

Short note on Marketing activity outside of DOD.

There is a directory called ARC-log and ident with same name (ARC-LOG) which has been setup to receive any contact report, visit reports, pending visits, phone reports, vacation and business schedules, etc. Please use it. You may look at the file <bbnb,arc-log,alog,reports> for a list of the contact reports -it has most since the beginning of the calendar year. comments on this are welcomed. ROB

Short note on Marketing activity outside of DOD.

In the recent rash of items on the DOD community ad ARC, I noted some suggestions to take positive action to get non-dod sponsors. Briefly, we have tried to do this for at least the last 9 months. EPA, Dept of Transportation, Dept of Interior, Dept of telecommunication, Bechtel Corp, FAA, FEA, City of San Jose and Tracy Calif., NSF, National Academy of Science, OSHA (Occupational Safety and Health Agency), First NATIONAL CITY BANK, IBM, Mitre Corp, Educom, Kaiser Hospital, IRS, USGS, NBS, LEAA (Law enforcement ??) all have been demo-ed and talked to. DVN has talked to others within his Documentation area. Basically two points should be made: 1) the non-dod agencies, especially the commercial ones do not have the FAT that the DOD boys have. They also are less likely to take risks in R and D like projects. (this is not to take any philo, ethical, etc, position but just the facts as I see them), 2) We must take steps to (management decisions) to provide operational service (defined to mean responsive service and reliable service, with a naive human interface and training capability). The first point means we must try harder (I think we can do it) the second point means we must take a different stand and commit resources to it (not lip service). We simply do not have a reliable, responsive utility. The bugs, the improvements, etc are all secondary. Bud, Ra3y, Jim B, and I have taken out this many times and have ideas. Feel free to contribute, Rb

Short note on Marketing activity outside of DOD.

(J26494) 17-SEP-75 23:27;;; Title: Author(s): Robert N.
Lieberman/RLL; Distribution: /SRI-ARC([INFO-ONLY]) ;
Sub-Collections: SRI-ARC; Clerk: RLL;

26494 Distribution

N. Dean Meyer, James E. (Jim) White, Douglas C. Engelbart, Martin E. Hardy, J. D. Hopper, Charles H. Irby, Harvey G. Lehtman, James C. Norton, Jeffrey C. Peters, Dirk H. Van Nouhuys, Kenneth E. (Ken) Victor, Richard W. Watson, Don I. Andrews, Susan K. Ocken, Raphael Rom, David C. Smith, Mary Ann Kellan, Buddie J. Pine, Andy Poggio, David L. Retz, Laura J. Metzger, Karolyn J. Martin, Jan A. Cornish, Larry L. Garlick, Priscilla A. Wold, Pamela K. Allen, Delorse M. Brooks, Beverly Boli, Rita Hysmith, Log Augmentation, Joseph L. Ehardt, Raymond R. Panko, Susan Gail Roetter, Robert Louis Belleville, Rene C. Ochoa, Ann Weinberg, Adrian C. McGinnis, Robert S. Ratner, David S. Maynard, Robert N. Lieberman, Sandy L. Johnson, James H. Bair, Jeanne M. Leavitt, Rodney A. Bondurant, Jeanne M. Beck, Marcia L. Keeney, Elizabeth K. Michael, Jonathan B. Postel, Elizabeth J. Feinler, Kirk E. Kelley

RLL 17-SEP-75 23:34 26495

Request for clarification on the Slot-based community for
Documentation

re <26489,> by DVN

Request for clarification on the Slot-based community for
Documentation

I really do not understand the pricing bit. What is the \$2000 for and where does it come from? Does it get applied to a slot from the \$13,000? What slot? This paper is a very good start towards a community, maybe we can use it as a sales pitch real soon. Rob

1

Request for clarification on the Slot-based community for
Documentation

(J26495) 17-SEP-75 23:34;;; Title: Author(s): Robert N.
Lieberman/RLL; Distribution: /DVN([ACTION]) &DPCS([INFO-ONLY])
DOCPLAN([INFO-ONLY]) ; Sub-Collections: SRI-ARC DPCS DOCPLAN;
Clerk: RLL;

26495 Distribution

Dirk H. Van Nouhuys, Documentation Production and Control System Interest Group, Joseph L. Ehardt, Raymond R. Panko, James H. Bair, David R. Brown, Glenn A. Sherwood, N. Dean Meyer, Kathey L. Mabrey, Norman R. Nielsen, Thomas L. Humphrey, Robert Louis Belleville, Elizabeth K. Michael, Richard W. Watson, James C. Norton, Robert N. Lieberman, Pat Whiting O'Keefe, Douglas C. Engelbart, Dirk H. Van Nouhuys,

LETTER: To Friedlander of MMM, sent 18 Sept 75, Re: document request.

Wm. S. Friedlander is a member of the Graphic systems Group at MMM.

LETTER: To Friedlander of MMM, sent 18 Sept 75, Re: document request.

Dr. Robert N. Lieberman
Stanford Research Institute
Augmentation Research Center
333 Ravenswood Avenue
Menlo Park, California 94025
415-326-6200 x4119
19 SEP 75

Mr. Wm. S. Friedlander
Graphic Systems Group
MMM Company
General Offices
3M Center
Saint Paul, Minnesota 55101

Dear Mr. Friedlander:

Dr. Engelbart showed me your letter of 27 August 1975. He has asked me to send you the enclosed literature which we hope will be useful to you.

1

We would be pleased to arrange a visit, either at your site or, preferably, at SRI. Since we have no documentation, as yet, on our graphics capabilities, a visit here could give you a good look at this new feature.

2

You will notice that one enclosure refers to a seminar we give on our system. This one week in-depth seminar is expected to be held again in November of this year. The cost will be \$750, including computer time. The objective is to give organizations an intensive look at what we have developed so they can make a suitable assessment of this new technology.

3

Let me also emphasize that we currently have several organizations using our services with about 300 individual users. A list of the clients and their applications is in the "The SRI-ARC Utility Service: What and Why" paper.

4

LETTER: To Friedlander of MMM, sent 18 Sept 75, Re: document request,

If you have any further questions or wish to arrange a visit, please contact me at your convenience.

5

Sincerely,

Robert N. Lieberman

ENCLOSURES:

"The Augmented Knowledge Workshop," Douglas C. Engelbart, Richard W. Watson, and James C. Norton, 1-MAR-73, (ijournal,14724,)
 "Coordinated Information Services for a Discipline- or Mission-Oriented Community," Douglas Engelbart, 12-DEC-72, (mjournal,12445,)
 "The SRI-ARC Workshop Utility Service: What and Why," James Norton, 10-SEP-75, (jjournal,26368,)
 "Seminar on the AUGMENTED KNOWLEDGE WORKSHOP," SRI-ARC, 12-Aug-75, <journal,33193,>
 "Announcement of AKW Workshop for August 1975," SRI-ARC, 15-AUG-75, <journal,26274,>
 DRAFT of "List of Client Organizations using NLS system"
 Handouts:
 System Capabilities
 AKW Services

LETTER: To Friedlander of MMM, sent 18 Sept 75, Re: document request.

(J26496) 18-SEP-75 00:04;;; Title: Author(s): Robert N. Lieberman/RLL; Distribution: /DCE([INFO-ONLY]) JCN([INFO-ONLY]) ARC-LOG([INFO-ONLY]) ; Sub-Collections: SRI-ARC ARC-LOG; Clerk: RLL; Origin: < ARC-LOG, FRIEDLANDER,NLS;3, >, 17-SEP-75 23:51 RLL ;;;; #####;

26496 Distribution

Douglas C. Engelbart, James C. Norton, James C. Norton, Log
Augmentation,

LETTER: To Dave Potter of ETS, sent 18 Sept 75, RE: Seminar
brochure request.

DAVE, this is the online version.

LETTER: To Dave Potter of ETS, sent 18 Sept 75, RE: Seminar brochure request.

Dr. Robert N. Lieberman
Stanford Research Institute
Augmentation Research Center
333 Ravenswood Avenue
Menlo Park, California 94025

19 SEP 75

Dr. David A. Potter
Educational Testing Service
Rosedale Road
Princeton, New Jersey 08540

Dear Dave:

Enclosed is a few of the brochures we had prepared for the last seminar. We expect to give another one in November (the second or third week) at a cost of \$750. Keep in touch,

1

Regards,

Robert

ENCLOSURES:

"Seminar on the AUGMENTED KNOWLEDGE WORKSHOP," SRI-ARC,
12-Aug-75, <journal,33193,>

DRAFT of "Listing of Client Organizations using NLS"

LETTER: To Dave Potter of ETS, sent 18 Sept 75, RE: Seminar
brochure request.

(J26497) 18-SEP-75 00:07;;; Title: Author(s): Robert N.
Lieberman/RLL; Distribution: /DAP([INFO-ONLY]) DCE([INFO-ONLY])
JCN([INFO-ONLY]) ARC-LOG([INFO-ONLY]) ; Sub-Collections:
SRI-ARC ARC-LOG; Clerk: RLL; Origin: < ARC-LOG, POTTEDR,NLS;2,
>, 17-SEP-75 17:26 RLL ;;;; #####

26497 Distribution

David A. Potter, Douglas C. Engelbart, James C. Norton, James C.
Norton, Log Augmentation,

LETTER: To Knowles of Costruction Engineering Res. Lab, Re: document request

Letter and enclosures sent 18 Sept 75.

LETTER: To Knowles of Costruction Engineering Res. Lab, Re: document request

Dr. Robert N. Lieberman
Stanford Research Institute
Augmentation Research Center
333 Ravenswood Avenue
Menlo Park, California 94025
415-326-6200 x4119

19 SEP 75

Mr. Michael Knowles
U.S. Army
Construction Engineering Research Lab
P.O. Box 4005
Champaign, ILL 61820

Dear Michael:

Per our phone call on 10 Sept 75, I am enclosing several documents for your information,

1

I hope they can help you; if not, please contact me for a possible visit (at Champaign or Menlo Park), seminar attendance, or loan of video tape,

2

Sincerely,

Robert N. Lieberman

ENCLOSURES:

"The SRI-ARC Workshop Utility Service: What and Why," James Norton, 10-SEP-75, (journal,26368,)
"Seminar on the AUGMENTED KNOWLEDGE WORKSHOP," SRI-ARC, 12-Aug-75, <journal,33193,>
"Announcement of AKW Workshop for August 1975," SRI-ARC, 15-AUG-75, <journal,26274,>
DRAFT of "List of users of the NLS system"

LETTER: To Knowles of Costruction Engineering Res. Lab, Re: document
request

(J26498) 18-SEP-75 00:10;;; Title: Author(s): Robert N.
Lieberman/RLL; Distribution: /DCE([INFO-ONLY]) JCN([INFO-ONLY])
ARC-LOG([INFO-ONLY]) ; Sub-Collections: SRI=ARC ARC=LOG; Clerk:
RLL; Origin: < LIEBERMAN, KNOWLES,NLS;2, >, 17-SEP-75 15:31 RLL
;;; ####;

26498 Distribution

Douglas C. Engelbart, James C. Norton, James C. Norton, Log
Augmentation,

problem in printing

I cannot get any of my files to print. Can you help me find out what is the matter, please?

1

problem in printing

(J26499) 18-SEP-75 09:25;;; Title: Author(s): Barbara Pitcher/BP2;
Distribution: /ROF([ACTION]) DAP([INFO-ONLY]) ; Sub-Collections:
NIC; Clerk: BP2;

26499 Distribution

Richard O. Fortna, David A. Potter,

Proofing Format of ETS Paper

I haven't heard from you guys so I assume you are not waiting for me to try the paper on the Proof system.

1

Proofing Format of ETS Paper

(J26500) 18-SEP-75 11:11;;; Title: Author(s): Dirk H. Van
 Nouhuys/DVN; Distribution: /DAP([ACTION]) ROF([ACTION]) &DPCS([
 INFO-ONLY]) DMB([INFO-ONLY] dpcs notebook please) ;
 Sub-Collections: SRI-ARC DPCS; Clerk: DVN;

26500 Distribution

David A. Potter, Richard O. Fortna, Documentation Production and
Control System Interest Group , Delorse M. Brooks,

USER SERVICES WEEKLY REPORT for Week of Sept. 2-5:

from JMB

1/2 day sick leave. Spent 1 1/2 days writing & journalizing course reports for the last 2 weeks. Switching to use of BBNB has drastically cut my efficiency in such work. Spent 1 1/2 days at end of week working on the Lineprocessor Users Guide for JHB. 1/2 day misc.--answering questions, mail, etc.

from SGR

Monday and Tuesday were spent training Lynn Sims and Pete Lambert how to use DNLS etc. - see course report.

Rest of the week was spent working on Crabtree's application, attending a wrap-up meeting of the Seminar, answering feedback questions, beginning course reports for the past two weeks, working on final arrangements for the New Jersey trip including talking with Pam and Priscilla about what to do when asked to do a demo, and other miscellaneous things.

from RH

Spent this week organizing the format procedure etc. for doing the ARPA budget review. It was very advantageous having Dean visit this week because he just happened to write a little subsystem which will expedite the entry of the data since there still isn't a convenient way to enter columns. His subsystem works beautifully for our purpose and hopefully this project will develop into something that ARPA will use several times a year.

I have spent this week showing people how we are going to handle the inputting of information and helping them decide the proper format and procedure for entering text material (as opposed to the information that is to go into the columns). They really weren't sure about using NLS for this review since in DMS they could check all their figures and everything would enter properly and neatly. It is true that DMS really lends itself for that application especially since all the data is already in DMS. I told Connie that if it (the DMS data) was an ASCII file that it shouldn't be too much trouble to transfer the data into NLS and I called Jeff to make sure. I was glad to tell ARPA that we could do it. They didn't really want to do it right now, they just wanted to know if they could.

We have had one problem though, Connie was told to use only her staff and that she couldn't get support help for this project

from any other areas. This put us, (especially me) in kind of a bind since Connie's secretary is on vacation for the next week and a half. Luckily we were able to get Claire Parisi's help (she works in the Director's Office right now and will transfer to Connie's division the first of the year); however she only learned NLS-7 and hasn't used NLS since a year ago when she learned it. Well she is learning it now, we have had a crash course in DNLS and TNLS printing along with my home phone number. She has been inputting most of the data in the late afternoon and early evening since the loads have been so lousy.

1c3

Terry Coleman of TTO was given an assignment to put a rental car ordering form template to put on-line by her boss, so I helped her with that this week.

1c4

from PKA

1d

Started doing Feedback this week as Sandy is now on vacation. I've been busy with it as there have been lots of messages each day, probably over 30 per day. I've had to ask Susan about many things, but I think that I will be more self-reliant next week. Spent a couple of hours today catching up on these weekly reports and my trip report of Aug 18-22.

1d1

from PAW2

1e

Busy week--finished working with Lance Murphy from the class the previous week. Wrapped up the second course with him. Worked with Dave Smith, a new ARC programmer, covering the Basic and only the intro, to the Second. Spent alot of time on Crabtree's process commands branch. Linked with him during the week for a couple of hours straightening out questions and giving him a quick overview of the process. Susan to go over the step by step process with him Monday morning. Received alot of satisfaction in seeing that project through, had seemed a little overwhelming initially. Spent time on Thursday and Friday organizing plans for trip to Princeton and Ft. Monmouth, New Jersey. Discussed course material for each place with Susan and appropriate demo material. Left for Princeton Sunday A.M.

1e1

JMB SGR PKA PAW2 RH 18-SEP-75 11:28 26501
USER SERVICES WEEKLY REPORT FOR WEEK OF SEPTEMBER 2-5

(J26501) 18-SEP-75 11:28;;; Title: Author(s): Jeanne M. Beck, Susan
Gail Roetter, Pamela K. Allen, Priscilla A. Wold, Rita Hysmith/JMB SGR
PKA PAW2 RH; Distribution: /US([INFO-ONLY]) JCN([INFO-ONLY])
JHB([INFO-ONLY]) ; Sub-Collections: SRI-ARC US; Clerk: RH;

26501 Distribution

Susan Gail Roetter, Priscilla A. Wold, Jeanne M. Beck, Pamela K. Allen, Rita Hysmith, Sandy L. Johnson, James C. Norton, James H. Bair,

PCPB8 compaction notes

Suggested changes to PCPB8 for more compact data transmission/encoding:

1

The top two bits of the type byte should be used to indicate how many bytes of count there are (zero bytes is equivalent to a count value of zero). This allows for a more reasonable overhead in transmitting short lists and character strings.

1a

The repeat count should be removed from the LIST header and a more general repeat feature should be added as follows:

1b

A new type REPEATLIST (type = 8) should be added, it should be of the form

1b1

type count repeatcount elements

1b1a

(Note that although a new type code is used, this is principally a compaction mechanism and should not really be thought of as a new data type.)

1b1a1

where repeatcount is two bytes long. This is shorthand for those count elements being repeated repeatcount times. For example,

1b1b

LIST(a, b, REPEATLIST[3](c,d,e))

1b1b1

is merely a compact way of expressing/transmitting

1b1c

LIST(a, b, c, d, e, c, d, e, c, d, e).

1b1c1

The types integer, boolean, and index should be allowed to have an optional count field. If it is present then count value fields follow the header.

1b2

Separate type codes could be used for BOOLEAN TRUE and FALSE to save a byte for BOOLEAN.

1c

PCPB8 compaction notes

(J26502) 18-SEP-75 10:15;;; Title: Author(s): Charles H. Irby/CHI;
Distribution: /CHI([ACTION]) ; Sub-Collections: SRI-ARC; Clerk:
CHI; Origin: < IRBY, B8=MODS,NLS;1, >, 18-SEP-75 10:12 CHI
;;###;

26502 Distribution
Charles H. Irby,

DAV thesis available

A few copies of my thesis, PYGMALION: A Creative Programming Environment, are now available. See me (Dave Smith) if you would like one.

1

DAV thesis available

(J26503) 18-SEP-75 13:25;;; Title: Author(s): David C. Smith/DAV;
Distribution: /SRI-ARC([INFO-ONLY]) ; Sub-Collections: SRI-ARC;
Clerk: DAV;

26503 Distribution

N. Dean Meyer, James E. (Jim) White, Douglas C. Engelbart, Martin E. Hardy, J. D. Hopper, Charles H. Irby, Harvey G. Lehtman, James C. Norton, Jeffrey C. Peters, Dirk H. Van Nouhuys, Kenneth E. (Ken) Victor, Richard W. Watson, Don I. Andrews, Susan K. Ocken, Raphael Rom, David C. Smith, Mary Ann Kellan, Buddie J. Pine, Andy Poggio, David L. Retz, Laura J. Metzger, Carolyn J. Martin, Jan A. Cornish, Larry L. Garlick, Priscilla A. Wold, Pamela K. Allen, Delorse M. Brooks, Beverly Boli, Rita Hysmith, Log Augmentation, Joseph L. Ehardt, Raymond R. Panko, Susan Gail Roetter, Robert Louis Belleville, Rene C. Ochoa, Ann Weinberg, Adrian C. McGinnis, Robert S. Ratner, David S. Maynard, Robert N. Lieberman, Sandy L. Johnson, James H. Bair, Jeanne M. Leavitt, Rodney A. Bondurant, Jeanne M. Beck, Marcia L. Keeney, Elizabeth K. Michael, Jonathan B. Postel, Elizabeth J. Feinler, Kirk E. Kelley

tried to send you a msg, must not have received. Please call me at
609-921-9000 ext 2732.

1

(J26504) 18-SEP-75 16:43;;; Title: Author(s): Richard O.
Fortna/ROF; Distribution: /DVN([ACTION]) ; Sub-Collections: NIC;
Clerk: ROF;

26504 Distribution
Dirk H. Van Nouhuys,

Meeting to discuss the IWP Symposium

Several ARC'ers (EKM, JHB, SGR, JMB, BEV, PKA, and PAW2) attended the Fall Symposium of the International Word Processing Association yesterday (Sept. 17). We'll describe our impressions Friday at 11:00 in the Conference Room for any interested people.

1

SGR 18-SEP-75 17:57 26505

Meeting to discuss the IWP Symposium

(J26505) 18-SEP-75 17:57;;; Title: Author(s): Susan Gail
Roetter/SGR; Distribution: /SRI-ARC([ACTION]) ; Sub-Collections:
SRI-ARC; Clerk: SGR;

26505 Distribution

N. Dean Meyer, James E. (Jim) White, Douglas C. Engelbart, Martin E. Hardy, J. D. Hopper, Charles H. Irby, Harvey G. Lehtman, James C. Norton, Jeffrey C. Peters, Dirk H. Van Nouhuys, Kenneth E. (Ken) Victor, Richard W. Watson, Don I. Andrews, Susan K. Ocken, Raphael Rom, David C. Smith, Mary Ann Kellan, Buddie J. Pine, Andy Poggio, David L. Retz, Laura J. Metzger, Karolyn J. Martin, Jan A. Cornish, Larry L. Garlick, Priscilla A. Wold, Pamela K. Allen, Delorse M. Brooks, Beverly Boli, Rita Hysmith, Log Augmentation, Joseph L. Ehardt, Raymond R. Panko, Susan Gail Roetter, Robert Louis Belleville, Rene C. Ochoa, Ann Weinberg, Adrian C. McGinnis, Robert S. Ratner, David S. Maynard, Robert N. Lieberman, Sandy L. Johnson, James H. Bair, Jeanne M. Leavitt, Rodney A. Bondurant, Jeanne M. Beck, Marcia L. Keeney, Elizabeth K. Michael, Jonathan B. Postel, Elizabeth J. Feinler, Kirk E. Kelley

Notes of What's Happening at ARC in your Absence

I felt like keeping a little file of notes about what happens around here while you're away, as it seems to me you are pretty concerned about some issues that are coming to a head--or have done so only to once again fade away temporarily. So the file I am sending you is a record of my impressions.

Notes of What's Happening at ARC in your Absence

Thurs., Sept. 18

1

Dear Kirk,

2

Since you are going to be gone for three weeks, I thought I would keep a little file of notes for you of things I thought you might like to hear about that happen here while you're away.

2a

The big issue this week is the funding of course. I'm sure you will talk to others about this, but here are my observations. We had a marathon all-ARC meeting on Mon., lasting from 11 a.m. to 1:30 p.m., and another one today (Thurs., Sept. 18). The one on Monday was just Doug telling us about his trip to Wash., and Charles telling about his trip to MCA. Good news there was that the Front End is being appreciated at last. Doug went into great detail about WWCCS (I think that's it--Worldwide Command and Control Systems --or a name like that. They are that massive agency incorporating all kinds of people from other agencies and service branches that are supposed to provide quick response to world emergencies involving the U.S. somehow). He also discussed AMC and NSA. You saw his blow by blow account of the latter. The CIA is luckily out of the picture for now, only because they are not interested in us I believe.

2b

Anyway, the gist of what Doug said was that these three organizations are just dying to give us money, that they have finally seen the light, and we are saved. I wouldn't say that the response of ARC was wild enthusiasm. Any attempts to discuss the "issues" of whom we get our money from was headed off, with the promise that that would be discussed later (today). I suspect that Doug was a little disappointed that we all didn't leave there burning with bright hopes. It must be discouraging for him to see our lack of gratitude for his hard efforts in keeping the place afloat.

2c

Later that day a few of us met with Dick to discuss what must be done to wrap NLS up into a deliverable package for NSW. This is what Dick thought Bill Carlse would be wanting to know when he arrived this week. It was a little depressing after our big ideas about the shopping list.

2d

As it turns out, I'm not sure that Bill even wants this much. The word today was that he wants us out of the project, and that we can't count on any more funds. But he has agreed to stretch our present funding out over a longer period, lasting up until the end of next June. After that, as Dick put it, the NSW cow withdraws its udder.

2e

Anyway, today Doug threw the floor open for discussion of the

Notes of What's Happening at ARC in your Absence

wider issues, but he did it by beginning with the statement that essentially the only issue was a practical one: whether we work for the NSA or begin firing people next July. He implied that we could all talk our hearts out, but any discussion was somewhat irrelevant. At least that was my perception. From there a discussion ensued. I felt that most people handled their comments and questions very intelligently and coolly, and that the important aspects of the issue were raised, but of course the whole discussion meandered around a great deal, and Doug spoke fairly irrelevantly and very vaguely most of the time.

2f

People were really trying to find out where ARC is going, and how it plans to get there. About the only concrete answer I heard was that ARC is going where Doug wants it and has always wanted it to go (along some straight line he sees in his mind) and that it does not matter how it gets there, as long as its sources of money do not knock it too far off its path. Other considerations such as who helps us get there and how individuals feel about these sources simply cannot be allowed to impinge upon ARC's single purpose.

2g

Throughout most of it felt that the whole meeting was going along rather healthily and was a happy example of how these things should be aired. But I guess this meeting took the same course as similar ones before, because near the end a couple of people became somewhat hot-headed and emotional (in the sense of making speeches about hitching ourselves to someone's dream and subsuming our own selves to it, or another comment about employees being impertinent and questioning the work of the leader) (some clarification--the first comment was that if we work here we must dedicate ourselves blindly to the leader and his vision; the second was that those of us who question funding are impertinent young whippersnappers who are making moral judgments for our peers)...

2h

Anyway (that statement was getting too long)...Right at the end it rather degenerated, and the emotional tone that was suddenly established made it easier for Doug to tell us that in fact we would take any and all money we could get from NSA, and that he didn't understand why anyone minded anyway, and that he was getting old and tired of being picked on. And lastly, that if a group of us really objecte, we should get together on our own time (this point stressed!) and formulate our objections more clearly (I almost felt he wanted them quantified), and then come talk to him. And if people wanted to quit, they should tell him so by tomorrow.

2i

From talking to a couple of old-timers, this whole cycle has now repeated itself, and the next step is that people rumble, perhaps

Notes of What's Happening at ARC in your Absence

one or two might even quit (I doubt it seriously), and then things will return back to normal. And so it goes... as Kurt Vonnegut put it.

2j

Getting down to the immediate implications--our funding will be spread thinner for a while, so the milestones will be revamped. And this will theoretically free up some time for proposals, etc. I will keep you posted about milestone/priority changes. Don't really know what this means for us. What will probably affect "documentation" even more is the fact that I now have to start working on the final report for the last contract period, and I also got the job of COMming the previous Final Report dumped in my lap. And I imagine that your days of Air Force Formatting might not be completely over. Another piece of news from Dick today is that a very heavy decision is going to be made in the next few months about NLS and the AF. That decision being whether or not the AF uses NLS through its entire operations, or kills it. So there will probably be more scrambling around than ever. But maybe Jan will handle it all.

2k

Well that's about all for now. Just felt like telling you about all this. Too bad you couldn't have been in on the fray. Think I'll send this to you today, and try to add more in the next couple of weeks.

2l

Notes of What's Happening at ARC in your Absence

(J26506) 18-SEP-75 19:13;;; Title: Author(s): Beverly Boli/BEV;
Distribution: /KIRK([ACTION]) ; Sub-Collections: SRI-ARC; Clerk:
BEV; Origin: < BOLI, KIRKNOTES,NLS;2, >, 18-SEP-75 19:07 BEV
;;;####;

26506 Distribution
Kirk E. Kelley,

Quote of the week

"Mother ARPA has withdrawn her udder." -- Dick Watson

1

Quote of the week

(J26507) 18-SEP-75 20:43;;; Title: Author(s): David C. Smith/DAV;
Distribution: /SRI-ARC([INFO-ONLY]) ; Sub-Collections: SRI-ARC;
Clerk: DAV;

26507 Distribution

N. Dean Meyer, James E. (Jim) White, Douglas C. Engelbart, Martin E. Hardy, J. D. Hopper, Charles H. Irby, Harvey G. Lehtman, James C. Norton, Jeffrey C. Peters, Dirk H. Van Nouhuys, Kenneth E. (Ken) Victor, Richard W. Watson, Don I. Andrews, Susan K. Ocken, Raphaël Rom, David C. Smith, Mary Ann Kellan, Buddie J. Pine, Andy Poggio, David L. Retz, Laura J. Metzger, Karolyn J. Martin, Jan A. Cornish, Larry L. Garlick, Priscilla A. Wold, Pamela K. Allen, Delorse M. Brooks, Beverly Boli, Rita Hysmith, Log Augmentation, Joseph L. Ehardt, Raymond R. Panko, Susan Gail Roetter, Robert Louis Belleville, Rene C. Ochoa, Ann Weinberg, Adrian C. McGinnis, Robert S. Ratner, David S. Maynard, Robert N. Lieberman, Sandy L. Johnson, James H. Bair, Jeanne M. Leavitt, Rodney A. Bondurant, Jeanne M. Beck, Marcia L. Keeney, Elizabeth K. Michael, Jonathan B. Postel, Elizabeth J. Feinler, Kirk E. Kelley

Changes to HELP group

I was told that you are responsible for maintaining peoples' IDENT/GROUP records (as displayed by Sendmail's Show Record command). If I am not mistaken, would you please make the following changes?

1

(1) Add me (DAV) to the HELP and DIRT groups.

1a

(2) Add Jeanne Beck (JMB) to the HELP group.

1b

(3) Put me in as having prime responsibility for the maintenance of HELP, instead of Kirk Kelley, as I have taken over the task from him.

1c

Changes to HELP group

(J26508) 18-SEP-75 21:01;;; Title: Author(s): David C. Smith/DAV;
Distribution: /MLK([ACTION]) ; Sub-Collections: SRI-ARC; Clerk:
DAV;

26508 Distribution
Marcia L. Keeney,

Error in your message

For some reason the output processor gets an error in trying to process your file (26464,).

1

DAV 18-SEP-75 22:16 26509

Error in your message

(J26509) 18-SEP-75 22:16;;; Title: Author(s): David C. Smith/DAV;
Distribution: /KIRK([ACTION]) ; Sub-Collections: SRI-ARC; Clerk:
DAV;

26509 Distribution
Kirk E. Kelley,

Format of ETS Paper

As maybe you've learned from the copy of the message I sent the operator, something seems to have been wrong with reaching me with messages. Glad you tried the journal. I will call you early tomorrow.

1

Format of ETS Paper

(J26510) 18-SEP-75 22:25;;; Title: Author(s): dirk H. Van
 Nouhuys/DVN; Distribution: /ROF([ACTION]) DMB([ACTION] dpcs
 notebook please) DAP([INFO-ONLY]) &DPCS([INFO-ONLY]) ;
 Sub-Collections: SRI-ARC DPCS; Clerk: DVN;

26510 Distribution

Richard O. Fortna, Delorse M. Brooks, David A. Potter, Documentation
Production and Control System Interest Group ,

Markers Stay Put

I renamed my initial file into <vanNouhuys, mockdyn, > I set the markers into their usual places. I added some other markers whose names are their statement numbers. The I added a statement, updated, then added a statement aga and updated compact. All the makers stayed where they belonged. I was in the running system at BBN.

1

Markers Stay Put

(J26511) 18-SEP-75 23:41;;; Title: Author(s): Dirk H. Van
Nouhuys/DVN; Distribution: /FEEDBACK([INFO-ONLY]) KJM([INFO-ONLY]
); Sub-Collections: SRI-ARC FEEDBACK; Clerk: DVN;

26511 Distribution

Special Jhb Feedback, Karolyn J. Martin,

SRI Proposal No. ISU 74-258 ADDENDUM

This is an update of <25980,> which includes the cost figures for various equipments.

SRI Proposal No. ISU 74-258 ADDENDUM

NLS WORKSHOP EQUIPMENT SUPPORT FOR RADC

Duane Stone
Rome Air Development Center
Griffiss Air Force Base
Rome, New York 13441

Dear Mr. Stone:

With reference to paragraph 4.2 of the statement of work for SRI Proposal ISU 74-258, the enclosed sheet provides the estimated costs of equipment.

Pursuant to the provisions of ASPR 16-206.2, the attached is a cost estimate in lieu of the DD Form 633-4.

The estimated time required before equipment can be provided is 90 days from receipt of authorization.

Since we do not know the precise quantities that the Government will order, we assume that fixed fee will be applied to each "buy" at the rate negotiated in the basic contract.

The prices quoted in the attached sheet are subject to change if suppliers of equipment change their price.

This proposal will remain in effect until 1 October 1975. If consideration of the proposal requires a longer period, the Institute will be glad to consider a request for an extension of time.

Very truly yours,

James C. Norton
Assistant Director

Enclosures

Approved:

Douglas C. Engelbart, Director
Augmentation Research Center

Bonnar Cox, Executive Director
Information Science and Engineering Division

SRI Proposal No, ISU 74-258 ADDENDUM

Direct Costs for Equipment

Item	: Lease	: Purchase	: Installation :	
=====				10a
TI 735	\$ 118,60	\$ 2590,00	\$ 50,00	10b
GE Terminet 1200	179,00	4180,00	120,00	10c
Data Media CRT	80,00	1806,00	-	10d
Data Media NLS Keyboard	-	375,00	-	10e
Delta Data 5000	235,00	4700,00	60,00	10f
Line Processor	-	2500,00		10g
Tektronix 4014 CRT	630,00	11,145,00	25,00	10h
Tektronix 4631 Printer	195,00	3895,00	25,00	10i
Tektronix 4012 CRT	300,00	6045,00	25,00	10j
Modem - Vadic 1200 baud	53,00	915,00		10k
Modem - ATT 208A 4800 baud	115,00	-		10l

Notes:

All costs will be subject to fixed fee per anticipated contract. 11a

All rental prices are per month for one-year lease agreements. 11b

All quotes are those of suppliers and are subject to change. 11c

A 6% tax on all rentals, which is not included in the above figures, will be levied by the State of California. 11d

An estimated 2% of the purchase cost, which is not included in the above figures, will be added for handling and shipping. 11e

The line processor includes keyset and mouse. 11f

Installation charge for GE Terminet 1200 includes de-installation. First month is free on one-year rental agreement. 11g

The Data Media NLS keyboard is special order and cannot be leased. 11h

The Tektronix 4014 includes Delux data communications I/F option, Minibus Extender option, and Enhanced Graphic Module option. 11i

The Tektronix 4012 includes Delux data communications I/F option and Minibus Extender option. 11j

The Tektronix hardcopy printer includes copy setup. 11k

An installation service call charge of \$70,00 will be added by the supplier for Tektronix equipment. The installation of each piece of equipment will cost an additional \$25,00 as indicated above. 11l

SRI Proposal No. ISU 74-258 ADDENDUM

Maintenance is included in rental costs for Delta Data, TI 735, and Tektronix equipment.

11m

SRI Proposal No. ISU 74-258 ADDENDUM

(J26512) 19-SEP-75 15:36;;; Title: Author(s): James C. Norton/JCN;
Distribution: /RLL([ACTION]) DCE([INFO-ONLY]) JCN([INFO-ONLY]
) ARC-LOG([INFO-ONLY]) JHB([INFO-ONLY]) MEH([INFO-ONLY])
BJP([INFO-ONLY]) ; Sub-Collections: NIC ARC-LOG; Clerk: RLL;
Origin: < ARC-LOG, LETTER,NLS;7, >, 10-SEP-75 15:11 RLL ;;;
####;

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

To:
Access Copy

26512

26512 Distribution

Robert N. Lieberman, Douglas C. Engelbart, James C. Norton, James C. Norton, Log Augmentation, James H. Bair, Martin E. Hardy, Buddie J. Pine,

First Draft of DPS Paper

This is the first draft of a paper we hope will be accepted for publication in one of the technical journals. I would greatly appreciate the comments of anyone willing to take the time to read through it. I'm especially interested in things which are not explained clearly, arguments which should be made but aren't, sub-topics which I've left out, etc. I will incorporate any comments I receive by Friday, 26-SEP; marked up quickprints would do fine. Thanks. --Jim

First Draft of DPS Paper

*** FIRST DRAFT ***

Resource Sharing, the ARPANET's Goal

A major goal of the now international packet-switched computer network (the ARPANET) constructed by the Advanced Research Projects Agency is to usefully interconnect geographically distributed hardware, software, and people resources [3]. Achieving this goal requires the design and implementation of various levels of support software within each "host" computer. This paper outlines an alternative to the approach that builders of such software have been taking since work in this area began in 1970.

The Current Software Approach

The current ARPANET software approach toward facilitating resource sharing has been described elsewhere in the literature [2, 8, 9]. It is sufficient here to remind the reader that it consists first of the specification of a Host-Host Protocol by which host operating systems cooperate to provide user processes with a Network-wide inter-process communication (IPC) facility; and then of various function-oriented protocols (FOPs) built upon this foundation by which user processes cooperate to provide specific services to the user.

The oldest and still by far the most heavily used FOP is a Telecommunications Network (TELNET) protocol which promotes "direct" resource sharing by enabling the user to use remote interactive systems from his local terminal. The remaining FOPs promote "indirect" resource sharing by enabling software to carry out remote activities on the user's behalf, and include a File Transfer Protocol (FTP) and Remote Job Entry (RJE) protocol which provide access to remote file and batch processing systems, respectively.

The Importance of Indirect Resource Sharing

Although interactive use of remote systems by human users is an important and highly visible form of resource sharing, it is, in the long run, the less powerful of the two forms.

First, it offers no possibility for bootstrapping new composite resources from existing ones. Because the access discipline imposed by each resource is a human-engineered command language, rather than a machine-oriented communication protocol, it is virtually impossible for one resource to programatically draw upon the services of the others; the user's presence is always

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required, and software can never be effectively substituted for him,

4b

A second limitation is that it forces upon the user all of the trappings of the host system which happens to contain the resource in which he is interested. To apply a resource to the solution of his particular problem, the user must exchange the familiar working environment provided by his local system for an alien one with its own peculiar command language discipline and system structure. Besides being almost unworkable for more than a handful of remote resources, this approach does not provide the user with the kind of organized and consistent workshop which he requires to work effectively [10].

4c

We must, therefore, begin developing the software machinery necessary to support and encourage the more powerful and convenient, indirect mode of resource sharing which will pay such large dividends in the future.

4d

Extracting an Important Mechanism from its Contexts

5

Each of the FOPs developed since TELNET specifies a set of operations to be implemented by one process, and an "access mechanism" by which another process can initiate them. Each protocol contains a unique, application-specific operation set, but all share a common access mechanism which involves the exchange of messages via the network's IPC facility. This mechanism allows the process initiating the operation to identify by name the operation he wishes performed, supply a parameter to it, and recover the outcome.

5a

The fact that the access mechanism itself has never been isolated from any of its contexts has had important restraining effects upon the progress of resource sharing within the ARPANET. First, it has discouraged development of the mechanism and allowed it to remain very crude. Multi-parameter operations, for example, must be implemented as composites of atomic operations, each of which incurs the overhead of a round-trip network delay.

5b

Second, it has encouraged separate implementations of the mechanism for each new process constructed either to use or offer a network resource, offering a builtin deterrent to any such undertaking. Formalizing the mechanism, on the other hand, would allow it to be independently implemented in a way that not only reduced the number of implementations to one per host (or at worst one per programming language), but which also provided the applications programmer with a run-time environment (RTE) capable of providing a variety of additional programming conveniences (e.g. insulation from the details of network IPC, automatic

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substitution of an internal form of IPC for intra-host communication, automatic conversion of parameters between their internal and network-standard formats).

5c

The thesis of the present paper is that one of the keys to facilitating network resource sharing lies in first isolating from specific applications, in both design and implementation, and then developing and refining this common machinery, providing the basis for a true distributed programming system which the applications programmer can then employ to build the distributed systems which will in turn promote network resource sharing.

5d

Treating Remote Resources as Programs

6

The characterization of a fully developed access mechanism as a Distributed Programming System (DPS) follows naturally from the similarity between the remote operations to which the mechanism must provide access, and the local procedures or subroutines a conventional programming environment makes available. Both carry out arbitrarily complex named operations on behalf of a requesting program or caller, are governed by parameters or arguments provided by the caller, and return to him additional parameters or results reflecting the outcome of the operation. Adopting the DPS model acknowledges the fact that in a network environment, a program must sometimes call subroutines in machines other than his own.

6a

Although the network environment is in the main very usefully modelled as an extension of the local programming environment, both the applications programmers who use DPS and the systems programmers who design it must avoid carrying the analogy too far. Remote procedure calls are vastly more expensive than local ones, for example, and the applications programmer must never allow this difference to drift too far into his subconscious or his handiwork will become increasingly inefficient. Like virtual memory, DPS offers great convenience and therefore power in exchange for a bit of caution.

6b

Neither is the analogy intended to suggest that a distributed system must have a single locus of control. DPS must, for example, admit systems containing largely autonomous processes which only occasionally interact with one another, and not require them to relinquish control of their own processor to do so.

6c

Nor is the analogy meant to convey the false notion that independent remote processes can be coerced into action or unfairly manipulated. There is no substantive difference between the procedure call model and a request-and-reply model in this regard; a file allocation subroutine, for example, whether local

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or remote, should not and will not hesitate to complain when directory space has been exhausted,

6d

Finally, one must concede that by no means all useful forms of inter-process communication are effectively modelled as procedure calls. DPS must, therefore, provide a continuum of communication facilities with binary message transmission at one end and procedure calling at the other.

6e

Despite the possibilities of abuse noted above, a fully evolved distributed programming system has great potential for stimulating the sharing of resources within a computer network. First, it will significantly reduce the cost of installing existing programs as network resources by allowing a network interface consistent with the programs' internal organization, and by eliminating the need for the design, documentation, and implementation of specialized access protocols. It will also encourage the use of remote services by eliminating the need for application-specific interface software and providing in its place a natural interface between local and remote software, one with which the applications programmer is comfortable and which makes remote procedures as accessible to him as local ones. And finally, it will encourage the construction of new services designed expressly for remote access because of the ease with which they can be offered and used within the network software marketplace.

6f

A Prototype Distributed Programming System

7

Background

7a

In July 1974, ARC undertook the design of a Distributed Programming System for use in the National Software Works (NSW) being constructed for the Air Force by the Advanced Research Projects Agency (ARPA) and Rome Air Development Center (RADC). The design work consisted of developing the DPS model, specifying the network protocol required to support it, and devising a RTE for a particular machine. Three design iterations were carried out during the course of the next 12 months, and the final design implemented and debugged. The remainder of this paper describes this final design in its three aspects,

7a1

The DPS which ARC designed, implemented, and tested in limited measure is offered here as an example of the kind of distributed programming system we believe can do much to encourage the sharing of resources within a computer network,

7a2

Although conceived from the outset as a general

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system-building tool, DPS was nevertheless prompted by a particular system (NSW); its use in other distributed systems would surely suggest features whose need we've failed to foresee. Entirely different DPS approaches are also imaginable, of course; the one described in the following sections is simply ours. Furthermore, the model description below has been somewhat simplified so as not to obscure essential features.

7a3

The DPS Model

7b

Procedures

7b1

Addressing a Resource

7b1a

The smallest addressable resource recognized by DPS is the "procedure". As in conventional programming systems, a procedure is, in its simplest form, a vehicle for carrying out some arbitrarily complex operation using externally supplied parameters as "arguments". During the course of the operation, the "callee" generates additional parameters which are eventually returned to the "caller" as "results" of the procedure.

7b1a1

Every DPS procedure has a name (a character string) which, since it cannot be bound to a memory address during compilation or loading, is supplied by the caller at run-time. This lack of binding typifies the inevitable differences in the call/return mechanisms (CRMs) required for local and remote procedures, the former being machine instructions, the latter probably a system call. However, the RTE can minimize the extent to which this difference is apparent to the user programmer, while compiler modifications (for those who wish to undertake them) can eliminate it entirely. The appropriate system support, therefore, can make the programmer as comfortable with remote procedures as with local subroutines.

7b1a2

Specifying Arguments and Results

7b1b

Each argument and result exchanged between caller and callee is modelled as one of a small family of fundamental "data types" defined by DPS, and is transmitted between distant procedures in one of several DPS transmission formats. Parameters encoded in any of the transmission formats are fully typed, permitting the user program to communicate with his RTE in the single format most consistent with his machine's word size, and

yet allowing the RTE to convert when necessary to a format more appropriate to the communication medium,

7b1b1

Since the number of data types is small, the programmer's local programming environment will provide internal equivalents for most of them. The RTE can therefore accept familiar parameters in their internal formats, infer their types on the basis of language cues or tables supplied by the program, and convert them to the appropriate DPS transmission format. The same conversion principles can, of course, be applied in reverse at the delivery end,

7b1b2

The following data types are recognized by DPS. Throughout the descriptions below, N is confined to the range [0, 2**15-1]:

7b1b3

LIST A list is an ordered sequence of N data structures called "elements". A LIST may contain other LISTS as elements, and can therefore be employed to construct arbitrarily complex composite data structures,

7b1b3a

CHARSTR A character string is an ordered sequence of N ASCII characters, and conveniently models a variety of textual entities, from short user names to whole paragraphs of text,

7b1b3b

BITSTR A bit string is an ordered sequence of N bits and, of course, provides a vehicle by which procedures can communicate arbitrary binary data (e.g., a debug procedure reporting the contents of a word of memory),

7b1b3c

INTEGER An integer is a fixed-point number in the range [-2**31-1, 2**31-1], and conveniently models various kinds of numerical data, including time intervals, distances, etc.,

7b1b3d

INDEX An index is an integer in the range [1, N]. As its name and value range suggest, an INDEX can be used to address a particular bit or character within a string, or element within a list. INDEXs have other uses as well, including the modelling of unique identifiers or "handles" for open files, created processes, etc. Because of their restricted range, INDEXs are more compact in transmission than INTEGERS, 7b1b3e

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BOOLEAN A boolean represents a single bit of information, and has either the value true or false, 7b1b3f

EMPTY An empty is a valueless place holder within a LIST or argument list, 7b1b3g

Reporting the Outcome 7b1c

One of the most important results that procedures often return in conventional programming systems is their outcome. This parameter can be returned to the caller as a formal result of the procedure, deposited in a global variable, or communicated by some other mechanism agreed upon by caller and callee. Although it cannot prevent the use of such ad hoc reporting schemes, DPS encourages the use of a standard reporting discipline by providing a special INDEX meta-result which accompanies the formal results of every procedure, 7b1c1

Two of the three legal procedure outcomes, SUCCESS and FAILURE, are employed to report the outcome of any of a large class of procedures which attempt well defined operations at which they can be said to have either succeeded or failed and for which the cause of failure is either unimportant or understood, 7b1c2

Many other procedures normally run to completion without incident, but occasionally encounter difficulties which prevent their continuance and which must be reported to the caller and perhaps even to the human user behind the higher-level task being performed. The third outcome, ABORTED, provides a means for reporting such errors, and its use constrains the formal results of the procedure to an INDEX error number and a CHARSTR diagnostic message, the former for use by the calling program and the latter for optional presentation to the user, 7b1c3

Transferring Control 7b1d

The Dialog Between Procedures 7b1d1

The invocation of a remote procedure begins a dialog between caller and callee which, in the simplest and most frequent case, spans only a single exchange of arguments and results. Some interactions, however, require more complex dialogs for convenient implementation. The additional dialog forms provided by DPS to meet such needs may involve, in addition to

caller and callee, other programs along the "thread of control" which results from the nesting of remote procedure calls within the distributed system.

7b1d1a

DPS employs the concepts of "control" and "control transfer" to regulate the dialog between caller and callee, one party being prohibited from speaking until the other relinquishes control to it. In a distributed system, a transfer of control is a logical rather than a physical operation, since caller and callee are sustained by separate processors.

7b1d1b

Signals and Coroutine Linkages

7b1d2

DPS provides mechanisms by which the procedure in control can initiate either a monolog or dialog with its partner. The former, termed "signalling", allows either caller or callee to transmit a set of parameters to its partner without relinquishing control of the call. The latter involves both the transmission of parameters and the release of control and provides a co-routine linkage between the two parties.

7b1d2a

Signalling is employed to give notice of a detected event, synchronize execution of caller and callee, send large arguments or results piecemeal to minimize buffering requirements, etc. Coroutine linkages are employed to obtain help with an encountered problem, return the results of the current sub-operation and obtain arguments for the next, etc.

7b1d2b

Event Reports and Help Solicitation

7b1d3

As in conventional programming systems, DPS procedures sometimes call upon others within the system to carry out portions of their task. Within the thread of control which results from such nested calls, each procedure is in a sense acting under the authority of, and therefore responsible to, not just its immediate caller, but also those procedures above it.

7b1d3a

DPS provides mechanisms by which a procedure can communicate with its "superiors", either to report an event which it has detected or caused, or to solicit help with a problem encountered. Termed "note" and "help", these mechanisms supporting monologs and dialogs, respectively, are analogous to the signalling

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and coroutine linkage facilities already described. However, they can only be directed up the control thread (i.e. to superiors) and then only to a class of procedures (i.e. all superiors), rather than to a specific one.

7b1d3b

Both NOTE and HELP present a pair of parameters to one or more of the procedure's superiors. The first parameter is an INDEX event or problem number, the second arbitrary supplementary information. NOTE broadcasts the parameter pair to every superior, none of which is required or given opportunity to respond. The invoking procedure retains control of the call. HELP relinquishes control of the call and presents the parameters to each superior in turn, beginning with the caller, until one responds positively or the end of the control thread is reached. Eventually, HELP returns to the invoking procedure a BOOLEAN outcome indicating whether or not help as been provided, and if so a second parameter supplied by the rescuing superior.

7b1d3c

Interrupting, Resuming, and Aborting

7b1e

In some distributed system applications, the control thread terminates in a system process to which no human user is directly attached. In others, remote procedure calls are made in direct response to a command from the user. In this second case, it is important, as it is in a conventional system, to provide, as DPS does, mechanisms by which a procedure can be suspended and later resumed, or aborted. The ability to abort a procedure is particularly important when the procedure has a significant execution time (e.g. a procedure that compiles a source file).

7b1e1

Data Stores

7b2

Formalizing a Class of Procedures

7b2a

Most large systems must maintain a variety of state information accessible throughout the system by means of either language constructs or specialized procedures. The vehicle which DPS provides for such purposes is the "data store", a repository for a parameter of the sort admissible as a procedure argument or result, i.e. one modelled from DPS data types.

7b2a1

Like a procedure, every data store has a name which

must be supplied whenever the data store is read or written. The lack of binding again typifies the inevitable differences in the manipulation mechanisms required for local and remote environments. But again, the differences can be minimized or completely hidden by the appropriate system software, which can make remote data stores as comfortable to work with as local variables.

7b2a2

Data stores are really no more than a mechanism for formalizing the large class of operations of the form, "replace the current contents of V with the value X", or "return the current value of V", which arise in most large systems, whether conventional or distributed. Although these operations, called WRDT and RDDT in DPS, can be carried out by means of specialized procedures, their standardization aids the programmer by permitting him, for example, to manipulate remote variables with the same language constructs he applies to local ones, the compiler simply dropping out WRDT and RDDT operations upon the remote variables whose names he specifies.

7b2a3

Identifying Elements of Composite Data Stores

7b2b

Like procedure arguments and results, the value of a data store can be arbitrarily complex (because of the LIST data type). To provide the programmer with greater flexibility, WRDT and RDDT manipulate either the whole data store or a specified substructure within it. If a data store is a LIST, any of its elements can therefore be individually read or written; if the selected element is itself a LIST, any of ITS elements can be manipulated; and so on, to arbitrary depth. At each level, the programmer specifies the index of the desired element. The resulting list of indices identifies the substructure whose value X is to be replaced or returned.

7b2b1

Besides the positional form of element addressing which indexing represents, DPS provides a keyword-like addressing mode which relies upon a hitherto unmentioned and optional property of every data structure called its "key". A key is a secondary data structure, usually but not necessarily a CHARSTR, which effectively names, and accompanies in transmission, the primary data structure with which it is associated.

7b2b2

Scratch Data Stores and Parameter List Masks

7b2c

In conventional programming systems, the results of

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procedures are used in a variety of ways, depending upon the context of the calls made upon them. A result may provide the basis for a branch decision within the logic of the calling program, be supplied as an argument to a subsequent procedure call, or even be ignored and thus effectively discarded. In a distributed system, where procedure results will be used in a similar manner, results are transported unnecessarily between caller and callee, in the last two cases described above, if the RTEs are unaware of a particular result's intended use. For large results, this unnecessary movement may also be expensive and therefore undesirable.

7b2c1

Data stores offer potential for eliminating the inefficiencies involved in the second case above by providing a place near the callee where results generated by the callee can be held until required by another procedure. DPS permits data stores to be used in this way by allowing the caller of any procedure to provide "argument and result list masks" which specify the source and destination of each of the procedure's arguments and results, respectively. The argument list mask permits the caller to supply each argument directly, via the argument list, or cause it to be extracted from a data store near the callee. The result list mask permits the caller to cause each result to be returned to the caller via the result list or deposited in a data store near the callee.

7b2c2

To supply the result of one procedure as an argument to another, the caller need only appropriately set corresponding elements of the result list mask in the first call and the argument list mask in the second. Any data store may be used in this fashion, but DPS also allows the creation (and later deletion) of special "scratch" data stores intended specifically for this purpose.

7b2c3

The inefficiencies which result in the third case above are conveniently eliminated by allowing the caller to identify via the result list mask the results which will be ignored and which therefore need not be returned to the caller.

7b2c4

Packages

7b3

Aggregating Resources

7b3a

Procedures and data stores are the building blocks of

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the distributed systems which DPS makes possible. Although an individual procedure or data store may be thought of as a resource (as previously suggested), it is usually more practical and convenient to conceive of larger, composite resources comprised of a number of related procedures and data stores. A simple data base management module, containing procedures for creating, deleting, assigning values to, reading, and searching for data objects, exemplifies such composite resources. Although each procedure is useless in isolation, the whole family of procedures provides a meaningful service. Such a composite resource, consisting of any number of logically related procedures and data stores, is termed a "package" in DPS, and every procedure and data store is contained within a package.

7b3a1

Every package and therefore every resource within the distributed system has a name which serves, in dialog and documentation, as shorthand for the procedures and data stores which it contains. "DTAMAN" thus becomes shorthand for "the procedures and data stores, providing data management services, whose functions and calling sequences are described in document X".

7b3a2

Controlling Access

7b3b

Large distributed systems are constructed from smaller modules logically interconnected in potentially complex ways. For example, a module A might draw upon the resources of a second module B, which in turn relies upon the services of a third module C. In such an arrangement, there is no need for A to have direct access to C. Indeed, it might be catastrophic if A could call procedures in C (suppose C updates an accounting record whenever an arbitrary module A obtains services from B).

7b3b1

So that access controls can be conveniently imposed, a module is required to "open" and thereby obtain a handle for a remote package before it can access any of the procedures or data stores it contains. It must then supply the handle with the procedure or data store name in subsequent access attempts (the package is also, therefore, the domain over which procedure and data store names must be unique). When a module attempts to open a remote package, its right to do so can be verified and the attempt aborted if necessary. Challenging the initial attempt to open the package is, of course, far less expensive than challenging every procedure call. The opening of a package also provides a convenient time

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for package-dependent state information to be initialized.

7b3b2

Processes

7b4

Gaining a Foothold Within a Host

7b4a

Before a module in one host can exploit the resources of another host, it must gain a foothold there: establish communication with the remote host, identify itself for purposes of billing and access to the host's file system, identify the module whose packages it intends to use, win the commitment of one or more processors to that module, and finally have the module started on its behalf. The object of all this effort is what DPS terms a "process", a named program with one or more processors at its disposal, running on behalf of a particular user, and linked to its creator via a communication channel. The process also serves as a context in which the effects of successive procedure calls and data store manipulations are preserved.

7b4a1

Interconnecting Processes

7b4b

The RTE of each process within the distributed system provides primitives for creating and deleting new processes as described above. Processes so created may in turn create processes of their own, and so on to arbitrary depth. The result is a tree structure of processes, each of which knows about and can therefore share the resources of only those processes adjacent to it, i.e., its father and children.

7b4b1

Because this limited sharing range is insufficient to implement many distributed systems, DPS permits a process to "introduce" to one another any two processes it itself already knows. Once introduced, the two processes may invoke one another's procedures with the same freedom the introducing process enjoys, until "separated" by that same process.

7b4b2

The Underlying Protocol

7c

Linking RTEs

7c1

The RTEs of connected processes must communicate with one another to implement the DPS model described above. Their dialog is conducted via an IPC channel established between them, and regulated by the protocol to be described below.

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The Protocol's primary concern is with the substance of the dialog, rather than with the details of the IPC facility used. When they reside on different hosts, the two processes will employ the Network IPC facility provided by their respective operating systems. Processes within a single host may employ any IPC facility available to them,

7c1a

Like the preceeding description of the DPS model, the protocol description which follows has been somewhat simplified so as not to obscure essential features,

7c1b

Messages

7c2

Implementing the Call/Return Mechanism

7c2a

The Protocol's primary task is to implement a call/return mechanism which will permit one process to invoke procedures in the other. This mechanism is implemented by three messages sent via the IPC channel, each of which is modelled as a DPS data structure and transmitted in one of the standard transmission formats. That is, a message is a LIST of parameters, the first of which is an INDEX op code identifying the message, and the second a routing code explained later in this discussion. Modelling the very messages from which DPS is constructed as data structures simply exploits the power and flexibility embodied in the concept of data types,

7c2a1

Each of the several DPS transmission formats provides a reasonable encoding of the messages (i.e. of DPS data structures) for a particular type of IPC channel. The format employed with channels accepting 36-bit binary words, for example, is the following:

7c2a2

Bit	0	If set, key data structure follows	7c2a2a
Bits	1-13	Unused (zero)	7c2a2b
Bits	14-17	Data type	7c2a2c
	EMPTY	=1 INTEGER=4 LIST=7	7c2a2c1
	BOOLEAN	=2 BITSTR =5	7c2a2c2
	INDEX	=3 CHARSTR=6	7c2a2c3
Bits	18-20	Unused (zero)	7c2a2d
Bits	21-35	Value or its length	7c2a2e
	EMPTY	unused (zero)	7c2a2e1
	BOOLEAN	14 zero-bits + 1-bit value (TRUE=1 / FALSE=0)	7c2a2e2
	INDEX	unsigned value	7c2a2e3
	INTEGER	unused (zero)	7c2a2e4
	BITSTR	unsigned bit count	7c2a2e5

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CHARSTR	unsigned character count	7c2a2e6
LIST	unsigned element count	7c2a2e7
Bits 36-??	Value	7c2a2f
EMPTY	unused (nonexistent)	7c2a2f1
BOOLEAN	unused (nonexistent)	7c2a2f2
INDEX	unused (nonexistent)	7c2a2f3
INTEGER	two's complement full-word	7c2a2f4
BITSTR	bit string + zero padding to word boundary	7c2a2f5
CHARSTR	ASCII string + zero padding to word boundary	7c2a2f6
LIST	element data structures	7c2a2f7

Calling a Remote Procedure

7c2b

The first of the three DPS messages, CALPE, initiates execution of a remote procedure, specifying the NAME of the procedure to be executed, a handle PKH for the previously opened containing it, and the necessary ARGUMENTS:

7c2b1

```
LIST (calpe INDEX, route INDEX, cah INDEX, pkh INDEX,
      name CHARSTR, arguments LIST,
      [arglmask LIST (caller INDEX / DSELECTOR*,
...)],
      [reslmask LIST (caller/discard INDEX /
DSELECTOR*,
...)])
```

7c2b1a

The call handle CAH is a unique identifier assigned by the sender and included in all subsequent dialog pertaining to the procedure call,

7c2b2

Also included among the parameters are optional (and therefore enclosed in square brackets above) masks ARGLMASK and RESLMASK for filtering the arguments provided by the caller and the first results returned by the callee, respectively. Each mask specifies the list of transformations to be applied by the receiving RTE to the corresponding list of parameters, before it relays them to or from the user program,

7c2b3

The argument list mask permits each argument to be drawn either from the argument list itself or from a data store whose "data store selector" DSELECTOR is specified. The data store selector contains the NAME of the data store, a handle PKH for the package which contains it, and an optional list of keys and/or indices which identify an element within the data store:

7c2b4

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LIST (pkh INDEX, name CHARSTR,
[LIST (<keynotindex BOOLEAN> any/INDEX, ...)]) 7c2b4a

The result list mask permits each result to be either returned in the result list, deposited in a data store whose DSELECTOR is specified and replaced by EMPTY, or simply discarded and replaced by EMPTY. The result list mask is ignored if the procedure aborts, and the error number and diagnostic message returned directly to the caller,

7c2b5

Returning to the Caller

7c2c

The second message, RTNPE, is issued in eventual response to the CALPE message and returns the OUTCOME and RESULTS of the procedure to the receiving process:

7c2c1

LIST (rtmpe INDEX, route INDEX, cah INDEX, results
LIST,
[reslmask], [arglmask], outcome INDEX) 7c2c1a

The outcome may have any of the three values (SUCCESS, FAILURE, or ABORTED) required by the Model, or a fourth value (VISIT) by which the coroutine linkage which the Model also requires is effected. Any of the first three outcomes invalidates the call handle, terminating the dialog between caller and callee,

7c2c2

Masks are again provided for filtering the present result list and (in the coroutine linkage) the next argument list,

7c2c3

Recalling the Callee

7c2d

The final message, RECPE, is issued in reply to the RTNPE message (with outcome VISIT) and transmits the next set of ARGUMENTS to the receiving process:

7c2d1

LIST (recpe INDEX, route INDEX, cah INDEX,
arguments LIST, [arglmask], [reslmask]) 7c2d1a

Masks are once again provided for filtering the parameter lists,

7c2d2

System Procedures

7c3

Bootstrapping the Remaining Functions

7c3a

Once the call/return mechanism has been implemented, a

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substantial number of protocol exchanges remain to be specified. Although additional messages could be defined for carrying out these remaining functions, we chose instead to bootstrap them using the CRM. The remainder of the Protocol, therefore, consists of the definition of a series of "system procedures" addressed via the CALPE message and distinguished from user procedures by an EMPTY package handle, and an INDEX number instead of a CHARSTR name.

7c3a1

Procedures

7c3b

The call/return mechanism implemented by the three messages just described, provides only the most basic of the Model's control transfer and procedure manipulation capabilities. The additional facilities are implemented for convenience by the system procedures described below.

7c3b1

The signal, note, and help control transfers are implemented as a trio of procedures:

7c3b2

SIGPE (cah INDEX, arguments LIST, [arglmask])
 NTEPE (cah INDEX, number INDEX, description)
 HLPPE (cah INDEX, number INDEX, description
 -> solution)

7c3b2a

7c3b2b

7c3b2c

the first of which signals the target procedure by transmitting to it the next set of ARGUMENTS (and mask ARGLMASK). Each procedure accepts as an argument the handle CAH (as specified in CALPE) of the procedure call to which it applies.

7c3b3

The note and help procedures specify the NUMBER of the event or problem reported, and its DESCRIPTION. Invoked only by the callee's RTE, these procedures are called recursively and thus work their way up the control thread in accordance with the Model. Implementation of the signalling and note functions as system procedures, rather than as messages, provides a crude form of flow control which prevents the receiving RTE's buffers from being overrun.

7c3b4

The three forms of callee manipulation -- interruption, resumption, and abortion -- included in the Model to assist the human user are implemented by the procedures:

7c3b5

INTPE (cah INDEX)

7c3b5a

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RSMPE (cah INDEX)

7c3b5b

ABRPE (cah INDEX)

7c3b5c

Data Stores

7c3c

The Model requires mechanisms for retrieving the value of a data store, replacing the current value with a new one, creating a data store for use as scratch space, and later deleting it. Data stores (and indeed all of the remaining model constructs) are manipulated wholly by system procedures:

7c3c1

RDDT (dselector -> value)

7c3c1a

WRDT (dselector, value)

7c3c1b

CRTDT (dselector, value)

7c3c1c

DELDT (dselector)

7c3c1d

each of which accepts as an argument a data store selector DSELECTION which identifies the data store to be manipulated and, in the cases of RDDT and WRDT, the particular component to be read or written,

7c3c2

Packages

7c3d

The model requires mechanisms for opening and closing packages. For increased efficiency, the system procedures which constitute these mechanisms manipulate a set of packages rather than a single one:

7c3d1

OPNPK (LIST (name CHARSTR, ...)

-> LIST (pkh INDEX, ...))

7c3d1a

CLSPK (LIST (pkh INDEX, ...))

7c3d1b

The first procedure opens and returns handle PKHs for the packages whose NAMES are specified; the second closes the packages whose handles are specified,

7c3d2

Processes

7c3e

Creating New Processes

7c3e1

As pointed out earlier, engaging a remote process in a dialog involves a number of steps, including the establishment of an IPC channel to the remote host, presentation of the requesting process' credentials, and specification of the program to be executed,

7c3e1a

The last two steps are effected by means of a call

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to the first of the following two procedures, which is the first procedure invoked over the IPC channel:

7c3e1b

```
INIPS (program CHARSTR, LIST (user CHARSTR,
    password CHARSTR, account CHARSTR))
TRMPS ()
```

7c3e1b1

7c3e1b2

which specifies the name of the program to inhabit the newly-created process, and the requesting process' USER name, PASSWORD, and ACCOUNT. TRMPS is the inverse of INIPS, terminates the process, and is the last procedure invoked within the process.

7c3e1c

Introducing Existing Processes

7c3e2

In an environment in which all processes share a common IPC facility, the introduction of two existing processes necessitates little more than the formation of an IPC channel between them. In other, less homogeneous environments, however, the creation of such a channel is not always possible. DPS, therefore, interconnects introduced processes by means of a "logical channel", rather than a physical, IPC channel. A logical channel is a composite communication path which links the two processes P(1) and P(n) to be introduced, and which is sustained by the intervening processes P(2) through P(n-1), who relay messages between P(1) and P(n) by means of their own IPC channels.

7c3e2a

Each process P(i) maintains one "segment" of the linked list which constitutes the logical channel. A segment is simply a table entry within the RTE which contains handles for the adjacent processes P(i-1) and P(i+1) and their respective segments (the two terminal segments, of course, contain only a single process and segment handle).

7c3e2b

To communicate a message to its distant neighbor, the source process' RTE (say P(1)) transmits a message via its IPC channel to P(2), with the message's ROUTE field addressing the appropriate segment within P(2). Upon receipt of the message, P(2) locates its table entry with handle ROUTE, replaces the message's ROUTE field with the handle to P(3)'s segment, and forwards the message to P(3). Eventually the message reaches P(n), where it is consumed.

7c3e2c

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A logical channel is established using the first of the following system procedures:

7c3e2d

```
CRTCHH (chainsgh INDEX, [modelsgh INDEX]
        => sgh INDEX, psh INDEX)
DELCHH (sgh INDEX)
```

7c3e2d1

7c3e2d2

P(2) creates the simplest logical channel (n=3) by invoking CRTCHH in both P(1) and P(3), specifying the handle CHAINSGH for its segment of the channel, and retrieving the handle SGH for the target process segment, as well as the process handle PSH by which its distant neighbor will be known by the target process; MODELSGH is EMPTY. More complicated logical channels (n>3) result when one or both of the introduced processes is already linked by a logical channel to the process performing the introduction, in which case MODELSGH specifies the handle of the segment (part of an existing logical channel) within the target process which is to be reproduced, and CRTCHH is called recursively to replicate the entire channel.

7c3e2e

The process P(i) which created the logical channel eventually dismantles it by invoking DELCHH in P(i-1) and P(i+1), who propagate the call to each end of the channel.

7c3e2f

Channels

7c3f

The generality of logical channels is obviously not secured without cost: each message transmitted via such a channel must traverse at least two IPC channels and be handled by all of the RTE's along the way. To eliminate this unwanted overhead in the majority of cases in which a direct IPC channel is possible, DPS short-circuits the logical channel with a physical one whenever it can. This IPC channel is negotiated by the process performing the introduction, using the family of system procedures below:

7c3f1

```
RDMMU (-> menu LIST (<format INDEX> domain INDEX,
...))
ALOPG (menu, location LIST (host INDEX,
    intrahostaddr,
    activenotpassive BOOLEAN
    => poh INDEX, index INDEX, port)
CRTCE (poh INDEX, port, [psh INDEX])
RELPO (poh INDEX)
```

7c3f1a

7c3f1b

7c3f1c

7c3f1d

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To create the channel, P(2) first employs RDMNU to retrieve a MENU of the IPC forms available to P(1), each characterized by its DOMAIN (either NETWORK, HOST, or JOB) and associated transmission FORMAT. P(2) then submits the menu along with P(2)'s LOCATION via ALOPO to P(3), who selects an IPC form compatible with its own location and with the forms of IPC available to it, allocates an IPC PORT to which one end of the channel can subsequently be attached, and returns its handle POH and the selected menu INDEX to P(2). P(2) then allocates a matching port in P(1) via ALOPO. Finally, P(2) actually creates the channel by invoking CRTCE concurrently in each process, specifying its local port handle POH, the remote PORT which has been allocated, and the local process handle PSH whose logical channel the new IPC channel is to short circuit,

7c3f2

Eventually, the process negotiating the channel will delete it and release its associated ports by invoking RELPO in each process,

7c3f3

An Implementation

7d

*** NEED THIS SECTION EXIST? ***

7d1

Introduction (Tenex)

7d2

The Controlling Fork

7d3

System Calls (VJSYSs via JSYS trap)

7d3a

Subprocesses, and Processors

7d4

User Entry Points and Appendages (VJUSRs)

7d4a

Areas Requiring Further Investigation

8

DPS in its present form only begins to embrace the range of concepts and facilities which it must eventually possess to fully exploit its potential for aiding the construction of distributed systems. Some of the areas requiring further investigation and work will identify themselves only as the existing concepts are applied by system builders; others have already been identified and some of these are mentioned here,

8a

One important and as yet little explored task of a DPS is that of providing mechanisms for assigning service requests to processes. Here a number of facilities are required, including those for queuing requests for long periods of time (e.g. days),

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broadcasting requests to several processes, subcontracting work to other processes without remaining a middleman, and supporting brief or infrequent inter-process exchanges with minimal startup overhead.

8b

Error recovery and restart procedures are additional areas requiring significant attention.

8c

Acknowledgments

9

Many individuals within both ARC and the larger ARPANET community have contributed their time and ideas to DPS' design and shakedown.

9a

The work reported here was supported by the Advanced Research Projects Agency of the Department of Defense, and by the Rome Air Development Center of the Air Force.

9b

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10

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10a

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10b

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10c

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10d

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10e

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10f

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10g

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10h

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10i

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10j

First Draft of DPS Paper

(J26513) 19-SEP-75 18:50;;; Title: Author(s): James E. (Jim)
White/JEW; Distribution: /SRI-ARC([ACTION]) ; Sub-Collections:
SRI-ARC; Clerk: JEW; Origin: < JWHITE, DPSPAPER,NLS;2, >,
19-SEP-75 18:41 JEW ;;;;####;

26513 Distribution

N. Dean Meyer, James E. (Jim) White, Douglas C. Engelbart, Martin E. Hardy, J. D. Hopper, Charles H. Irby, Harvey G. Lehtman, James C. Norton, Jeffrey C. Peters, Dirk H. Van Nouhuys, Kenneth E. (Ken) Victor, Richard W. Watson, Don I. Andrews, Susan K. Ocken, Raphael Rom, David C. Smith, Mary Ann Kellan, Buddie J. Pine, Andy Poggio, David L. Retz, Laura J. Metzger, Karolyn J. Martin, Jan A. Cornish, Larry L. Garlick, Priscilla A. Wold, Pamela K. Allen, Delorse M. Brooks, Beverly Boli, Rita Hysmith, Log Augmentation, Joseph L. Ehardt, Raymond R. Panko, Susan Gail Roetter, Robert Louis Belleville, Rene C. Ochoa, Ann Weinberg, Adrian C. McGinnis, Robert S. Ratner, David S. Maynard, Robert N. Lieberman, Sandy L. Johnson, James H. Bair, Jeanne M. Leavitt, Rodney A. Bondurant, Jeanne M. Beck, Marcia L. Keeney, Elizabeth K. Michael, Jonathan B. Postel, Elizabeth J. Feinler, Kirk E. Kelley

Dialog Support

Just a note on (33510,) - A definition of Dialog Support. In the third TNLS course we spend some describing the concepts Journal and Dialog Support. A suggestion made by Jim Bair as to the content of this little discourse which I like goes as follows: Most professions have journals which are used to support dialogue between geographically distributed professionals. Every group of people with a common interest needs some method for "supporting" communications (dialogue), therefore we have a "journal" to aid our communications (support our dialogue). It just dawned on me that this is an analogy not a definition so it may not be of any real use to you but since I've taken time to type it I'll go ahead and send it...

1

Dialog Support

(J26514) 19-SEP-75 19:38;;; Title: Author(s): Susan Gail
Roetter/SGR; Distribution: /RA3Y([ACTION]) ; Sub=Collections:
SRI=ARC; Clerk: SGR;

26514 Distribution
Raymond R. Fanko,

Negative Feelings about the Journal

References (33496,)

Negative Feelings about the Journal

Do you think it would be worthwhile for someone to contact Ron Uhlig and try to get his feelings on what makes the journal "a pain in the neck to use"? Or have you asked him? --Susan

1

Negative Feelings about the Journal

(J26515) 19-SEP-75 19:43;;; Title: Author(s): Susan Gail
Roetter/SGR; Distribution: /RA3Y([ACTION]) ; Sub-Collections:
SRI=ARC; Clerk: SGR;

26515 Distribution
Raymond R. Panko,

Illegal Instruction Trap in Output Processor

i consistently get an illegal instruction trap when attempting to
output process the journal item 26464, --jon.

1

Illegal Instruction Trap in Output Processor

(J26516) 19-SEP-75 19:57;;; Title: Author(s): Jonathan B.
Postel/JBP; Distribution: /FEED([ACTION]) ; Sub-Collections:
SRI-ARC; Clerk: JBP;

26516 Distribution
Special Jhb Feedback,

Documentation Weekly Report

GLOSSARY printed; more xHelp,Base; COM version of '73-74 Final
Report; Word Processing Conference.

Documentation Weekly Report

Week ending 9/19/75

1

Bev

1a

This Week

1a1

Got the GLOSSARY back from SRI printing,

1a1a

Nursed SECRETARIAL FUNCTIONS GUIDE along through SRI printing,

1a1b

Completed first editing cycle on Xhelp, Base,

1a1c

Joined in discussion of funding issues with all of ARC,

1a1d

Began working on the last (1973-74) FINAL REPORT--the COM version, which I have unexpectedly inherited,

1a1e

Attended Word Processing Conference,

1a1f

Next Week

1a2

Complete proofing of '73-74 Final Report, Send off to DDSI for proofs,

1a2a

Start gathering together materials for the '74-75 Final Report,

1a2b

Check on progress of sec. func. guide,

1a2c

Discuss new documentation milestones with Dick, Jon,

1a2d

Begin second pass of Xhelp, Base,

1a2e

Kirk

1b

On vacation,

1b1

Documentation Weekly Report

(J26517) 19-SEP-75 20:21;;; Title: Author(s): Beverly Boli/BEV;
Distribution: /SRI-ARC([INFO-ONLY]) DIRT([INFO-ONLY]) ;
Sub-Collections: SRI-ARC DIRT; Clerk: BEV;

26517 Distribution

James C. Norton,
 N. Dean Meyer, James E. (Jim) White, Douglas C. Engelbart, Martin E.
 Hardy, J. D. Hopper, Charles H. Irby, Harvey G. Lehtman, James C.
 Norton, Jeffrey C. Peters, Dirk H. Van Nouhuys, Kenneth E. (Ken)
 Victor, Richard W. Watson, Don I. Andrews, Jonathan B. Postel,
 Priscilla A. Wold, Rita Hysmith, Pamela K. Allen, Delorse M. Brooks,
 Elizabeth F. Finney, Beverly Boli, Lawrence A. Crain, Kirk Sattley,
 Susan Gail Roetter, Robert N. Lieberman, Ann Weinberg, Kenneth E.
 (Ken) Victor, Douglas C. Engelbart, James H. Bair, Elizabeth K.
 Michael, Richard W. Watson, Elizabeth J. Feinler, Harvey G. Lehtman,
 Kirk E. Kelley, Laura E. Gould, Jeanne M. Beck, Dirk H. Van Nouhuys
 Susan K. Ocken, Raphael Rom, David C. Smith, Mary Ann Kellan, Buddie
 J. Pine, Andy Poggio, David L. Retz, Laura J. Metzger, Carolyn J.
 Martin, Jan A. Cornish, Larry L. Garlick, Priscilla A. Wold, Pamela
 K. Allen, Delorse M. Brooks, Beverly Boli, Rita Hysmith, Log
 Augmentation, Joseph L. Ehardt, Raymond R. Panko, Susan Gail Roetter,
 Robert Louis Belleville, Rene C. Ochoa, Ann Weinberg, Adrian C.
 McGinnis, Robert S. Ratner, David S. Maynard, Robert N. Lieberman,
 Sandy L. Johnson, James H. Bair, Jeanne M. Leavitt, Rodney A.
 Bondurant, Jeanne M. Beck, Marcia L. Keeney, Elizabeth K. Michael,
 Jonathan B. Postel, Elizabeth J. Feinler, Kirk E. Kelley

watson messages

3-SEP-75 20:33:29-EDT,1478;000000000000
 Mail from BBN-TENEXB rcvd at 3-SEP-75 2033-EDT
 Date: 3 SEP 1975 2031-EDT
 Sender: WATSON at BBN-TENEXB
 Subject: AKW System Framework
 From: WATSON at BBN-TENEXB
 To: irby at ISIC, JWHITE, POSTEL
 Cc: WATSON
 Message-ID: <[BBN-TENEXB]3-SEP-75 20:31:41-EDT,WATSON>

1

I had been counting on the NSW Protocols, WM FE to move in directions that we felt comfortable with to be the framework for the AKW also. Now it is not clear to me that protocols, WM will meet the needs I perceive and their evolution seems uncertain. Therefore I believe it is very important that we put together a proposal for what is really needed and obtain separate funding if possible to go off on our own as required. The proposal could be to design such a framework, covering interprocess communication, coherent file system etc. It would have to indicate direction we thought should go, problems with NSW, and rsexec requiring separate approach. Possible sources of funding for such a design are RADC, AMC, and NSA, possibly NSF. Since Jim White has to think about some of these issues for his DPS paper I would like him to coordinate an initial think piece covering broader area as well. I would like to have a meeting within next week to talk about this. It might even be good to have it this week with DCE there so he could talk to some people in Washington next week. Jim would you get together appropriate group and Doug say Friday? Dave Retz and Dave Smith should probably come, Dick -----

2

4-SEP-75 10:52:03-EDT,1273;000000000000
 Mail from SRI-AI rcvd at 4-SEP-75 1051-EDT
 Date: 4 SEP 1975 0750-PDT
 From: SRI-ARC at SRI-AI
 Subject: visit to mca
 To: irby at ISIC
 cc: watson at BBNB, postel at BBNB

3

Charles, when you talk with mca today, I think even if basic agreement is reached on the phone you should still definitely plan to visit there probably next week. I think it important to be physically there and to give a seminar on cml and begin dialog on their views of how to improve it, to begin to get them to identify with it as something they are influencing and is partly theirs. I would also like you to go over to BBN and be with shantz and find out generally what bbn is doing what they are thinking etc. Just being there will yield much more useful info than would come from a phone call. My view of DPS says that it offered the following capabilities, 1) data formats standards
 2) procedure call return facilities

Watson messages

3) ability to set up and manipulate cross host process strucutes
There were some additional features like data stores nsw wasn't using
that might someday be needed and the concept of packages that I do
not fully understand the implications of, 1 and 2 seem to be
surviving in some form, how is it that process get tied together in
new msg world? Dick -----

4

watson messages

(J26518) 19-SEP-75 20:30;;; Title: Author(s): Jonathan B.
Postel/JBP; Distribution: /JBP([INFO-ONLY]) ; Sub-Collections:
SRI=ARC; Clerk: JBP;

26518 Distribution
Jonathan B. Postel,

Trip Report, ETS and FT, Monmouth

ETS (2 mandays) Sept, 8-9

1

1. Persons (users or not) contacted [Use upper case if they have a directory]

1a

Blanche Mark (Statistical Analysis), Barbara PITCHER (Statistical Analysis), Greta Brown (GRE Programs), Bob ALTMAN (GRE Programs), Bill Nemceff (Educational Studies), Ellie Clemson (Opportunities for Women), Donna Penman (Law Programs), Marylou Panacek (ERIC),

1a1

2. COURSE: (Basic and Second Course Training)

1b

Everyone was present for Monday's session; This was the first NLS exposure for all those in the class except Bill Nemceff who had previously taken Basic and Second Course training. He had not used NLS however since taking these courses and attended for the review. Bob had received some basic instruction the prior week by Dave Potter.

1b1

We completed the entire Basic Course on Monday and we reviewed special procedures for BBNB users.

1b2

On Tuesday, the Second Course material was presented. Marylou Panacek was unable to attend and Bob Altman was in and out throughout the day.

1b3

4. APPLICATION (3 slots)

1c

NLS is currently being used at ETS for document production and correspondence, as an information management and retrieval tool. The specific current applications include use in maintaining bibliographic data and as an aid in developing questionnaires, rating scales, and other instruments.

1c1

Blanche Mark and Barbara Pitcher in Statistical Analysis will be using NLS on an experimental basis over the next few months. This group runs validity studies on various ETS designed tests. They periodically send out these studies to schools and colleges and anticipate using NLS in preparing such studies. Greta Brown and Bob Altman (both from GRE Programs) plan on using NLS for intraoffice communication and for proposal writing. Bill Nemceff works directly for Dave Potter and needs a general understanding of the system to help with some of his work as architect. Ellie Clemson in Opportunities for Women is working with Abby Harris on a bibliographic data base document. Donna Penman in Law Programs will be using NLS for minute writing and report drafts.

1c2

Trip Report, ETS and FT, Monmouth

5. ISSUES:

1d

Dave Potter was extremely helpful during my visit there. He appears to be going out of his way to help other ETS/NLS users,

1d1

Dave has recently purchased a new Termicette terminal which prints nicely on letterhead or computer paper. In his continuing efforts to aid NLS users, he has volunteered to print out any NLS documentation for ETS users on his own terminal.

1d1a

He seemed to think that some people at ETS would soon need Third Course training.

1d1b

Glossaries and Sample Sessions were requested by the new users.

1d1c

Ft. Monmouth (2 mandays) Sept.10-11

2

1. Persons (users or not) contacted [Use upper case if they have a directory]

2a

TOM DAMES, Steve Austin, both from FT, Monmouth and Dave GROBSTEIN (commander of Piccatty Arsenal)

2a1

2. COURSE: (Basic and Second Course Training)

2b

Monday was spent covering the Basic Course with the exception of the addressing section. Mr. Dames was forced to leave late in the afternoon. Steve and Dave remained so we could cover ways of sending edited files through sendmessage.

2b1

Tuesday we covered the Second Course in its entirety.

2b2

3. ASSISTANCE (other than formal course):

2c

After having completed the Basic Course on Monday, Steve and Dave remained so we could cover ways of sending edited files through sendmessage. We covered sendmessage using control b, and Dean Meyer's message program which now accepts both idents and directory names and is compatible with MSG.

2c1

4. APPLICATION (3 slots)

2d

The three men attending the class were the first of the AMC clients to receive any NLS training. They indicated that their on-line activity would be limited almost entirely (at least initially) to sendmessage and MSG. Their use of these programs however should be substantial.

2d1

Trip Report, ETS and FT, Monmouth

5. ISSUES:

2e

All three men appeared to appreciate some of Sendmail's capabilities, but felt it was at this time impractical for the AMC group due to the very limited exposure their personnel have had to NLS,

2e1

Dave Grobstein was interested in knowing what Jim Norton had decided concerning XED. Grobstein and Dames both seem to think that sendmessage and a simple text editing system like XED would best fit their needs,

2e2

The AMC people were particularly concerned about file security. We discussed file protection, showing and changing protection in both NLS and in TENEX, and the relationship between the two.

2e3

Subsequently we spent a good deal of time using Help. Dave Grobstein felt it was particularly annoying when choosing a number from a menu item explanation list, seeing it print out, but then being unable to immediately select another item number from the same menu list. Dave Potter at ETS also expressed concern over this limitation.

2e4

Trip Report, ETS and FT, Monmouth

(J26519) 19-SEP-75 20:55;;; Title: Author(s): Priscilla A.
Wold/PAW2; Distribution: /JCN([ACTION]) DCE([INFO-ONLY]) RLL([
INFO-ONLY]) US([INFO-ONLY]) ; Sub-Collections: SRI=ARC US; Clerk:
PAW2;

26519 Distribution

James C. Norton, Douglas C. Engelbart, Robert N. Lieberman, Susan
Gail Roetter, Priscilla A. Wold, Jeanne M. Beck, Pamela K. Allen,
Rita Hysmith, Sandy L. Johnson,

Gunter report for week ending 9/21/75

The Week Ending 9/21/75

66-1

Pete and Lynne continued to run the rewrite.,this week it was volume X11. Joann and Grace did most of the editing and Pete the formatting. All the rewriting was finished that had been planned, but the final copies were not able to be run before the writers had to leave. This was due to the fact that the PDP11 was down since they were trying to hook it up to the B4700. Copies were printed on Saturday afternoon and will be mailed first thing Monday morning,

PR

All of the two volumes (except for two tables) has been loaded. The writers have copies and are marking their edits. Lynne Simms will run the editing inputs. It is projected that all the editing will be finished by September 30,

Format

A meeting was held with Standards and the new format was discussed. A complete description of the format was generated and a letter was issued declaring that either this new standard or the standard used in 66-1 will be the standard format for all documents to be maintained using NLS,

Future Plans

The schedule for 66-1 is a follows:

Volumes I and II will be formatted this next week and final camera ready proofs will be mailed to Washington by Friday,

Volume 6 will be mailed to Washington by Friday October 3,

Volume 12 will be mailed to Washington as soon as possible after that,

PR: The editing of the PR documents will take place next week. The final copy of the document is due in quality control on October 14. The format must be developed and run on these files before they are printed out,

Training: There will be additional training either the first or third week in October. Discussions will be held with Susan to finalize these plans,

Gunter report for week ending 9/21/75

Wumpus: I must go because I am due At Col. Brunner's home to
teach him how to play Wumpus as home..bye

1d4

Gunter report for week ending 9/21/75

(J26520) 20-SEP-75 16:35;;; Title: Author(s): Ann Weinberg/POOH;
Distribution: /SRI-ARC([INFO-ONLY]) ; Sub-Collections: SRI-ARC;
Clerk: POOH;

26520 Distribution

N. Dean Meyer, James E. (Jim) White, Douglas C. Engelbart, Martin E. Hardy, J. D. Hopper, Charles H. Irby, Harvey G. Lehtman, James C. Norton, Jeffrey C. Peters, Dirk H. Van Nouhuys, Kenneth E. (Ken) Victor, Richard W. Watson, Don I. Andrews, Susan K. Ocken, Raphael Rom, David C. Smith, Mary Ann Kellan, Buddie J. Pine, Andy Poggio, David L. Retz, Laura J. Metzger, Karolyn J. Martin, Jan A. Cornish, Larry L. Garlick, Priscilla A. Wold, Pamela K. Allen, Delorse M. Brooks, Beverly Boli, Rita Hysmith, Log Augmentation, Joseph L. Ehardt, Raymond R. Panko, Susan Gail Roetter, Robert Louis Belleville, Rene C. Ochoa, Ann Weinberg, Adrian C. McGinnis, Robert S. Ratner, David S. Maynard, Robert N. Lieberman, Sandy L. Johnson, James H. Bair, Jeanne M. Leavitt, Rodney A. Bondurant, Jeanne M. Beck, Marcia L. Keeney, Elizabeth K. Michael, Jonathan B. Postel, Elizabeth J. Feinler, Kirk E. Kelley

Do you want to see Word Processing Report?

ARC has a subscription to Word Processing Report that has ATTN: me.
If you're interested in seeing it when it arrives, let me know and I
will start routing it to all interested people.

1

Do you want to see Word Processing Report?

(J26521) 20-SEP-75 19:56;;; Title: Author(s): Susan Gail
Roetter/SGR; Distribution: /SRI-ARC([ACTION]) ; Sub-Collections:
SRI-ARC; Clerk: SGR;

26521 Distribution

N. Dean Meyer, James E. (Jim) White, Douglas C. Engelbart, Martin E. Hardy, J. D. Hopper, Charles H. Irby, Harvey G. Lehtman, James C. Norton, Jeffrey C. Peters, Dirk H. Van Nouhuys, Kenneth E. (Ken) Victor, Richard W. Watson, Don I. Andrews, Susan K. Ocken, Raphael Rom, David C. Smith, Mary Ann Kellan, Buddie J. Pine, Andy Poggio, David L. Retz, Laura J. Metzger, Karolyn J. Martin, Jan A. Cornish, Larry L. Garlick, Priscilla A. Wold, Pamela K. Allen, Delorse M. Brooks, Beverly Boli, Rita Hysmith, Log Augmentation, Joseph L. Ehardt, Raymond R. Panko, Susan Gail Roetter, Robert Louis Belleville, Rene C. Ochoa, Ann Weinberg, Adrian C. McGinnis, Robert S. Ratner, David S. Maynard, Robert N. Lieberman, Sandy L. Johnson, James H. Bair, Jeanne M. Leavitt, Rodney A. Bondurant, Jeanne M. Beck, Marcia L. Keeney, Elizabeth K. Michael, Jonathan B. Postel, Elizabeth J. Feinler, Kirk E. Kelley

Library - Possible approach for space

The shelves in the conference room are about to overflow with the hardcopy journal and a new arrangement will have to be made. I offer the following as a keep or toss solution to the problem: Move the 'Office-1' set (red binders) of the journal to the shelves near the refrigerator. Move all the stuff currently on these shelves to the NIC room where we will weed out as time and funds permits (much of it is ancient history). Discontinue keeping a second set of the journal for Doug (he has suggested this, but may have second thoughts). Put the black binders with NLS code on the side shelves on wall opposite the refrigerator (or somewhere handy in that area). Put useful books on one or two shelves. Put a reasonable sized table (there is one in the hall for tow-away now) with some chairs so that the big notebooks can be spread out. Add a decent reading light. This puts the most used reference information in a place that is most readily accessible to all, cuts down on scattering and maintenance. The shelves in the conference room could be used to house NLS documentation of which there is getting to be a sizable amount. Since training is often done in the conference room, documentation would be right at hand there.

Library - Possible approach for space

(J26522) 22-SEP-75 10:42;;; Title: Author(s): Elizabeth J.
Feinler/JAKE; Distribution: /SRI-ARC([INFO-ONLY]) ; Sub-Collections:
SRI-ARC; Clerk: JAKE;

26522 Distribution

N. Dean Meyer, James E. (Jim) White, Douglas C. Engelbart, Martin E. Hardy, J. D. Hopper, Charles H. Irby, Harvey G. Lehtman, James C. Norton, Jeffrey C. Peters, Dirk H. Van Nouhuys, Kenneth E. (Ken) Victor, Richard W. Watson, Don I. Andrews, Susan K. Ocken, Raphael Rom, David C. Smith, Mary Ann Kellan, Buddie J. Pine, Andy Poggio, David L. Retz, Laura J. Metzger, Karolyn J. Martin, Jan A. Cornish, Larry L. Garlick, Priscilla A. Wold, Pamela K. Allen, Delorse M. Brooks, Beverly Boli, Rita Hysmith, Log Augmentation, Joseph L. Ehardt, Raymond R. Panko, Susan Gail Roetter, Robert Louis Belleville, Rene C. Ochoa, Ann Weinberg, Adrian C. McGinnis, Robert S. Ratner, David S. Maynard, Robert N. Lieberman, Sandy L. Johnson, James H. Bair, Jeanne M. Leavitt, Rodney A. Bondurant, Jeanne M. Beck, Marcia L. Keeney, Elizabeth K. Michael, Jonathan B. Postel, Elizabeth J. Feinler, Kirk E. Kelley