description of complicated polyhedra and curved surfaces. His program describes and identifies pottery in terms of basic shapes plus local modifications. The identifications are remarkably consistent with those of archeologists, and his terminology, chosen from everyday English, can be applied to other complicated objects, with resulting descriptions that seem very natural.

5a1

S. Ullman has investigated visual detection of light sources, and has shown that the factors of: absolute intensity, intensity compared with average illumination, local and global contrast, and lightness contrast do not explain our ability to detect light sources, even under simple conditions. He has implemented an method for light-source detection and intensity measurement based on the comparison of the intensities and gradients ratios.

5a2

G. Freuder has developed a modular and extensible interactive system for visual recognition, flexible enough to deal with real visual scenes. His language implements heterarchical principals by combining particular results with general visual knowledge to advise the user on further processing.

5a3

MACHINE LEARNING AND REPRESENTING KNOWLEDGE

5b

Work on systems for representing knowledge has continued to make progress, with Minsky's Frame-Systems theory inspiring new approaches by several people.

5b1

B. Kuipers has developed a "mental map" descriptive system for urban geography in order to investigate frame representation. He is working on a frame representation for this system which will result in a program which converses in English about street directions. Another frame-based representation is Kern's and Goldstein's appointment scheduling system. They are concentrating on resolving conflicts among solutions to a problem proposed by competing specialists.

5b1a

S. Fahlman is investigating knowledge retrieval problems involved in using a semantic network. He shows how simple programs can be written for a parallel processor to accomplish types of quick retrieval from large databases which are difficult for serial machines.

5b1b

Pi-Write-up, Winston

A LISP programmer's assistant to aid in the debugging of complex programs has been designed by C. Rich and H. Shrobe. It integrates the programmer's goals, his code, and comments through knowledge of programming techniques. An extensible prototype system is being implemented.

5b1c

The problems of natural language are being attacked from the perspectives of both understanding and generation. M. Marcus has designed a parser whose grammatical rules are batteries of pattern-invoked "demon" specialists. It can partially parse input by doing recognition in simple local environments where the whole system's resources are committed to "bulling its way through" difficulties. D. McDonald is developing a theory of natural language generation in high level systems such as personal assistants. He proposes a system in which experts examine the data structures of the executive system and create a high level plan, conveying the system's intentions for composing English.

5b1d

PRODUCTIVITY TECHNOLOGY

5c

The Micro-Automation group has implemented the basic hardware and software for the Mini-Robot system acquired in 1973. New research for the implementation of a Physical Electronic Repairman has also been completed.

5c1

R. Waters has implemented the arm control system described in AI Memo 301. M. Billmers has completed basic system software for the mini-computers, including a symbolic debugger and a mini-LISP.

5c1a

B. Horn has developed a program for orienting chips in the IC lead bonding process. D. Taenzer has written a program which finds the holes in a PC board which has been etched, but not drilled. Another program inspects soldering.

5c1b

LISP MACHINE

5d

T. Knight and R. Greenblatt have implemented many of the important steps for a LISP machine, short of actually building the hardware, including: specification of the CONS micro-processor and the LISP, the micro-assembler, the basic bootstrap-able LISP software.

5d1

Pi=Write-up, Winston

(J25628) 26-MAR-75 13:16;;; Title: Author(s): Elizabeth J. (Jake)
Feinler/JAKE; Distribution: /ACM([INFO-ONLY]) ; Sub-Collections:
SRI-ARC; Clerk: JAKE; Origin: < FEINLER, WINSTON,NLS;2, >
20-MAR-75 16:15 JAKE ;;;; #####

Pi=write-up, Doyle

Internetworking Research
1974 ARPA Project Summary

Prepared for: ARPA IPT Principal Investigators Conference
San Diego, Mar. 12-14, 1975

Prepared by: Michael L. Dertouzos
Project MAC
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139
(617) 253-2145

In 1974 Project MAC continued work under ARPA support in the areas of
Automatic Programming, Automation of Programming Technology,

ARPANET RELATED ACTIVITIES, AND THE MATHEMATICAL LABORATORY,

A. Automatic Programming

The principal goal of this work is to seek a long-term solution to
the high-cost of software by automating the process of program
generation from high-level descriptions of desired tasks. We are
well underway in the planning and development of our prototype called
PROTOSYSTEM-I which is an expert system in many aspects of the design
problem to be solved. This system helps the human designer to
express his solution in terms of methods already known to the system,
and in a very high-level language. Using this information and
knowledge of the environment in which the system being designed will
run, PROTOSYSTEM-I finds an efficient way of implementing the
specified system and produces the required software. PROTOSYSTEM-I
also stands ready to explain the design and its behavior, for future
maintenance purposes in a natural language familiar to the system
maintainer.

In 1974, several experiments were done on a data base query system;
modules for operations management were implemented; heuristic
algorithms for designing IBM-370 PL/I files were tested; the number
of data items generated in PROTOSYSTEM-I was studied; the OWL system
for building expert problem-solving systems was redesigned and its
implementation was begun. In addition, a conceptual framework was
produced for automatically programming micro computers from a very
high-level language.

B. Automation of Programming Technology

Pi-Write-up, Doyle

The goal of this work, which is part of our Automatic Programming effort, is to increase programmer productivity through a system and associated tools that make possible the creation, debugging and documentation of programs. During 1974, a version of ABSTR, an automated abstractor, was made operational; a sophisticated message system was completed; CALICO the system with over 2,000 well-documented subroutines was completed and generalized to MUDDLE (higher-level language) subroutines. In addition, an initial TENEX MUDDLE was completed along with several additional projects in graphics. With these various subsystems it is now possible to augment a programmer's ability to specify, retrieve, prepare, test, debug, validate, document and update programs in an effective way.

10

C. Arpanet Activities

11

During 1974, the ARPANET was successfully connected to the MULTICS development machine, thereby making possible through this second connection a variety of testing, modification and diagnostic procedures. In addition, several hardware and software interface related activities were carried out and buffering strategies were revised leading to 40,000 useful data bits per second, end-to-end file transfer rates via standard ARPANET protocols.

12

D. Mathematical Laboratory

13

This system, one of the most advanced operational expert programs continues to become progressively more important as a research tool for people who need expertise in symbolic manipulation. During 1974, work was completed on the use of the Hensel Lemma in algebraic manipulation; power series and poisson series packages were completed; new algorithms were developed for inverting matrices with symbolic entries; and new versions of the reference manual were produced. In addition, much time was devoted to user interaction. We are hopeful that in 1975, we will be able to offer this unique program to many more researchers through a consortium arrangement.

14

Pi-Write-up, Doyle

(J25629) 26-MAR-75 13:36;;; Title: Author(s): Elizabeth J. (Jake)
Feinler/JAKE; Distribution: /ACM([INFO-ONLY]) ; Sub-Collections:
SRI-ARC; Clerk: JAKE; Origin: < PI, DOYLE,NLS;3, >, 27-FEB-75
14:47 JAKE ;;;; #####;

Resource Notebook Will NOT be Printed through COM this Spring

Since its inception there has been talk of producing the resource handbook via COM. It seems natural as a way to convert these online files to an attractive, compact printed form, and a good advertisement for what can be done. Early in February Jake came to me and suggested we make a serious try. We set up a schedule based on the first small trial proofs returning 2/7 and finishing 4/21, pending new hires I have about 40 hours per month to devote DPCS activities outside NSW and I figured maybe 10 of those hours would go to this effort. I asked Ann Weinberg to work with me to learn about COM. Up to that time only Dean and I at ARC had really used the COM directories and that's not healthy.

The effort proved more demanding than I had anticipated. The first small trial draft did not go South until February 13th and did not return until the 18th. It had been hard for Jake to communicate what she needed and the draft did not look right to her in several ways. At that point I offered to give up with no hard feelings. But it was not so easy for Jake to find another way to print the book. We analyzed more carefully the files that exist online. The worst part as usual was handling tabular material. Special formats imposed by the Query system rather run at cross purposes with the Output Processor's style. We agreed to set some long tables in monospaced type which is not so attractive but would have saved us an estimated couple of hundred hours of hand setting tabs.

The fact that some of the files involved must be read online by users while being brought up to date precluded inserting directives (or special characters to be replaced later by directives) while inserting and creating the original text. A complex user program might do most of what we agreed upon.

I estimated that each of 35 remaining server files would need about 40 minutes hand work each, to be spread among Ann, Adrian, Jake and me, mostly setting tabs and Grabs. We proposed a new schedule ending May 1.

Ann did most of the work to prepare a new trail files which went to DDSI on the 20th with the message that if it was not back on Monday the 24th, they would probably loose about \$2000 worth of business. DSSI says they were mailed back on the 21 but they did not arrive until the 26th. In the mean time Jake had found a way to print the files through the XGP at Stanford AI. The result will not be so attractive and that production route has its own problems, but she understandably chose to go with the XGP.

If's:

If CRT display of a page approximately as it will appear through COM were available, as proposed for NSW, setting up this format

Resource Notebook Will NOT be Printed through COM this Spring

would take only a few minutes per site and we could have kept the schedule.

6a

If NLS handled tables as planned for NSW setting up this format would take only a few minutes per site and we could have kept the schedule.

6b

If I had worked out clearly the number and complexity of the tables involved and known that special characters could not be entered during input, I would have never undertaken the project with the schedule involved.

6c

If Jake had been able to specify what she wanted in terms of directives or the normal ways of talking about the style and layout of type on a page rather than in terms only of the final effect she wanted, we would have had a much better chance of keeping the schedule.

6d

If we had a local COM vendor reliable with respect to schedule, we would have had a much better chance.

6e

Moral:

7

Unlikely as it as it may seem, Jake and I are both interested in trying again next time. The time to start planning is the moment she is finished with the current run. Planning should include:

7a

A production cycle and/or a way of inserting directives (or directive-like things) that allows hand formatting to take place when the text enters.

7a1

Agreement at the beginning of text input as to what the final printed format will be.

7a2

Conservative consideration of the features that will be available from NSW and other proposed DPCS projects.

7a3

DVN 26-MAR-75 17:42 25630

Resource Notebook will NOT be Printed through COM this Spring

(J25630) 26-MAR-75 17:42;;; Title: Author(s): Dirk H. Van
Nouhuys/DVN; Distribution: /JOAN([ACTION] dpcs notebook please) DPCS(
[INFO-ONLY]) ; sub-Collections: SRI-ARC DPCS; Clerk: DVN;
Origin: < VANNOUHUYS, RSHNDBK,NLS;1, >, 26-MAR-75 17:28 DVN ;;;;####;