DECUS U.S. CHAPTER SIGs NEWSLETTERS

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QUESTIONNAIRE SECTION

JOIN THE WISE

THE RELIGION OF DATABASE MODEL

Mark S. Crego

Abstract

Somewhere in my past I recall being instructed that there are two taboos that you must never discuss in a business environment, politics and religion. However, I note that when database management systems are discussed, the topic of model invariably is debated in a manner not unlike a heated religious argument. On one hand, you have the "Old Religion", the adherents to the CODASYL Network model, who claim performance and integrity as the tenets of their religion. On the other, there are the relational disciples of E.F. Codd, who, by their adherence to his 12 commandments, claim flexibility and elegance of data structure.

The purpose of this brief article is to open up the discussion to readers of this DECUS SIG Newsletter, and to try to bring some sanity and objectivity to the debate. As the first article in a series, some basic evaluation concepts will be proposed.

The Concept of Application Suitability

In debating the concept of database model, the notion of whether a particular data model is suitable for an application is often lost in the rhetoric. While it is fundamentally true that certain models and hence database management systems can implement virtually any data structure, it is not necessarily the case that they do so in the "best" manner for any application.

From a statistical point of view, it has been my observation that less than 5% of data on VAX computers is stored in formal databases, even at those sites where database management is fully understood and facilitated using a DBMS. Although this is not a bullet-proof justification for non-use of a DBMS, it does say that either the database concept is not yet fully accepted by all developers or it is simply not suitable for the vast majority of applications.

For the minority of data that resides in formal databases, it will be found that sites using relational products far outnumber those using their network competitors. Does this tell us that the relational model is "better"? For some reason I get the feeling that the notion of "better" is really a religious issue and not tangible or objective enough to constitute a reasonable criteria. In lieu of this, I suggest that the differing models are not "better" or "worse" but rather "more suitable" or "less suitable" for a particular application. The key, therefore, is to determine the requirements of the application with no preconceived notion of DBMS model, then to evaluate the various alternatives as to their compliance to the requirements.

The Concept of Performance

Recently I read an article by Codd which evaluated "Non-Stop SQL", a product which is based in a Tandem environment that can achieve, with some very specific hardware configurations, a transaction rate of 200 to 300 transactions per second. What was disappointing about the article was that this prophet of the relational sect heralded that this "proves" that the relational model has overthrown the "alleged performance advantages" of the network model, and in so doing has silenced those who oppose his point of view.

In effect, Codd has placed the notion of performance into the category of topics we file under "religion". Although the phrase "performs well" is marginally more objective than "better", it is helpful to define what performance implies. For those of us with standard computer configurations, such as VAX's, and with standard disk drives (note that disk technology has had no major "order of magnitude" speed/performance breakthroughs in the past 10 years), the concept of performance is may be defined in two essential forms: How long does it take to perform a "typical" transaction, and how many "typical" transactions can be processed per second. In the latter case, it will be possible to achieve more transactions per second than would be possible under the formula 1/typical_transaction_time due to facilitating multiple concurrent accesses to the database.

The problem with this definition of performance is defining what the "typical" transaction involves. Although there are some fairly standard benchmarks that attempt to qualify the "typical" transaction, it really depends completely on the application in question.

The Concept of Independence

The article by Codd which highlighted a specific hardware configuration that would achieve high transaction performance represents a serious problem to those of us that require standard computer configurations. The concept of independence in this context implies that the we must evaluate the DBMS on its merits alone, without requiring additional hardware in the form of a specialized CPU or database machine.

The Concept of Integrity

That the majority of information on VAX's lies in RMS files and not databases is a strong argument that transaction-level integrity is not recognized as a significant factor for most applications, for it is integrity that is the most distinguishing factor of a DBMS. In general terms, there is great similarity between the features of integrity offered in the various models, such as maintaining a journal of transactions, ensuring that a transaction is completed before making a permanent change to the data.

Nevertheless, there are notions of integrity that are relevant to the model chosen. These issues have to do with how, when a record (or relation) is added, updated, or deleted, that all other relevant records or relations in the database are added, updated, or deleted. Since the network model implements explicit links to the related records and the relational does not, there are clear implications to how you "tie-in" those related records or relations. Note, however, that the manner in which records or relations are related or joined to each other is highly application specific.

The Concept of Flexibility

For anyone who has had to change a network schema, and unload/reload a network database, the concept of inflexibility *takes* on new meaning. As a result, this apparent weakness in the network model in flexibility has become a major point of argument in the model debate.

In this case, the volatility of the application, its tendency to change is a most relevant factor. Although the relational model is designed around the possibility of change and accommodates changes well, it does so at the expense of speed of access and update. Whether this is relevant depends largely upon schema design and application requirements.

The Concept of Tools

Many decisions to purchase a DBMS lie not in the merits of the model but rather in the capabilities for application development and ad-hoc query/reporting that the product offers. This then becomes analogous to adhering to a religion for some obscure tenet that seems pleasing to you, rather than looking at the whole body of doctrine.

It is generally the case that the relational products in the VAX environment offer a wider variety of tools. For example, when DEC announced its COBOL Code Generator, the DBMS with which it interfaced was Rdb/VMS and not VAX DBMS (Rdb is relational and VAX DBMS is CODASYL-compliant network). Oracle, Ingres, and now Rdb all embody SQL, a standard for query languages. Oracle and Ingres have both implemented forms of distributed DBMS. It should be noted that these capabilities are not so inherent to the model as they are to the funding and marketing efforts of their respective vendors.

Still, in order to make a rational decision for a DBMS, the concept of tools is relevant, but only in light of the requirements of the application. The objective should be to determine what tools are essential, then to find those tools — they need not in every case be integrated with the DBMS.

Summary

This brief treatise has attempted to isolate some concepts that can render objectivity to the religion of database models. In every case, the argument must be focused upon the requirements and characteristics of the application under evaluation and not upon model-specific dogma.

Contributions

Submissions to this newsletter are constantly sought. A submission can be an article, a letter to the Wombat Wizard, a technical tip, or anything of interest to people using or considering the use of Datatrieve or any 4GL product. Submissions on magnetic media are preferred but almost any type will be considered.

Contributions for the newsletter can be sent to either of the following addresses:

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About the Cover

Bart Lederman's Wombat is taking refuge from the August heat in the kiddie pool.

Chairman's Corner

Joseph Gallagher, 4GL Solutions, Kansas City, MO

Those of you who were not in Nashville missed one the best and most successful symposium that DECUS has had. The facilities at Opryland were outstanding: southern hospitality made everyone feel delighted to attend. A larger than anticipated attendance assured financial success for the 1987 DECUS budget.

There was much more diverse material presented at sessions sponsored by the DTR/4GL SIG at this symposium than in the past. The expansion of our activities into the Digital and non-Digital 4GL areas are becoming more evident.

There have been many changes in the DTR/4GL Steering Committee. Mary Ann Fitzhugh is our new Counterpart for DATATRIEVE and the Digital 4GL Products. Mary Ann is the former counterpart to the OA SIG. We are looking forward to productive interactions with her.

The Powerhouse Working Group had several successful presentations and meetings at the Nashville Symposium. Randall Barth, the Powerhouse Working Group Chair chosen at the San Francisco, now works for DEC: Fred Vietri of TSO Financial Corp. has agreed to serve as Powerhouse Working Group Chair.

At a Smartstar Birds-of-a-Feather sessions at Nashville, a Smartstar Working Group was formed. Leslie Byars of Corning Electronics has agreed to serve as Working Group Chair.

The Accent-R User's Group met during the Nashville Symposium. That group has its own organization independent of DECUS. However, Winston Tellis of Fairfield University, the Chair of the Accent-R User's Group, has agreed to act as liaison with the DTR/4GL SIG.

Pat Scopelliti of Corning Glass Works and Lorey B. Kimmel of Thomson-CGR Medical Corporation are now Associate Newsletter Editors. We look forwarding to seeing their contributions to the Wombat Examiner and 4GL Dispatch.

Enjoy the hot summer, but try to stay cool.

Wombat Wizard

Philip A. Naecker, Consulting Software Engineer, Altadena, California

Greetings oh Great Wizard:

I have what is a relatively simple problem to solve in FORTRAN. but appears to be quite difficult in DATATRIEVE. I want to select records. from an indexed file. which satisfy exactly five of a possible six selection criteria. Then I want to use the report writer to print out specific information contained in the selected records.

For example. assume the record definition looks like:

```
        .
        .
        .
03      CRITERIA.
        05      CRITERIA_A      PIC X.
        05      CRITERIA_B      PIC X.
        05      CRITERIA_C      PIC X.
        05      CRITERIA_D      PIC X.
        05      CRITERIA_E      PIC X.
        05      CRITERIA_F      PIC X.
        .
        .
        .
```

Assume the fields contain either an ASCII blank or some character. If I want the selected records which contain exactly five non-blank conditions. there are five valid combinations:

```
ABCDE
ABCD F
ABC EF
AB DEF
A CDEF
 BCDEF
```

This combination can be searched for with a rather specific Record Selection Expression.

But this is a specific example of a rather general condition. It becomes much more complicated if each field contains several valid criteria ("W"."Z". and "X") and several invalid criteria ("G"."D". and "Q") which can be mixed and matched to produce the ultimate valid combination.

Any suggestions on how to solve this problem? Thanks a bunch for your help.

Thomas F. Glowacki

Dear Tom: - You don't want much. do you? Just a general solution. huh? Well. let's see what we can do.

First. I'm a little unclear on your exact needs. I assume your reference to an indexed file is because CRITERIA (the 03 level in the record definition above) is a key in the file. Of course. if other fields are keys it doesn't matter to DTR that the file is indexed. However. since you may not have indexed the file

on CRITERIA, let's first talk about some solutions to that simpler case (with the file sequential on CRITERIA).

One thing I would suggest would be a few computed-by variables and some simple arithmetic operations to simplify the logic of the situation. Consider the following:

```
DECLARE CRITERIA_A_VALUE COMPUTED BY
        CHOICE
                CRITERIA_A EQ "W","Z","X" THEN 1
                ELSE 0
        END_CHOICE.
(do the same thing for CRITERIA_B through CRITERIA_F)

DECLARE CRITERIA_SUM COMPUTED BY
        (CRITERIA_A_VALUE + CRITERIA_B_VALUE + CRITERIA_C_VALUE +
         CRITERIA_D_VALUE + CRITERIA_E_VALUE + CRITERIA_F_VALUE)
```

Then you could do an RSE with a selection criterion like:

<div align="center">...WITH CRITERIA_SUM EQ 5</div>

That would make your code much more maintainable and readable. Of course, you could also play games with the COMPUTED BY clauses to make some values "more valid" than others, or to make some "less valid". For example, you might make CRITERIA_B work like this:

```
DECLARE CRITERIA_B_VALUE COMPUTED BY
        CHOICE
                CRITERIA_B EQ "W","Z","X" THEN 1
                CRITERIA_B EQ "Q" THEN -5  ! To eliminate any with Q
                ELSE 0
        END_CHOICE.
```

By the way, if you are trying to find out if AT LEAST ONE criterion contains a particular value, you have two simple ways (as well as one hard way using the explicit tests on every field). The first simple way is a little trick the Wiz picked up at the last Wombat Magic at DECUS. (This one was a winner by the way!)

<div align="center">...WITH " " EQ CRITERIA_A, CRITERIA_B, CRITERIA_C, ...</div>

Note that the usual order for the Boolean has been reversed, with the constant value on the left (in this case, the quoted space) and the variables from the record on the right (CRITERIA_A, etc.). The advantage here is that you have a single Boolean expression that will evaluate to true if ANY of the CRITERIA_x equal to " ". This is much simpler (and possibly clearer) than:

```
...WITH CRITERIA_A EQ " " OR
        CRITERIA_B EQ " " OR
        .
        .
        .
```

Another way to handle this will make SIG Chair Joe Gallagher happy - use an Inner List. Consider this revised record definition:

```
03 CRITERIA.
    05      CRITERIA_A     PIC X.
    ...
03 CRITERIA_STRUCTURE REDEFINES CRITERIA.
    04      CRITERIA_LIST OCCURS 5 TIMES.
        05 CRITERION      PIC X.
    ...
```

This structure would allow the RSE's of the form:

...WITH ANY CRITERIA_LIST WITH CRITERION EQ " "

You could also accomplish the counting function you desired with an RSE like the one in the following REPORT statement.

```
REPORT my_domain WITH
    (COUNT OF CRITERIA_LIST WITH CRITERION EQ " ") EQ 5
        report statements go here
END_REPORT
```

Alas. I suspect that none of these solutions is adequate for your needs because you apparently want to use the CRITERIA field as a key. If you were to do this in a 3GL like FORTRAN or COBOL. you would create a series of match keys (each of your ABCDEF combinations) and do a READ using that each of those key values in turn. This would involve an outer loop in your program. each pass through the loop changing a different byte in the match key. Note. however. that even in a 3GL you would have to construct a key for each valid case. since you cannot use RMS key lookups on just certain bytes in the field (that is. you can't do a partial key lookup except in the trivial case where the part of the key of interest is the first (leftmost) part of the key). Also. you can't do complex index selections in RMS files. although some database systems have some capability to select records based upon only their index values (such as Rdb/VMS) or by doing a bit-mapped index operation (such as Interbase from Interbase Software Corporation).

I suggest that you do the same thing in Datatrieve that you would in a 3GL: construct the keys that make up the "valid" cases then instruct RMS to look up the records for each of these cases in turn. In Datatrieve. the easiest way to do this is to construct a domain with all of the valid values. You can populate or modify this domain on the fly if you like. Then use a FOR loop on this domain and a FOR (or REPORT) loop on your original domain to locate the records of interest. For example:

```
DEFINE DOMAIN INTERESTING_KEYS USING INTERESTING_KEY ON INTERESTING_KEYS.DAT;

DEFINE RECORD INTERESTING_KEY USING
01 DATA.
    03  CRITERIA.
        05      CRITERIA_A      PIC X.
        05      CRITERIA_B      PIC X.
        05      CRITERIA_C      PIC X.
        05      CRITERIA_D      PIC X.
        05      CRITERIA_E      PIC X.
        05      CRITERIA_F      PIC X.
    03  OTHER_STUFF.
        05      GROUP           USAGE WORD.
        05      CATEGORY        USAGE WORD.
;

DEFINE FILE FOR INTERESTING_KEYS KEY=CRITERIA(UP);

DEFINE TABLE CRITERIA_GROUP USING INTERESTING_KEYS
        CRITERIA : GROUP
        ELSE 0
END_TABLE;
```

The procedure with your report might then look like this:

```
FOR I IN INTERESTING_KEYS BEGIN
        REPORT M IN my_domain WITH CRITERIA EQ I.CRITERIA
                report statements go here
        END_REPORT
END
```

This approach will produce a different report file for each report; that is, one report for each key value. If you want to have all of these reports concatenated together, you could then use an FN$DCL statement to APPEND the reports into a single file. The report file will be empty for those records in INTERESTING_KEYS that have no match.

You can get a single report file using a CROSS instead of the FOR loop and the implied FOR in the REPORT statement:

```
REPORT I IN INTERESTING_KEYS CROSS M IN my_domain OVER CRITERIA
        report statements go here
END_REPORT
```

You can also limit the CROSS to certain records in INTERESTING_KEYS, using the GROUP and CATEGORY fields. For example:

```
REPORT I IN INTERESTING_KEYS CROSS M IN my_domain OVER CRITERIA WITH
    I.GROUP EQ 5 OR I.CATEGORY EQ 39
        report statements go here
END_REPORT
```

Note that the order of the two domains in the cross is important - if you want to use the index in my_domain it must follow INTERESTING_KEYS. You can also use the virtual variables I defined before to select the records of interest from INTERESTING_KEYS:

```
REPORT I IN INTERESTING_KEYS CROSS M IN my_domain OVER CRITERIA WITH
    I.CRITERIA_SUM EQ 5
        report statements go here
END_REPORT
```

Note that CRITERIA_SUM is qualified to point to the INTERESTING_KEYS domain, although it doesn't really matter in this particular case.

If you don't need to use the index in your domain but you like the flexibility provided by the INTERESTING_KEYS domain, then you might want to use the following approach:

```
! To get all the records belonging to criteria-group 3
REPORT my_domain WITH CRITERIA VIA CRITERIA_GROUP EQ 3
        report statements
END_REPORT
```

If, for some reason, you can't use the CROSS or nested-FOR loop approaches I've outlined here, then you really only have one more solution using Datatrieve: Callable DTR. Using Callable, I can think of another five or six ways to approach the problem. However, my favorite is also the most flexible and probably the least used; in fact, I don't know of anyone besides myself who has applied this technique. Callable DTR has a little-known feature which allows the callable program to start up to five different Datatrieve sessions simultaneously. Each session gets it's own DAB (Datatrieve Access Block), so it really is five separate DTR sessions under the control of a single program. In this case, we will only need two sessions: one for record selection and one for reporting.

The basic model is as follows. Start up two DTR streams by making two calls to DTR$INIT with different DAB addresses. In the first stream, start a REPORT statement running with it's input coming from a PORT (a port is a communication device between the program and DTR). Once you have the REPORT statement running, it will keep asking (stalling) for records until you send it a PORT_EOF (end of file). In the second stream, start up as many FOR loops as you need to select the records of interest. The records can come from different sources, have different RSE's on the same source, be in different orders, or in general have any characteristics you want. Take the records from these diverse record streams and shove them BACK INTO Datatrieve, into the first record stream - the one that is asking for input! Once you have given it all the data you want to report on, send the port an EOF, and Voila! - a report will be created! The report can have any sort order you desire, the report statement can apply different selection criteria, and in general there are no limitations on the REPORT statement itself.

Actually, it's just about as simple to write as it is to explain. If you have a report that is to be created from a complicated series of record streams, then this is just the ticket for you.

Good luck!

The Wombat Wizard

Wombat Magic - Spring DECUS U.S. Symposium, Nashville, TN

Edited by: Steven Cordiviola, Kentucky Geological Survey, Lexington, KY

This article is the presentations from the WOMBAT MAGIC session held during the 1987 Spring DECUS Symposium. The pieces of magic were transcribed from the presenter's transparencies and from a transcription of the audio tape. Unfortunately, we were not able to salvage all the material, nor was it possible to catch the "atmosphere" of the session. There is always something special about Wombat Magic and this session was no exception.

The editor apologizes to any authors who's names are misspelled or affiliations are wrong or missing. My thanks to MS. Shirley Dawson, who keyboarded the transparencies.

Douglas Cropper, DATATRIEVE Developer, Digital Equipment Corporation

Doug wanted a quick way to compute car payments...

```
DEFINE PROCEDURE MORTGAGE
     DECLARE APR USAGE REAL
          EDIT_STRING IS Z(2)9V99.
     DECLARE BALANCE USAGE REAL
          EDIT_STRING IS Z(9)9V99.
     DECLARE TERM USAGE INTEGER
          EDIT_STRING IS Z9.
     DECLARE PERIODS COMPUTED BY TERM * 12.
     DECLARE IPP COMPUTED BY APR/1200.
     DECLARE POWER USAGE REAL.
     DECLARE MONTHLY COMPUTED BY
          ((IPP*BALANCE)/(1- (1/POWER))).
     DECLARE TOTALPI COMPUTED BY MONTHLY * PERIODS.
     DECLARE TOTALI COMPUTED BY TOTALPI - BALANCE.

          APR = 13.5;
          BALANCE = 50000;
```

```
            TERM = 30;

      APR = *."annual percentage rate <13.5>"

      WHILE APR NE 0
            BEGIN
                  BALANCE =     *."the mortgage amount <50000>"
                  TERM    =     *."the length of the loan <30>"

                  POWER = IPP+1

                  REPEAT PERIODS - 1              ! EDITORS NOTE:   The
                        BEGIN                     ! FN$POWER function
                           POWER = POWER * (IPP+1)  ! can replace this
                        END                       ! portion of code.

                  PRINT SKIP 4,"Term is ",FORMAT (TERM) USING Z9,"years"
                  PRINT "Annual percentage rate is ", FORMAT(APR)
                                                USING Z9V99 , "%"
                  PRINT "Monthly payment is " ,FORMAT (MONTHLY) USING
                                                $(5)V99
                  PRINT "PRINCIPAL IS ",FORMAT (BALANCE) USING
                                                $(9)V99
                  PRINT "Total interest is ",FORMAT (TOTALI) USING
                                                $(9)V99

                  APR = 13.5;
                  APR = *."annual % rate, use 0 to exit <13.5>"
                  BALANCE = 50000;
                  TERM = 30;
            END
END-PROCEDURE


DTR> :MORTGAGE
Enter annual percentage rate <13.5>: 9.5
Enter the mortgage amount <50000>: 75000
Enter the length of the loan <30>: 30


Term is 30 years
Annual percentage rate is  9.50 %
Monthly payment is  $630.64
Principal  is   $75000.00
Total interest is    $152030.54

Enter annual percentage rate, use 0 to exit <13.5>: 9.0
Enter the mortgage amount <50000>:  13000
Enter the length of the loan <30>: 5


Term is  5  years
Annual percentage rate is  9.00 %
Monthly payment is  $269.86
Principal is    $13000.00
Total interest is     $3191.42

Enter annual percentage rate, use 0 to exit <13.5>: 0
DTR>                              DTR-8
```

Herb Reines, Reznick, Fedder & Silverman, Bethesda, Md.

w/Help from: Joe Gallagher, Doug Cropper, and Tom Considine

Problem:

Some users need to be restricted from editing CDD definitions in DTR.

Solution (one of many I'm sure):

```
$ define DTR$EDIT "There"
```

(Placed in the login file or even at the syslogin level)

Then:

```
$ DTR32

DTR> edit yachts
There is not a valid editor within VAX DATATRIEVE
```

Fred Van Itallia, DuPont

Test for Success

Fred had a problem in batch jobs to convert dates, which were stored as text strings, to DATATRIEVE DATES. For example, a text file contains a date in the form "13-1-87" and a user wishes to enter that data into a domain via a BATCH job, DATATRIEVE will choke. The user has no way to tell if the DATATRIEVE procedure died before processing all the records. The batch job will just continue with the next command. Fred's solution is to put a PRINT "SUCCESS" on filespec statement in the DATATRIEVE procedure which will execute only if no errors are encountered. Then he uses DCL commands to see if the file contains "SUCCESS" before executing the rest of the batch job....

In the BATCH command file...

```
$ ON ERROR THEN GOTO ERROR_MSG

$ DTR
:procedure_name

$!  MORE COMPLEX PROCESSING
$ IF F$SEARCH("TMP.LIS") .EQS. "" THEN GOTO ERROR_MSG
$ EXIT
$ ERROR_MSG:
$!     WHAT EVER YOU WANT THE PROCEDURE TO DO...
$ EXIT
```

In the DATATRIEVE procedure the code might look like this..

```
        READY DATE_CONV_DOM MODIFY
        FOR DATE_CONV_DOM
        MODIFY USING DATE = FN$DATE(DATE_TXT)
        PRINT "SUCCESS" ON TMP.LIS
        EXIT
```

If an error occurs during the FOR statement, DATATRIEVE will exit the procedure before it executes the PRINT statement. Thus the word "SUCCESS" will not be written to the file TMP.LIS.

Bart Z. Lederman, ITT World Communications

How can you get the average of 2 dates, for example to find the midpoint of a project...

PRINT ("12-APR-1987" & "14-APR-1987")/2

...this DOES NOT WORK because you can't divide dates. If you create a record definition (or computed by fields) similar to these:

```
RECORD DATE_REC.
     01 DATE_RECORD.
     10 DATES.
        20 BDATE USAGE DATE.
        20 EDATE USAGE DATE.

     10 QUADS REDEFINES DATES.
        20 BQUAD USAGE QUAD.
        20 EQUAD USAGE QUAD.

     10 MDATE COMPUTED BY
        (BQUAD & EQUAD)/2
           EDIT_STRING DD-MMM-YYYY.

     10 MTIME COMPUTED BY
        FN$TIME(MDATE)
;
```

Now you can use these filed to print the correct dates...

```
DTR>        PRINT BDATE,EDATE,MDATE,MTIME OF rse..
BDATE              EDATE             MDATE            MTIME
12-APR-1987        14-APR-1987       13-APR-1987      00:00:00.00
12-APR-1987        15-APR-1987       13-APR-1987      12:00:00.
```

Tom Fournier

"Waltzing Matilda"

Tom wanted a quick and dirty way to find out the number of characters in a string (apparently his system manager did not link in the function FN$STR_LEN available on the DTR/4GL SIG tape- ed.). The magic involves concatenating unique characters to the string of interest then using the DATATRIEVE supplied function FN$STR_LOC. Tom uses 2 tildes as a unique string....

```
     DECLARE IN_STRING PIC  x (80).
     DECLARE SIZE PIC 99.
                 .
                 .
                 .

     SIZE = FN$STR_LOC(IN_STRING|||'~~', ' ~~')-1
```

A second piece of magic shows that there is more than one way to approach a problem. In this case, Tom wanted to exclude fields in a record which were equal to 0...

```
     DEFINE RECORD STUFF_REC USING
        01 REC.

        05 NUMBER-1               PIC 99.
```

```
          05 NUMBER-2            PIC 99.
          05 NUMBER-3            PIC 99.
          05 ...
;
```

the most common solution would be an RSE similar to:

```
          FOR ALL STUFF WITH NUMBER-1 = 0 OR
                              NUMBER-2 = 0 OR NUMBER-3 = 0 BEGIN
                              etc...
```

Tom's solution. thus magic is to reverse the order:

```
          FOR ALL STUFF WITH 0 = NUMBER_1, NUMBER_2, NUMBER_3 BEGIN...
```

Lorey Kimmel

(Editors note: Lorey presented her magic at DECUS. but was kind enough to send me the text which explains very clearly what she presented.)

Following is a simple Menu procedure you can use to present menus to users. By using Tables as the basis for the menu. it is very easy to add/delete/modify what is presented on the menu.

I have also included a "sample" table. and a command procedure that can be used to execute the Datatrieve Procedure MENU from DCL. as well as print any type DTR files created by the user while in Datatrieve. If you consistently create all output report files with a type of .DTR. this procedure will print them once the user exits Datatrieve.

Each section will be explained.

MENU is the Datatrieve Procedure used to display a menu and execute a Datatrieve Procedure based on what the user enters.

```
PROCEDURE MENU
SET DICTIONARY menu_dictionary          !for ease in "controlling" the
                                        environment,  I have placed all
                                        "completed" procedures in one
                                        dictionary

DECLARE CH PIC 9(2).                    !CH is used to calculate which
                                        item from the table to be
                                        displayed

DECLARE STOP PIC 99.                    !STOP is computed to determine
                                        when to STOP the WHILE statement
                                        which  determines how many items
                                        will be displayed

DECLARE STOP COMPUTED BY
"TT" VIA USER_TABLE.                     !TT is defined in the table, (See
                                        below)

DECLARE SEL PIC XX.                     !SEL is used to input the user's
                                        SELection from the menu items
                                        displayed

CH = 001                                !CH starts at 1, the first entry
```

```
                                        of the table

FN$WIDTH(80)                            !Make sure screen is clear, and
                                        set to 80  characters for display
                                        of the menu


PRINT "Datatrieve Menu",SKIP

!The following BEGIN-END loop actually displays the menu. By using the
!FN$INIT combined with FN$STR_EXTRACT functions, you are assured the
!right table are displayed in the proper format. By incrementing CH by
!1 (CH = CH + 1) succeeding entries are displayed

WHILE CH LE FN$NINT(STOP)
    BEGIN
        CHOICE
            CH < 10 THEN
                PRINT FN$NINT(FN$STR_EXTRACT(CH,1,2))(-),
                    SPACE 1, FN$STR_EXTRACT("0"|CH,1,2) VIA
                    USER_TABLE
            CH > 9 THEN
                PRINT FN$NINT(FN$STR_EXTRACT(CH,1,2))(-),
                    SPACE 1, FN$STR_EXTRACT(CH,1,2) VIA
                        USER_TABLE
            ELSE PRINT "Invalid Choice"
        END_CHOICE
        CH = CH + 1
    END

PRINT SKIP, "          99 Exit Menu"

SEL = *.'Selection'                     !Input user's SELection

IF SEL = "99" THEN ABORT                !"99" means Exit Menu

! The following statement creates the Datatrieve logical EXECUTE_PROC by
! looking at the second table entry. By stringing "A" with the value of
! SEL, we use the Procedure name associated with a menu item displayed !
(see explanation of table below).

FN$CREATE_LOG("EXECUTE_PROC",FN$STR_EXTRACT("A"|SEL,0,3) VIA
    USER_TABLE)

:EXECUTE_PROC                           !This statement executes (:) the
                                        logical name created above

FN$DELETE_LOG("EXECUTE_PROC")           !You must DELETE the logical name
                                        assignment

:MENU                                   !After the desired procedure is
                                        executed, re-execute MENU
RELEASE ALL                             !Release all variables

FN$WIDTH(80)                            !clear screen

END_PROCEDURE
```

A sample table and the appropriate entries are listed and explained below.

```
TABLE MENU1_TABLE
01 : "Procedure Description"          !This is the text actually
                                       displayed on the screen
A1 : "DTR_PROCEDURE_NAME"             !This is the actual Datatrieve
                                       procedure name
TT : "1"                             !This entry (Table Total) MUST
                                       contain the total number of
                                       procedures used in the table
ELSE "Invalid Table Entry"
END_TABLE
```

Notice how entry 01 has a corresponding "A1" entry, entry 02 would have to have a corresponding "A2" entry, and so forth. This allows one entry to contain the information to be displayed on the screen (the numerical entry), and one entry to contain the actual procedure to be executed (the "A" entry). If I had an 02 and corresponding "A2" entry, then "TT" would have to be incremented to "2". "TT" must contain the total number of procedures listed in the table, not the total number of table entries. You MUST assign a value in DCL

$assign datatrieve_table USER_TABLE BEFORE

executing the Datatrieve procedure MENU. By adding in this functionality, you can create different tables for different user's and/or applications. Below I have included a sample DCL procedure used to execute the Datatrieve Menu procedure.

```
$!!   THIS SECTION CLEARS THE SCREEN
$!!
$ devt = f$getdvi("tt","devtype")
$ if devt .ne. 96 then goto NONVT100
$ write sys$output ""
$ write sys$output ""
$ goto EXIT_CLEAR
$NONVT100:
$ write sys$output ""
$ write sys$output ""
$EXIT_CLEAR:
$!!
$!This section checks for a node name, as we have Datatrieve
$!installed on only one node of our cluster
$!
$ node==f$getsyi("nodename")
$if node .ne. "node name with Datatrieve" then goto -
dtr_no_access
$! the next statement keeps all output files in the user's home
$! directory
$SET DEFAULT SYS$LOGIN
$dtr32=="$sys$system:dtr32tdms.exe"
$assign/user sys$command sys$input
$!
$! the next statement executes the Datatrieve procedure MENU
$dtr32 execute menu_dictionary.menu
$!
$! after exiting from Datatrieve, search for any type DTR files
$! and if they exist, print them to specified print queue
$if "''f$search("*.dtr")'" .eqs. "" then exit
```

```
$inquire/nopun/local ans "Please enter print que [SYS$PRINT] > "
$if ans .eqs. then ans = "SYS$PRINT"
$print/delete/notify/que='ans' *.dtr;*
$goto exit
$!
$! this section is for node without access to datatrieve
$!dtr_no_access:
$write sys$output ""
$write sys$output ""
$write sys$output "You cannot access Datatrieve from this node""
$write sys$output "    Press enter to continue"
$write inquire/nopun dummy ""
$exit:
$exit
```

The only problem I have encountered with this procedure is that when using the Report Writer function of Datatrieve. Datatrieve opens the output file regardless of whether or not any actual records are to be printed. A type .DTR file will be created, but it will be empty, and this procedure will attempt to print the empty file, which will of course not print. This has been a little frustrating to my user's as they run a report, and then rush to the printer to get their report, and nothing is there. Any suggestions as to a solution to this problem would be welcome.

Bill Tabor, W.I. Tabor, Inc., Coral Springs, Florida

Bill's magic involves some PRO-DATATRIEVE hints and kinks...

PRO DATATRIEVE does not provide a dictionary compress utility, so this will clean-up your dictionary after it becomes cluttered from editing sessions. Users must EXIT from DATATRIEVE after the DEFINE statement so as to trick the software into using the new dictionary.

```
INVOKE DTR
    DTR> EXTRACT ALL ON  X
    DTR> DEFINE DICTIONARY   DTR$DIC
    DTR> EXIT

INVOKE DTR a second time and execute X

    DTR> @X
```

Now use the PRO's purge utility to clean up the dictionary.

Another useful tidbit involves VMS SORT, which has the capability to extract partial records. When writing a DATATRIEVE report on a subset of a large datafile, it will be much more efficient to define a domain accessing a sequential file of the sorted records. Invoke SORT to extract the records from the main datafile and to write the sorted output to the sequential file. Then use DATATRIEVE against that new file. You may get a 6 or 7 times increase in performance.

Steve Convey, Consultant

While trying to impress a client, I began playing with the FAMILIES database...

```
DEFINE TABLE WIFE_TABLE OF FAMILIES USING
    FATHER :  MOTHER
    ELSE "** SINGLE **"
END_TABLE
```

```
DEFINE TABLE HUSBAND_TABLE ....

DECLARE WIFE COMPUTED BY NAME VIA WIFE_TABLE.
DECLARE HUSBAND ....
DECLARE SPOUSE COMPUTED BY
        IF SEX = "M" THEN NAME VIA WIFE_TABLE
        ELSE NAME VIA HUSBAND_TABLE.
DECLARE NAME COMPUTED BY KID_NAME.
DECLARE SEX COMPUTED BY
        IF FN$STR_EXTRACT(1,1,NAME) = "A", "E","I","O","U" THEN "F"
        ELSE "M".

FOR FAMILIES PRINT PARENTS, ALL KID_NAME, SPOUSE OF KIDS
```

A blast from the past...courtesy of Bill Opalka (DTR-11 developer)...

Presented by Bert Roseberry

What does this do?
(in an old version of DATATRIEVE-11

```
RW> AT TOP OF PAGE PRINT NEW-PAGE

answer: EMPTIES A BOX OF PAPER IN LESS THAN 10 SECONDS!
```

Pat Scopelliti, Corning Glass Works

"Plotting what ain't really there"
Magic from Richard Copeland (in absentia)

A file contains a series of data points. It is desired to make a plot of these points versus their *"point number"* on an x-y plot. e.g.: plot point number 1's value on the Y axis versus the number 1 on the X axis. plot point number 2"s value on the Y axis versus the number 2. etc. How can you do this plot without having the x value physically residing in the data file?

Here's a solution...

```
DTR> declare x_value computed by running count.
DTR> plot x-y all x_value, point
```

Joe Gallagher makes a comment: This will screw-up the end point. An old magic session Joe edited showed how to get around this problem by multiplying the RUNNING COUNT by 99.99. The graph will not be effected and the end point will come out at exactly the right point. Phil Dickerson was the first to point this out. but now the DATATRIEVE command SET LIMITS to override the scaling.

John Henning, DEC

PROBLEM: Do not allow users to leave DATATRIEVE (e.g. for security)

ANSWER: $ SET PROMPT = "DTR>"

Gary Burton, DuPONT

Gary tried to use a laser printer from DATATRIEVE. He wanted to send escape sequences for various fonts. landscape orientation. etc. Using the REPORT WRITER. Gary sent the sequences via the appropriate DATATRIEVE procedure..

```
DTR> REPORT DOMAIN ON NODE::LASER
```

```
RW> AT TOP OF REPORT   :PRINT_STATEMENT, NEW_PAGE
RW> PRINT domain
RW> END_REPORT
```

This technique can also be used to print more information than is normally allowed at top of reports.

Bob Hoover, HLP, Prescott, AZ

While trying to populate a data file with unique keys can be difficult especially when you are just trying to test the application.. One way to create unique key fields is to use RUNNING COUNT...

-

```
DTR> FOR domain STORE USING
    BEGIN
       LNAME=LNAME||RUNNING COUNT
    END
```

Joanne Martin, Anheiser-Bush

FIELD LEVEL ACCESS CONTROL

In trying to develop an application. Joanne wanted to create a way to control what fields various users could have access too...

First some rules:

1. All users may see all data
2. Accounts share data file but use separate dictionaries and separate logins.
3. A MALICIOUS USER CAN BREAK ANYTHING!

The following DOMAINS use different RECORD DEFINITIONS on same file.

```
DTR> define domain USER1 using USER1_REC on FILE.DAT
DTR> define domain USER2 using  USER2_REC on FILE.DAT

define record USER1 using      define record USERS2 using
01 USER1_REC.                  01 USER2_REC.
   03  INDEX                       03  INDEX
   03  USER_1_FIELD                03  FILLER
   03  FILLER                      03  USER_2_FIELD
```

Phil Naecker, Wombat Wizard

Phil thought about a number of ways to keep users from using an editor in DATATRIEVE. One way is to build DATATRIEVE without links to any editors..

```
$ TYPE DTR$LIBRARY:DTRBUILD.COM
$.
   .
$.
$ LINK  .../LIBRARY , SYS$INPUT:/OPTION   <== Find this line
       stuff. . .
       /INCLUDE = (EDT, TPU, . . .)       <== Make a change here

CHANGE TO
       /INCLUDE = ( ... )
```

DTR-16

Another way is to use the DMU utility, provided you have the privilege, and BANISH users from Updating the dictionary...

```
$DMU  ==$DMU
$DMU
DMU> SET PROT CDD$TOP/BANISH=U
```

Bryan Dooley GE - Major Appliances Appliance Park, Louisville, KY

(Editors note: Bryan also presented this magic at the symposium, but sent a complete text file for inclusion in the Wombat Examiner...thanks Bryan!)

Because several of our users were used to using systems in which the field terminator was a carriage return, the default behavior of FMS screens in DTR32 in which the TAB key is the field terminator, and the RETURN key is a screen terminator was causing a good deal of confusion. The results were failures of various edit checks, and sometimes incomplete records were being entered in the files involved. In order to make our DTR32 applications more like existing applications, we created a user defined function to swap the TAB and RETURN key functionality in FMS under DTR32. Listed below is the FORTRAN routine we inserted in DTRFUN.OLB and the addition to DTRFND.MAR made to define the function to DTR32.

```
        INTEGER FUNCTION SWAP_FMS_KEYS*4
C*************************************************************************** C
C       SWAP_FMS_KEYS - THIS ROUTINE SWAPS THE FUNCTION OF THE RETURN
C                       AND TAB KEYS IN FMS FOR DATATRIEVE
C
C       AUTHOR:  BRYAN DOOLEY
C       DATE  :  12/16/85
C
C***************************************************************************
        IMPLICIT        INTEGER*4 (A-Z)
        INTEGER*2       KEYTABLE(4)        ! KEYS TO BE SWAPPED
        DATA            KEYTABLE/13,1033,11,1037/
        SWAP_FMS_KEYS = FDV$DFKBD(%DESCR(KEYTABLE),2)
        RETURN
        END
```

```
;FN$FMS_SWAP - Alter function of RETURN and TAB on FMS keyboard
;
;        output is a longword status return
;
$DTR$FUN_DEF FN$FMS_SWAP, SWAP_FMS_KEYS, 0
    $DTR$FUN_OUT_ARG  TYPE = FUN$K_STATUS
    $DTR$FUN_NOVALUE
    $DTR$FUN_NOOPTIMIZE
$DTR$FUN_END_DEF
```

It should be noted that the FDV$DFKBD function in the FORTRAN routine can be used to re-map the FMS keyboard in any way desired. The documentation for this routine is in the FMS Form Driver Reference Manual.

The only restriction for use of this function is that a DTR statement that uses FMS must be executed before FN$FMS_SWAP is executed. This is because the initial READY of a domain with an FMS form defined, or the initial DISPLAY_FORM statement, causes certain FMS workspaces to be created and initialized. These workspaces must be present before the FN$FMS_SWAP will work. The function needs to be called only once per DTR session.
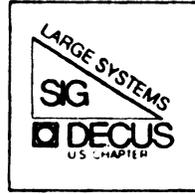
DIGITAL EQUIPMENT COMPUTER USERS SOCIETY

LS
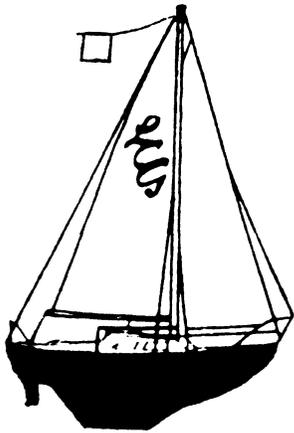
AT LARGE

The Newsletter of the Large Systems SIG

Contributions

Contributions and suggestions for this newsletter are constantly needed. Articles, letters, technical tips, or anything of interest to our SIG are greatly appreciated. The editor prefers submissions be made electronically, but magnetic tape and hard copy will be accepted.

Send your contributions to:

ARPAnet/CSnet: ctp@sally.utexas.edu
UUCP: ctp@ut-sally.uucp ({harvard,ihnp4,seismo}!ut-sally!ctp)
CIS: 75226,3135
BITNET: use the Wisconsin Gateway

or if you must, use the U. S. Mails:

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Chairperson's Article

Leslie Maltz, Stevens Institute of Technology, Hoboken, New Jersey

This will be an extremely brief article this month. Instead of the usual, I would rather point you in the direction of the articles that follow. They are on VAX 8700 systems and some experiences that may be of interest. The intent of these articles is to share both experiences and attitudes that seem to be present in the care and feeding of the systems. As professionals involved in the acquisition and use of Digital's highend computing systems, we have a need to know whatever possible to insure that we can support and use properly functioning, reliable systems. As managers and users of such systems, we need to share experiences with these and other systems. I encourage you to read the 8700 article, and share your experiences with 8700's and other highend computing systems with all of us. We have much to gain by the sharing of information and experiences.

VAX 8700 Support Experiences, Introduction

Leslie Maltz, Stevens Institute of Technology, Hoboken, New Jersey

Many of us are now supporting one of the popular VAXes in the 8000 series, namely the 8700. As the systems have not been in use for as many years as the traditional 700 series (730, 750, 780/5, ...), they do not have a long and rich history. This lack of history means many things, but for the purposes of this article, I will concentrate on some issues pertaining to performance and reliability. This is not to imply that 8700's are inherently bad systems; on the contrary, they are quite good in the environments in which many have chosen to use them. Many of us enjoy the benefits of such systems, but we are somewhat disappointed by the manner in which solutions to known problems are being handled.

I don't know about the distribution of systems in other geographic areas, but in the NY/NJ metropolitan area there are many VAX 8700 systems. Some installations have as many as 10 8700's. Some of us have only one. In view of the high concentration of systems in this area and the newness of the product, the community is in close contact. As such, when one installation is experiencing major problems of any nature, it is likely that others are aware of the situation. Such problems range from power problems to hardware support or performance issues. In this regard, the sense of community is great.

Recently it became known that some 8700 systems were experiencing repeated, unexplained, and very unpleasant problems. At some installations some of these problems were addressed, but not all problems at all sites, even if the systems were known to be experiencing the problems. Further, there seemed to be a hesitancy by the field service organization to be open and acknowledge these problems, and more importantly to share the solutions. As a result a LUG (Local User Group) meeting was convened of the Commercial Cluster LUG to openly discuss the issues, problems, and solutions. This meeting was extremely informative for those in attendance, and it was thought that others might profit from the information presented.

Please note that the Digital representatives from Field Service who spoke at the meeting felt that the problems were being addressed adequately already. As indicated (toward the end of the

presentation below), Digital felt that all systems in this area had been audited and informed of the issues. Those of us who had not yet been informed of the fact that the symptoms that we had been seeing were in fact known, much less the fixes to the problems, felt otherwise. Digital was urged to be pro-active in sharing this list of known symptoms and their fixes with existing 8700 sites. If you are supporting an 8700, I'd suggest that you talk with your local support organization to determine which, if any, of the problems have been encountered, and establish a plan for implementation of the remedies. It is not productive to have to live with known problems when fixes have been identified. Further, it is important that an open atmosphere, where we all have a pro-active attitude, should exist between customers and the field service organization since we all are working toward the same end - properly functioning, well maintained systems.

A summary of the known problems and the solutions to the problems is listed below. The list was distributed at the LUG meeting and the sharing of it in this publication is with the approval of the Digital presenter at the meeting. Some of the solutions are not scheduled to be made generally available until October according to the Digital representative. As such, you will have to discuss the timing of implementation with your local support team if needed sooner.

Problem	Module	Fix
Remote console	LA120	Setup P: 2/8
"UNIBUS" Interrupt ("Read Lock Timeout")	8700	Microcode Rev D3 (Cons. Rev. E)
LAT sessions drop	DEBNT	Rev 1.3B
Console disks	Console VMS	Rev E CWDRIVER
18 hour crashes	VMS	V4.5 or SYSLOA8nn
Various other crashes	8700	Memory CTL Rev F3 or F4
TODR errors	Console	Fix to Rev E

[Editor's Note: The following presentation was given by Richard Garland of Bankers Trust Co. at the monthly meeting of the New York Commercial Cluster LUG held at Bankers Trust Company, New York City, June 15, 1987. (The following summary of the presentation was prepared by Richard and is being published with his permission.) The meeting was attended by about 40 members and several representatives of DEC Field Service, including the Unit, District Support, and the Area Customer Relations manager. After the talk, questions were addressed both to the speaker and to DEC Field Service.]

VAX 8700 Support Experiences, Presentation

Richard Garland, Bankers Trust Company, New York, NY

I am in charge of hardware support, with the Distributed Processing Technical Support group of Bankers Trust. Our Group provides centralized system and hardware support to all DEC systems at Bankers Trust. Bankers Trust is a fairly centralized organization with all of its VAXes in 3 data centers in 2 locations. I would like to relate the experiences we have had in setting up

and operating a number of 8700 systems. We currently run 10 8700s and 1 8500. The first 2 were installed at our New Jersey data center in October of 1986 and the last were installed in February 1987. We encountered a number of problems over the period from November to about March, all of which were eventually solved. It is our hope that the information in this presentation will be of help to other organizations using or contemplating acquiring this type of system.

I will present the problems and solutions from a user's perspective. In other words I will address particular symptoms which were observed even if 2 or more symptoms had the same fix. When the FCOs are published, these problems may be broken down differently.

Problem 1, Remote Console

Before describing the first problems that were encountered, it is important to describe the configuration we use at the Bank, with particular regard to the system console. In what I might call the "Normal" configuration of a VAX 8700, (A slide here shows an 8700 with the Pro-380 console on a terminal stand next to the CPU) the Pro-380, which is the system console subsystem, is located adjacent to the CPU on its own stand. This configuration is typically what you would see at a DECUS symposium or a trade show. The distance between the CPU and the Pro-380 is limited be the length of the cable joining the 2, about 6 feet. In this configuration, the system operator is expected to use the Pro-380 to boot the system, Halt it, etc. This configuration is probably fine for a Lab or department with a single CPU.

This configuration was not, however, the way we wished to use these systems in our data centers. Our centers typically consist of 10 - 20 VAXes in a highly conditioned room with all the system consoles in a centralized control room. This layout allows us to better manage the large number of systems and optimizes the operators' productivity. In order to use the 8700 in our environment, and upon the advice of the DEC 8700 product line, the VAX's RDC port, located on the Pro-380, was used as a console port, and an LA120 in the control room was wired to it. Appropriate commands are issued to the Pro-380 and our LA120 then becomes the system console transparently. (Another slide shows a sketch of an 8700 with the Pro-380 on top and a wire going off to a distant LA120). While the system is running, the LA120 in the control room is used for all commands and output. The Pro-380 sits on top of the 8700 and is essentially ignored.

Another option which we considered, was the use of the VAX Cluster Console (a microVAX which serves as the console to several VAXes simultaneously) We considered this at one time but decided that it does not suit our needs as we currently operate.

The problems we encountered after setting up the first 2 systems were both related to the use of the remote console port. The first issue was that the console would get into various states of confusion as to whether the remote port were enabled or disabled and would sometimes hang the VAX and some times require itself (the Pro-380) to be rebooted or power-cycled. The second issue was that the LA120 was incapable of sending certain control characters to the console subsystem - notably CONTROL-P. Naturally the console lacks some essential functionality in this case: we could BOOT the system but we could not HALT it. We were eventually put in touch with the development group which wrote the Pro-380 console software and in a 3 way conference call solved the control character problem. The LA120 had to be set with the "P" parameter set to 2 or 8. Ours had been set to 1 as on all the other VAXes. They also sent us a pre-release of the console software rev. D (since released) which solved the problems of console confusion when enabling the remote port.

Problem 2, "UNIBUS" Interrupt

At this point in time, the 8700s were given over to the users and several projects began to build applications on them. There was a general impression that things were working well although in retrospect we know there were several problems which were not yet recognized.

In January of 1987 we took delivery on the fifth 8700 and immediately discovered a real problem. The system would crash 1 to 3 times a week with a Bugcheck: "Unexpected UNIBUS Adapter Interrupt" (UNEXUBAINT). This was particularly unexpected since the system had no UNIBUS Adapter. Field Service was able to identify this as a known problem through the Colorado Support Center and a fix was obtained. This consisted of a new version of the 8700 microcode (rev. D3). This is now the released version and is part of the Console rev. E software kit. The new microcode was also put on the other 8700s although the problem seems only to have occurred on this one system. The DEC engineers refer to this as the "Read Lock Timeout" problem and it concerns the logic controlling the NMI bus and the BI controller.

Problem 3, LAT Sessions Drop

In late February, complaints from users and data center operations personnel began to show a pattern pointing to several problems. After many meetings with our users and with DEC we could recognize 2 major problems: LAT terminal problems and crashes.

The LAT problems observed were that users sessions would drop. The configuration in use for most users involved approximately 150 users in our New York City Office communicating with 4 8700s in our New Jersey facility. The users in New York were on terminals connected to DECserver 100s and DECserver 200s. The New York Ethernet was connected to the New Jersey systems using a Vitalink TransLAN[1], which operated over 2 T1 links. The symptom was unfortunately reminiscent of problems encountered in the Fall of 1986 due to Vitalink configuration problems. For some time users would simply say "The Vitalink just went down again" and they would complain to our telecommunications group. It was soon recognized that the Vitalinks were working properly and the problem lay in the Ethernet controller of the 8700 systems (known as a DEBNT). After lengthy study by one of our systems programmers, a correlation was found with DECnet traffic: high DECnet traffic would cause the LAT problem; LAT traffic (in itself) would not. An additional symptom was the presence of a high number of "System Buffer Unavailable" (1-2 per second worst case) when the Ethernet counts were displayed. After we had thus narrowed down the issue, DEC was able to determine that the DEBNT microcode was at fault (several VMS driver patches were first tried). A new chip set (rev. 1.3B) was sent and tested and this solved the problem. Eventually all DEBNTs in the bank were thus upgraded. An unexpected but welcome side effect was that the units performed noticeably faster with the new firmware. (DEC has since incorporated the firmware into a redesigned module which is now shipping. It is module number T1034. Older units requiring the fix will be replaced by the new module.)

Problem 4, Console Disks

Along with the LAT problems we became aware that the systems were crashing or hanging. We recognized several cases: use of the Pro-380 (say to edit the default BOOT file) would usually hang or cause VMS to crash. At a meeting with DEC we found that there were cases where the Pro-380 software and VMS would not interact properly, particularly when the Pro-380s disks were being accessed. This could happen in two cases: editing files on the Pro-380 (actually typing on the Pro) and reading/writing the disks from VMS. It had long been documented that the two floppies on the Pro could be used as read/write, but the hard disk (an RD53) was to be write-only from VMS. We found that any use of the disks from VMS, even simply reading the RD53, could cause problems. Using the Pro-380 to edit files likewise caused problems. DEC informed us that a new version of the Pro-380 software (rev. E) together with VMS V4.6 would solve these console disk problems. Since VMS V4.6 was (an is) not yet released, patches for VMS V4.4 and V4.5 were obtained as well as a pre-release version of rev. E console software (since released). With these fixes in place we have found that we can do all the operations that used to cause problems. There is still the restriction that VMS can not write to the Pro-380's RD53. We have told DEC that

---

[1] TransLAN is a trademark of Vitalink Communications Corp.

this is an inconvenience and have been told that the restriction will be lifted in the future. At this time if VMS issues a MOUNT to the RD53, a message comes back "Drive is write-locked".

Problem 5, 18 Hour Crashes

We also recognized that VMS would sometimes crash wit INVEXCEPTN Fatel Bugchecks when no one was using the Pro and no one was accessing the Pro's disks from VMS. Curiously, these crashes would generally occur on 2 out of 4 systems in New Jersey at around midnight every night, and on 2 out of 3 systems in New York at 6 PM every evening. After analyzing a number of crash dumps, DEC (in Colorado) found that we had uncovered the "18 hour crash" bug. Apparently, 18 hours after first issuing a "SYSGEN> CONNECT CONSOLE" command the system would crash. It turns out that the New Jersey systems were typically BOOTed at 6 AM each day and the New York systems are BOOTed at midnight. Our system startup procedure requires that a file be read off of the console and thus the curious timing was explained. The systems that were not crashing were running VMS V4.5. The fix was to go to VMS V4.5 (and to use console software rev. E which we had just started using). Since it was unfeasible for several of our groups to go to VMS V4.5 we requested a fix to VMS V4.4 and eventually received it.

Problem 6, Various Other Crashes

After carefully studying error logs over a 2 month period we noticed that a few crashes did not fall into the same category as the previous. The Bugcheck message were generally very obscure, never before seen bugs. DEC informed us that a memory controller error had been diagnosed which resulted in a timing problem when memory not installed at the factory was used on a system. It turns out that factory installed memory was matched with the controller but that field installed memory was not matched. The problem was very infrequent - we believe we saw it around 4 or 5 times in 6 months of running between 4 and 10 machines. New controllers (rev. F3, current rev. is F4) were sent for all of our systems. We have not seen any of these crashes since.

Problem 7, Time of Day Errors

At this point it seemed that all of our systems were running reliably. We began to receive complaints from our operators that the system time which came up when the system BOOTed was occasionally wrong by a random amount. If this went unnoticed it would wreak havoc with file creation times, DECnet, etc. After several attempted work-arounds, DEC sent us a fix to the console (rev. E) software which addressed the problem. It seems that on the 8700, the Pro-380 is the repository of the time when the CPU is down (unlike earlier VAXes which had a separate battery powered TODR). The Pro would fail to save the time properly when a VMS "SET TIME" command was issued (with no argument this is supposed to set the time back into the hard ware register). This fix is the only thing that was not fixed in console rev. E. and will be part of rev. F (not yet released). The patch is available from Field Service and should ship with currently shipping systems.

Conclusion

At this point a representative of DEC Field Service outlined procedures for solving any of these problems. A service call should be logged for all suspected problems. All fixes and updates outlined here are available immediately. Furthermore, it was stated, in the New York Area, all installed 8700s have been audited and known problem situations have been identified. All systems shipped as of this time are said to incorporate all fixes. Users were advised to use escalation procedures, in place, if problems are not resolved. Lou Schiavone (212-714-6746), the New York Area Customer Relations manager said he would be happy to converse with DEC Field Service from other areas on these problems.

Several users questioned DEC Field Service on the issue of notification to the user community at large of known problems and fixes. The publication of FCOs, it was pointed out, lags months behind problem identification and resolution. (In fact, the FCOs incorporating the fixes outlined above are not yet published as of the latest issue of DEC-O-LOG).

A question on whether the information, attributed to DEC, that Local Area VAXclusters (Ethernet based) should not use an 8700/DEBNT as a load host, was due to the DEBNT problem mentioned in this presentation. DEC said they would look into that question.

The Times They Are A-Changin' – MARKET Going Away

Reed B. Powell, Digital Equipment Corporation

As part of LCG Marketing's plans for being out of business on 30-June-1988, we are working on plans to dismantle system 2244, aka MARKET:: & DEC-MARLBORO, in the very near future. After looking at the usage of the system, which is very low, it does not seem to make sense for DEC to have 2 systems on the ARPAnet, one of which spends most of its time transferring PC utilities via KERMIT.

As I said, the life-span of MARKET/DEC-MARLBORO is now quite short: we expect to remove it from active service on 30-June-1987. We are quite anxious to make this as painless as possible, and therefore are soliciting input from anyone who feels this will adversely impact them, so that we can try and make the appropriate arrangements. We are planning on retaining the MARKET and DEC-MARLBORO synonyms for the existing DEC20 within engineering currently on the ARPAnet.

We do not expect the KERMIT library to survive this move. We do expect all current internal DEC users to continue to have ARPAnet access. We do not expect to retain external (to DEC) users on the system picking up this load. The Integration Tools Clearinghouse will remain in operation, but without the LCG.CUSTOMER account, whose usage has been minimal.

Please send comments, etc., to myself as POWELL@DEC-MARLBORO.

[Editor's Note: Because many readers do not have network access to ARPAnet, you may also send your comments to me at any of the addresses at the beginning of this newsletter. I will forward them to Reed. By the time this article is published, system 2244 will be a part of history.]

From the INFO-VAX Mailing List

Abstracted by: Betsy Ramsey, American Mathematical Society, Providence, RI

The following messages are selections taken from the INFO-VAX interest group, which is a mailing list maintained on the DARPA Internet. These items appear for information purposes only. Neither DECUS nor the authors assume any responsibility regarding the usefulness or accuracy of the information herein. By convention, lines beginning with ">" are extracts from previous mail messages that are included for clarity.

Date: Wed, 22 Apr 87 19:45:37 est
From: decvax!unh!wfc@ucbvax.Berkeley.EDU (William F. Costa)
Organization: Academic Services Group, UNH Computer Services

I'm new to the NET, so I can't help feeling a little nervous about this, my first contribution. However, a number of letters about defining 'new' commands for VMS users has struck a cord, so here's my two-cents on the subject.

At the University of New Hampshire (UNH) we've added quite a few home-grown programs as well as the usual second-party stuff (SAS, SPSSX, System 1032, etc.) Since not everybody uses these products, we do not automatically make them available for all users. This obviously helps keep the system login file a reasonable size (and duration). However, we did create one new command that all users get, it's called "SETUP". Essentially, if a user wants to access any of these non-native VMS programs, they simply ask for it:

```
$ SETUP S1032
```

This will define S1032 (System 1032) as a command for the remainder of their terminal session. (Those users who use such applications day in and day out can simply place this command into their own LOGIN.COM.) We feel that this approach makes access to these 'new' commands as easy as possible for the users who need it, while at the same time limiting the overhead for everyone else. We also hope that doing this helps reinforce the fact that what they have just ask for is NOT a normal part of VMS, but rather a tool that UNH has added. (This is also why we put the help information for these programs into a separate HELP library and keep the Digital supplied version as virgin as possible.)

By the way, the SETUP program is dirt simple. Right now it is simply a command procedure that, when asked to 'setup' the program FRED, will search a particular system directory for the file "FRED.SETUP". If the file does NOT exist, the user is told that there is no such command as FRED, and that they should check their spelling. If FRED.SETUP is found, it is simply "@'d". In other words, FRED.SETUP is itself a command procedure that will do WHATEVER IT TAKES to make FRED a command for the user. (For some programs, it may mean defining a dozen or so logicals and inserting the command into their DCL command table. For others, it may be as simple as defining a symbol; "FRED :== @UTL:FRED.COM").

We've added a few other bells and whistles, but I think you get the general idea. If you have any more questions, please feel free to contact me directly, I'd be happy to supply the current source to SETUP.COM as well as documentation that we've written for our users about it.

Date: 25 Apr 87 01:02:00 EDT
From: Greg Hamm <hamm@BIOVAX.RUTGERS.EDU>
Organization: Rutgers Molecular Biology Computing Lab
Subject: RE: SETUP

Bill Costa at UNH describes their SETUP utility. I found this interesting because it's nearly identical to a utility we implemented at the European Molecular Biology Lab (EMBL), for all the same reasons. (Actually, we borrowed the idea from someone at a British University - wonder how many other implementations there are?) Our version was called PREPARE (usually PREP).

We did go through a couple of evolution cycles on the thing, though:

The first change was that we wrote a program instead of a command procedure, because people usually put PREPAREs in their login.coms and got tired of waiting for them. We then had a file (called a "prepare dictionary") which contained a single-line command for each "prepare environment". Usually these were things like "@some.com", but they were also allowed to be SET COMMANDs or single definitions of some sort. Since the things were not required to sit in one directory, this also gave us a mechanism to provide global access to things the systems group were not maintaining - we'd just point the prepare command at some user's setup procedure, and let him/her do all the work.

This worked well, but the list of environments grew, and the thing was again too slow. Finally we made the dictionary file indexed, and wrote a small PREPUTIL to add/remove things from it. This was less convenient than having just a text file, but sure was faster. As far as I know, this is the version they're currently running.

By the way, all this "we" stuff I keep saying was mainly Roy Omond - I just watched and made helpful noises ("It's too slow, Roy!").

Whatever the implementation, I certainly agree with Bill that this is an ideal way to avoid defining everything for everyone. It also provides a lazy way out of the problem which occurs when two third-party packages define the same symbol differently. You just tell people to prepare only one of them at a time. (Beats workin'!)

Who else has implementations of SETUP/PREPARE, and how do they differ from these two?

Date: Mon, 27 Apr 87 08:54 PDT
From: Chris Yoder <CHRIS@ENGVAX.SCG.HAC.COM>
Organization: Hughes Aircraft Company
Subject: RE: SETUP

>Who else has implementations of SETUP/PREPARE, and how do they differ from
>these two?

We do... Though after reading about the way that other people have this type of utility defined there has been some serious thought about redoing the way that it works! Our's is called SETUP, so in SYLOGIN.COM the DCL symbol SETUP is set to @PUB:SETUP. Currently SETUP is one big long command procedure with a bunch of labels. When a user issues a command like:

```
$ SETUP TEX
```

The DCL code fragment that they execute in SETUP looks like:

```
$ on warning then goto No_Such_Setup
$ if p1 .eqs. "" then goto Show_Available_Setups
$ goto 'p1'
  :
  :
```

```
        :
$ TeX:
$ LaTeX:
$ @TeX_Root:[Local]TexSetup
$ if f$mode() .eqs. "BATCH" THEN goto Done
$ define/user sys$input sys$command
$ News/Directory TeX
$ goto Done
```

Note that this allows to point different names for the same setup at the same procedure. The problem with this approach is that even with abbreviated sections for each command, the SETUP command procedure quickly gets **very** long. Ours is 407 lines, and growing. It also contains product definitions for **every** system that we manage, so portions are never accessed on some systems.

Personally I like the idea of having a short, simple command procedure that attempts to execute the first parameter passed to it. If you're tricky, you put the setup command files in a directory pointed to by a logical name that is a list. Then you can put your "normal" command files in the "every-system" directory, and the "local" command files in the "local" directory and let the system look in the local directory first and the every-system directory if it can't execute anything in the local directory. In some ways it's easier to manage, commands are trivial to add and remove simply by adding files to or deleting them from your system directory, though you do end up with a whole mess of little tiny command procedures cluttering your setup directory(s).

I'm not quite sure what to say about the issue of speed... The approach outlined above will be quicker than one big long command procedure most of the time, but I really have no data or feel for how long it takes to add another command procedure onto the stack. I'm also not quite certain how one would get a program to be able to execute the setup command procedure **in the context of the current process** (it's easy enough to spawn of a command that executes the command file though). I don't believe that a parent processes symbols or Command Language Definitions can be modified from a subprocess.

More ideas, thoughts, and musings on this subject are welcomed! I'd love to hear how other people deal with this issue.

Date: Wed, 29 Apr 87 04:09:45 PDT
From: Frank Nagy <nagy%43198.hepnet@LBL.ARPA>
Organization: Fermilab Research Division EED/Controls
Subject: RE: SETUP/PREPARE

In designing systems like SETUP or PREPARE which end up calling lots of little command procedures... remember that just about the SLOWEST operation DCL can do is to open a new file (for reading, writing or command execution). "Simple" things (a logical name or 2 and a symbol or 2 at most) are best grouped together to avoid this problem! For more complicated packages, the overhead of the file open becomes less important. However, the long dragging wait for LOGIN to complete can be a real pain!

Date: Tue, 28 Apr 87 04:34:18 PDT
From: Frank Nagy <nagy%43198.hepnet@LBL.ARPA>
Organization: Fermilab Research Division EED/Controls
Subject: Current (not-so modern) backup devices for VAXClusters

>If you ask DEC for their suggested backup technology for VAXclusters
>where you might have multiple RA81's or SA482's they reply TU78's and
>similar which cost a small fortune.

All the big (CI) VAXClusters here at Fermilab have TA78 systems which are used for backups. My group's LAVCs (Local Area VAXClusters) is either using RA60s (with pack-to-pack backups) or backing up onto (ugh) TK50s.
>Can anyone suggest more modern equipments to solve the thorny backup
>problem WHICH ARE RELIABLE AND PROVEN...

In my experience, the TA78s are reliable when used primarily for backups. The main VAX-Cluster here has 12 TA78s which are HEAVILY used by users for reading/writing data tapes. They have intermittent problems with formatter hangs (discussed in a previous Info-VAX sub-mission).
>How about some of the Megatape products I see (650Mb a cartridge??) or
>WORM optical discs...what are big cluster sites doing now.

One thing about TA78s is that they are fast; assuming you have a large VAX (at least 785, >8500 best) AND that your backup does not get dominated by disk head motion. GCR tape recording is a very reliable and proven technology. One major advantage of the TA78s (and any other tape or disk drive which emulates DEC products) is that system disk backups are easily done and can be restored using Standalone Backup. Consider if you use a WORM drive which requires a special driver; you must still make provisions to save your system disk on tape or disk such that Standalone Backup can restore your system disk in case of ultimate "oops". This is, I think, the major problem with devices like the Megatape or ExiStore (I think this is the name of the recently announced 8mm tape which can store - get this - 2048 MB!). We are planning to add a TU81+ to our LAVC to replace TK50 backups for just this sort of reason (currently the LAVC has dual RA81s, soon to be a full set of 4).

WORM disks would be nice. However, vendors seem to be concentrating on making WORM disks look like read/write magnetic disks in terms of the on-disk file structure and system access. A better and probably cheaper solution for WORM backups would be to make the WORM drive look like a magnetic tape. One other thing about WORM drives; their data transfer rates are SLOW, on the order of 200KBytes/sec for writing. This is considerably slower than current tape technology.

Input Needed for New White Paper on Large Computers

Clyde T. Poole, The University of Texas at Austin, Austin, TX

The DECUS U. S. Chapter, Large Systems SIG, is once again sponsoring the development of a "White Paper" for possible presentation to Digital. This paper will concern itself with the large computers and computer systems of the future as seen by users of Digital computers.

By the time this newsletter is in the hands of its readers, the SIG Steering Committee will have already reviewed a draft outline for this paper but input from the user community will still be needed. Without attempting to prejudice your input, here is what I think we would like to hear from you. "What should future Large Computers and Computer Systems produced by Digital look like?" You should not feel limited by any current Digital operating systems or computer architecture nor will I attempt to answer the question "What is a Large Computer?".

Your input is VERY much needed. Send your comments and suggestions to any of my addresses listed at the beginning of this newsletter under "Contributions."

OFFICE

AUTOMATION

FROM THE EDITOR...

For those of you who have been patiently awaiting the announcement of the OASIS (notes) system for all DECUS members intereted in OA, the wait is over! Our first article this month lists the phone numbers and information needed for you to access OASIS, find out more about it, and apply for access to Notes. It's a free service so sign up soon.

Our August issue is dedicated to the System Improvement Requests (SIR's). First, we have Digital's feedback (or responses) to the items you voted were most important. Not only did they respond to the top 10, as usual, but also 40 more! Then, we dive right into another voting cycle for SIR's submitted between San Francisco and Nashville, plus all of the 'Wish List' items the users gave us during Nashville. Please take some time to read the new SIR's, fill out a ballot and mail it in (feel free to photocopy the ballot so your co-workers may also vote). As you can see from reading Digital's responses, they are listening to our ideas and through voting, evaluating the items we collectively feel are important.

Regards, - *Therese LeBlanc*

OA Newsletter Editor
275 London Place
Wheeling, IL 60090
(312) 459-1784

ANNOUNCING OASIS

Many of you who came to the Nashville Symposium had the opportunity to hear about a new service for DECUS members interested in Office Automation - the Office Automation SIG Information System (OASIS). OASIS is a way for you to ask OA related questions of other users, and share your experiences or expertise with others. OASIS is a free (you pay for the phone call) services located on a DECUS MICROVAX which combines the Notes and Videotext products so that subscribers can carry on information exchanges on a variety of topics.

OASIS is now available for your use. The majority of the introductory information and documentation will be found on-line once you have successfully logged in, applied for and received your account. (This is a painless process).

OASIS CONTINUED...

To access OASIS, you may use one of four lines:

(603) 884-1738 — 1200 baud only
(603) 884-1739 — 1200 baud only
(603) 884-1740 — 1200 baud only
(603) 884-1742 — 2400 baud

REMEMBER: THE SERVICE IS FREE...YOU PAY FOR THE PHONE CALL.

To Use:

1. Once you have connected to OASIS, log into the account: OASIG.

2. You will be taken directly into VTX where you may read several pages of information on OASIS, the OASIG, etc.

3. Before logging off, be sure and fill in the account request form so your account can be created, allowing you access to the VAXNOTES system and the OASIG conferences.

If you have any difficulties completing these preliminary steps, please feel free to call or write:

> Joe Whatley
> OASIS System Administrator
C/O A.C. Nielsen Co.
> 375 Patricia Ave
> Dunedin, Fl 33528
>
> (813) 734-5473 x2438

Joe

DIGITAL FEEDBACK TO DECUS SIR ITEMS

The following represents some general thoughts about the System Improvement Request (SIR) process. It is intended to provide some insight as to how it is utilized within Digital, the guidelines we have established for providing feedback, and the context in which we believe our customers should view the information provided.

I. The SIR process is important to Digital, we want and value inputs from our customers.

II. The SIR list is distributed to senior marketing, product management, and engineering managers resonsible for planning Digital's office products.

III. The SIR's are evaluated, and become part of the strategy and planning discussions for future releases of our products.

IV. SIR's tend to generate items that are "feature oriented," as a result, implementation is considered as part of the normal release cycle for a product.

V. It takes time to implement good ideas. If a SIR represents a new idea, the process of research, specification, development, testing, and release can take a significant amount of time for a major development item. If work has already started on an item as part of our normal product development prior to it becoming a DECUS SIR, the SIR process helps to establish priority, and to provide additional input into implementation.

VI. In order that we not mislead customers, both DECUS and Digital places limitations on discussions of future products. In general, no commitment can be made concerning specific enhancements to the release of a particular product. Discussions of future product direction are considered as part of individual customer plans under non-disclosure agreements. As a result, although the requests generated through the SIR process are vital to our planning, feedback to DECUS must often be limited.

VII.   The feedback provided on SIR's will fall into four general categories:

      1. We currently have no plans to implement the suggestion.
      2. Good idea, we will evaluate further and consider implementation.
      3. We are currently developing a capability similar to the request.
      4. We currently provide that capability.

It is important to remember that since we are often dealing with futures, we do not suggest that our customers make operational plans based on this information. However, the information may be of some assistance to customers who are considering alternatives for investing development time in system modification.

SPRING DECUS 1987 - OA SYSTEM IMPROVEMENT REQUEST RESPONSE

rank # 1
sir # 486037
votes 203

> *Provide LN03 support for WPS: proportional spacing; mixed fonts on the same page; and, portrait and landscape modes on the same page.*

This is a good suggestion and will be considered for a future release. Currently DECPAGE supplies this support through the DECPAGE proportional fonts, it does not use the cartridges supplied by the LN03. WPS-PLUS does do landscape and portrait together but we recommend doing it on separate pages as the page settings are quite different. Printer tables to support mixed fonts are also available on the DECUS OASIG tape.

rank # 2
sir # 187024
votes 193

> *Improve the facility for shared documents.*

A shared FC is available through software services assets library. This feature will be considered for ALL-IN-1 in a future release.

rank # 3
sir # 386002
votes 188

> *The Janitor function should be enhanced to include searching for expiration dates, and to delete those documents past expiration.*

This suggestion will be considered as we plan future releases of ALL-IN-1.

rank # 4
sir # 287065
votes 179

> *A new Print menu should be developed to include options such as: Cancel Print (without the user issuing a command from the DCL level), Pause Printer (to pause the printer before a specific job so that the paper can be changed), and Continue Print (to continue printing after the Pause Printer command has been executed).*

Good suggestion, this is all part of print queue management which will be considered as we plan future

releases.

rank # 5
sir # 287010
votes 174

> *When printing a multi-page document, provide the capability to print selected pages or range of pages.*

This is clearly a desirable feature and will be considered for future releases.

rank # 6
sir # 287012
votes 169

> *Provide a supported, fully "blessed", archiving function for documents.*

This feature is under consideration for a future release.

rank # 7

sir # 187004

votes 167

> *Provide greater standardization of data entry on ALL-IN-1 forms; for example, tab, return and down arrow are inconsistent in usage from screen to screen.*

There are some improvements on layout in V2.2 - This is part of a continual process of user interface improvement.

rank # 8
sir # 486031
votes 143

> *Improve the multi-column composing and editing features of WPS — up to 5-6 columns (side by side) of text are required. The multi-column print facility also need to be improved.*

The column cut and paste functionality from the DECMate is being considered for a future release.

rank # 9
sir # 287008
votes 123

> *Provide a shared folder facility for UDP's.*

This request will be evaluated as we plan future releases.

rank # 10

sir # 385034

votes 112

> *For ALL-IN-1 users, non-ALL-IN-1 users, and both, provide the ability to send, receive, and all of the other mail functions, regardless of whether the user is in ALL-IN-1 or not and have the receiver receive it whether or not he is in or out of ALL-IN-1.*

Both ALL-IN-1 mail and VMSMAIL are constantly under review. Both mail systems can send and receive the other's messages. It is not likely that VMSMAIL will ever be able to perform all of the functions of ALL-IN-1 mail but as many features as possible are included in both.

rank # 11
sir # 187001
votes 111

> *Provide a facility to abort printing of a document.*

(Same as 4) will consider as we plan future releases.

rank # 12

sir # 187016

votes 101

> *Provide a column cut and paste facility that is the same for all of Digital's Word Processing software.*

We are continuing to work toward consistency and increased functionality in all of our word processing products. We will consider this suggestion as we plan future releases of those products.

rank # 13
sir # 287071
votes 99

> *The editor screen width for a wide document should be "attached" to the document; therefore, when the editor is invoked for that document, the editor would automatically shift into wide-screen mode.*

This is considered a bug, and will be taken care of in the next release.

rank # 14

sir # 287006

votes 91

> *Provide a facility to define which ALL-IN-1 users may access a selected document/folder; access should be defined as either READ or READ/WRITE.*

(Same as 2) a shared file cabinet facility is available from software services. This feature will be considered as we plan future releases of ALL-IN-1.

rank # 15
sir # 287070
votes 90

> *Provide a document archiving and retrieval system.*

(Same as 6) will consider as we plan future releases.

rank # 16

sir # 386043

votes 83

> *Allow the text to automatically wrap when editing, so that the user doesn't have to "advance" through it.*

We will consider this as we plan future releases. this is a performance consideration.

rank # 17
sir # 187019
votes 81

Provide a global search and replace function for spell check within WPS-plus.

We will consider as we plan future releases.

rank # 18

sir # 187023

votes 80

Provide the facility for the output document of a form document to take on print format.

We will consider as we plan future releases.

rank # 19

sir 385017

votes 78

In the distribution of future ALL-IN-1 releases, when menus are eliminated or modified, provide a list of them so that sites with extensive customization can more easily migrate to the new versions.

A very good suggestion. we will consider this as we plan future releases.

rank # 20

sir # 287059

votes 78

Provide documentation on all WPS-Plus/ALL-IN-1 error messages.

This will be considered as we plan documentation requirements for future releases.

rank # 21
sir # 187002
votes 75

Provide an abbreviated Print Index facility that would displ the title and folder of the document, the creation date, and creator.

We will consider in a future release

rank # 22

sir # 287073

votes 75

The list processing output document should take the print settings from the form document. just as DECmate/WPS does.

We understand this request to be the same as number 13.

rank # 23

sir # 287067

votes 73

Enhance the gold-write function to allow writing to an existing document; the function could prompt for insert at top, bottom or overwrite.

Good suggestion, we will consider for a future release.

rank # 24

sir # 287004

votes 72

> *Provide a new File Cabinet menu option that will print a list of folders, without using the Print Screen function. The following information should be printed: folder name, date created, and number of documents in folder.*

We will consider in a future release.

rank # 25

sir # 287034

votes 66

> *Provide full functionality word processing that will be on a par level with other PC-based word processing packages and will also be com patible with WPS-Plus/VMS.*

Good suggestion - our strategy is to continue to enhance our word processing products.

rank # 26
sir # 287017
votes 66

> *When WPSPlus is the default editor and the Answer (A) function has been invoked, GOLD-0 should provide a "toggle" between the original document and answer.*

This is not easy to achieve because of the architecture of the WPS-Plus editor. However it is possible to do by means of a UDP very simply. Please ask your software specialist to show you how it is done.

rank # 27
sir # 287068
votes 65

> *The status line which is available with GOLD-Z should be permanently displayed on the bottom of the screen. This would make it compatible with DECmate/WPS.*

Will be considered as we plan future releases.

rank # 28

sir # 187027

votes 63

> *Provide an improved VAXnotes/ALL-IN-1 interface, using the Gold-Key concept.*

VAXNOTES currently supports the WPS-Plus editor. Further integration of VAXNOTES will be considered as we plan future releases of it and ALL-IN-1.

rank # 29
sir # 287007

votes 63

> *Provide the ability to change the name/title of a document without having to refile it to another folder or creating a new document.*

This feature is already available.

rank # 30

sir # 287060

votes 61

> *Provide a simple to use mechanism to send the first page of a document to one paper tray of a printer and the rest of the document to the other paper tray.*

Improvements to the automatic sheet feeders are planned for the future releases.

rank # 31
sir 485004
votes 60

> *Make the List function quit deleting trailing blanks and special characters; it also mishandles some Regis commands.*

Deleting of trailing blanks considered a bug. Improved Regis and Sixel support is being planned for future releases.

rank # 32
sir # 385049
votes 59

> *Provide tools, support and/or clues on interfacing and integrating non-Digital layered products to ALL-IN-1; such as, Telegraf, 1032 and SAS.*

Information on integrating applications with ALL-IN-1 can be found in the Applications User Guide. Software Services consulting and DECUS resources are also available for help on this subject.

rank # 33
sir 287011
votes 58

> *Provide a Telephone Message Pad (TMP). When a secretary is answering the phone, they need to access the TMP from any screen, including the Interrupt screen. The information on the TMP should be that which appears on a standard Telephone Message Pad. ALL-IN-1 should have a "IMP-flag Waiting" like "Mail Messages Waiting"; and, the TMP message should be readable from a GOLD-Key function from any screen.*

This is a good suggestion. We will be consider the possibility of including such a feature in a future release.

rank # 34
sir # 485033
votes 34

> *Provide a new service: computer conferencing/bulletin board.*

The combination of VAX VTX and VAXNotes can provide computer conferencing and bulletin board capabilities now.

rank # 35
sir 385010
votes 35

> *Provide a full scale office work station for the IBM PC, something on the order of the DECmate office workstation except better, ie. more functions downloaded into the PC, the calendar downloaded to some extent on the PC, allow menus to be modified on the VAX and download them onto the PC.*

To some extent this is the definition of PC ALL-IN-1 minus the
CALENDAR/VAX menu modification. this request will be considered as we
plan future releases of PC ALL-IN-1.

rank # 36
sir # 287031
votes 55

> *All WPS-Plus versions, regardless of hardware environment, should have the same functionality and user interface.*

Thus our continuing strategy is to make the user interface and functionality of all WPS-PLUS products the
same. This is not possible in all situations due to operating system as well as hardware limitations.

rank # 37
sir # 386013
votes 54

> *Provide a printer option that does not display a menu, but rather goes directly to the user's default printer.*

This will be considered for a future release but can be achieved now through customization.

rank # 38
sir # 287066
votes 54

> *Enhance the RV (Receive from VMS) function to allow the use of wildcards.*

We will consider for a future release but it is not currently achievable
with the existing design of WPS-Plus.

rank # 39
sir # 287036
votes 50

> *Provide a Spell Check function.*

DECSPELL provides this function for all of our word processing systems and is available today.

rank# 40
sir 287024
votes 49

> *Allow for "Standing Meetings": When the option is invoked. parameters could be specified for dates and/or number of days/weeks.*

We are evaluating the functionality of time management and will continue

to enhance future releases.

rank # 41
sir # 287005
votes 49

> *Enhance the document transfer function for importing VMS files to the ALL-IN-1 file cabinet:
> provide a prompt to query if the VMS file should be deleted or not after it is imported.*

This is a good suggestion. we will consider it as we plan future releases.

rank # 42

sir # 287015

votes 46

> *Provide a feature to automatically delete all documents from the read and outbox folders after
> the documents have reached a specified age. The age would be set by the ALL-IN-1 System
> Manager or by an option on the individual's file cabinet.*

Will consider as we plan future releases.

rank # 43

sir # 386011

votes 42

> *Provide a "secret" classification for mail; this type of mail would require greater security than
> "confidential and the secretary would not be able to read it.*

Will consider as we plan future releases of our mail products.

rank # 44

sir # 486002

votes 42

> *Provide an option to allow a user see the status of mail messages that have been sent but not
> yet read. Message status would include the title of the message and the addresses who have
> not read the message.*

This is a very good suggestion and we will consider it as we plan future
releases.

rank # 45
sir # 287035
votes 40

> *A Copy function should exist to allow the copying of documents from one drive to another.
> Currently, approximately six steps (including DOS commands) are required to accomplish this
> operation.*

This feature can be found in PC ALL-IN-1 today.

rank # 46

sir # 287023

votes 38

> *Allow mail messages to be filed in the user's directory (personal storage) and delete the
> pointers to the share file. The current File Text and File Message facilities are not acceptable.*

Filing mail messages in the user's directory would make them editable and would therefore dilute the

integrity of the mail message. It is possible to accomplish the effect you are looking for with todays product.

rank # 47
sir # 385011
votes 36

> *Provide an indication on the ALL-IN-1 screen or menus of the load on the system; when the system is heavily loaded, the users don't mind waiting a little longer, if they know it will take a little longer.*

This function could be provided through customization with todays product. We will consider for inclusion in the standard product as we plan future releases.

rank # 48
sir # 287044
votes 36

> *Provide the ability to Get a page or specified range of pages from another document, rather than the entire document.*

We will consider for a future release. There is a workaround to this problem that can be accomplished by utilizing library document techniques. This subject was discussed by Jack Gilmore during his "Power of GOLD KEY Editing" presentation.

rank # 49
sir # 187018
votes 36

> *Give LN03 printing capabilities on the VAX as on the DECmate. This capability should include the facility to stop the print job and to stop before each page.*

Will consider as we plan future enhancements to the print queue manager.

rank # 50

sir # 385009

votes 36

> *Provide the ability to manage the ALL-IN-1 system files separately from the janitor process. By breaking these two functions apart, the amount of dedicated system time is minimized.*

Will consider for a future release.

TIME TO VOTE !

E. Catherine Ditamore
ARA Services, Inc.

Once again, it's time to vote on the SIR's! The System Improvement Request (SIR) Process provides us, Digital users, with a mechanism to help guide the development of Digital's Office Automation (OA) products. SIR's are submitted by you and then prioritized through a tally of your votes on the SIR's. It is this prioritized list that Digital will review in order to prepare their response, which will be given at the OA Wish List Session in Nashville. For those of you not attending the symposium, you'll find the response printed in the OA SIG Newsletter after symposium.

In order to give Digital an adequate amount of time to form their response, you need to vote TODAY! Any ballots received after <u>OCTOBER 12</u> cannot be counted. You'll find the ballot in the "tear-out" section at the end of the newsletter.

The list of SIR's was compiled from three sources: completed SIR forms (like the one in the "tear-out" section at the end of the Newsletter); wishes submitted at the OA Wish List session during symposium; and, SIR's to which Digital has not yet made response but which received votes during a prior ballot.

The SIR's are grouped below by category, to simplify your review. You have 100 points to allocate among the SIR's on the ballot, although you may not give any one SIR more than 10 points. You may assign the point values in either a positive or negative sense: a high positive value would strongly encourage change, and a low negative value would discourage the change. For example, if the positive points total 80 and the negative points total 20, the allowed 100 points have been fully utilized.

Remember, only one ballot per DECUS member will be accepted!

ALL-IN-1: GENERAL ENHANCEMENTS

386003	The VAX-11 FMS Translator License should be included with the ALL-IN-1 layered product.
187003	Provide updates to the ALL-IN-1 documentation kits from version to version, rather than complete new documentation kits.
187005	The contents of a document should be consistent, regardless of its origin. A document created in Electronic Messaging appears to contain both header and text; therefore, when such a document is transferred, both the header and text should be transferred. The fact that only the text is transferred is very difficult to explain to an ALL-IN-1 user.
287002	Provide the ability to save rulers for Electronic Messaging documents, as in WPS-Plus.
287003	Implement PC MEM as part of the base Action Item product; in the past, it has been an unsupported function that enhanced the Calculator function.
287009	In the Nickname Management Subsystem, change the "Mail Address" field to "Username" to minimize confusion.
187026	When Spell Check is selected from Electronic Messaging (EM), ensure that it returns to the EM menu, not Word Processing.
387001	Have the print formatter recognize and correctly interpret the special print characteristics embedded in COBOL/FORTRAN generated print files.
387002	Provide more ways to Index documents, e.g. using a SINCE or BEFORE qualifier or using a SEARCH string.
387003	When using Spell Checker, EDT documents should not be converted to WPS.
387004	Provide a message indicating that the Spell Checker has finished.
387005	Expand the length of the Nickname Management name field so that it can be used to assist in accessing public networks.
387009	Improve the facilities for managing mail distribution across a multi-node network, e.g. users shouldn't have to know what node another user is on.
487001	Allow the user to "blank out" the ALL-IN-1 screen via one or two keystrokes.
487002	Digital should establish a corporate philosophy that all software will require the same keystrokes to perform similar functions, and establish and publish a User Interface Standard.
487003	Allow multiple users to log into and work in the same ALL-IN-1 account (same Username), concurrently, while maintaining the integrity of the data files.
487004	Revise the menu operation to allow task selection by cursor key controlled, highlighted selection; pressing the first letter of the desired function selection and return, or a function key, would reduce keystroke requirements — similar to the Spell Checker.

| 487005 | When viewing the display of an Index request, allow the user to scroll backward as well as forward. |

NEW ALL-IN-1: FEATURES AND FACILITIES

| 185002 | Provide the capability for system-wide nicknames. |

| 185025 | Provide better integration of ALL-IN-1 with the following products: DECslide, DECgraph, and DECalc. |

| 385013 | Provide improved security and protection features for ALL-IN-1, something on the order of allowing users to see the menus and the selections on them, but not be able to execute the individual functions unless they have been authorized to do so. |

| 385031 | Improve the packaging of OA products. With an ALL-IN-1 system there are a large number of products that require coordination of different versions for compatibility. They should all be bundled together so that the user can receive one big package in the mail and know that they have everything needed to bring up a new version. |

| 187007 | Provide ALL-IN-1 Error Message Documentation on DSIN. |

| 187029 | Provide an automatic interface between ALL-IN-1 and CMS; provide the ability to develop forms in CMS. |

| 387006 | Provide TPU support. |

| 387007 | Provide a statistical analysis that would allow the system manager to monitor ALL-IN-1 user activity. |

| 387008 | There should be a User Profile option to provide for Auto Delete of Return Receipts. |

| 387016 | Provide a Speed Read facility that allows you to Read New Mail messages, but does not return to the E-mail menu after reading each mail message. |

| 387017 | Provide a facility that will notify you at log in or log out that you have unsent Mail messages in the CREATED folder. |

| 387018 | Allow Mailing of an entire Folder, and then filing of that folder without reading through every document in the folder. |

ALL-IN-1: SYSTEM AND SYSTEM MANAGER FUNCTIONS

| 185004 | Provide the ALL-IN-1 system manager with the ability to manipulate mail messages. |

| 185023 | Include an additional 80-bytes in the user profile for customer specific use. |

| 185029 | Provide a conversion utility telling you what's been changed in your current ALL-IN-1 system. |

| 185033 | The Atlanta Hot Line should provide comprehensive user support. If the Atlanta Hot Line cannot answer a question and feels it is a responsibility of Colorado Springs, Atlanta should contact Colorado directly and pursue the problem with Colorado, rather than tell the customer to call Colorado. |

| 385014 | Provide additional development tools to aid in development of ALL-IN-1 applications, such as cross-reference utilities. |

| 385042 | Recognize the ALL-IN-1 script facility or language as a language and support it as a language, with the language standards. Also, provide a TPU interface so that we can get past the SYNTAX and get to the application building. |

| 485016 | Provide a function (OA$SYM-DELETE) to delete symbols from the permanent symbol table. |

| 386005 | The ALL-IN-1 documentation set should include both WPS-Plus and DECPage documentation. Also, there should be a documentation index for WPS-Plus and DECPage. |

486008	Provide the ability to run ALL-IN-1 user main processes at a higher priority (than other users), while any ALL-IN-1 user sub-processes would run at the normal (default) priority.
486013	ALL-IN-1 should support the IBM PC/XT/AT printer port; i.e. the user should be able to select PORT IBM like PORT LA50 can be selected.
187008	Provide an ALL-IN-1 Guide to Development for new ALL-IN-1'ers.
187009	Provide additional script functions for string manipulation, similar to DCL Lexical Functions, except without having to use DCL.
287001	Provide a script function that is equivalent to a PASCAL "case" statement.
287013	Provide the capability to READ, MODIFY, and CREATE/WRITE text DSAB's that are compatible with ALL-IN-1 DSAB's; this would allow for the complete manipulation of documents. This facility should be documented in the APR manuals.
287014	Provide technical ALL-IN-1 Training, *ANYWHERE* (Ed. Services, DECUS, etc.)! It should consist of Introduction to Scripts, Intermediate Scripts, Advanced Scripts, etc.
387010	Provide an easy way to change an ALL-IN-1 username.
387011	For sites running non-homogeneous clusters, provide a facility (for use by the ALL-IN-1 manager) that allows mail messages that have been delivered to the wrong node to be redirected.
387012	Allow the Carpenter facility to run on a subset of the ALL-IN-1 system, e.g. on a crashed disk, so that the system can be restored quickly, rather than taking the many hours required to rebuild the entire system.
387013	When deleting an ALL-IN-1 user, the entries in PENDING.DAT and MEETING.DAT should also be deleted.
487006	Provide menu-driven system administration functions (such as backup, queue management, etc.) for non-technical VAX environments, similar to A-Z Systems.
487007	Provide a tape backup and restore facility for all documents in *one* ALL-IN-1 folder.

ALL-IN-1: ELECTRONIC MESSAGING

385021	Upgrade the Mail function "Delete" with confirm and no-confirm options.
485001	Provide some kind of audit trail, notification to a user or duplicate messages indicating that something was sent to him and auto-forwarded.
485009	An option is needed to present expansion of distribution list or not, as subscribers are handled, since lists of names in excess of 20 are cumbersome.
485010	Names of mail-format BLP's (i.e. MAILMEMO1.BLP) are hardcoded into ALL-IN-1. They could be logicals and therefore changeable.
485014	Add an option to allow a user to get a list of the sender and all addressees at the MAIL ANSWER prompt.
386023	Provide the ability to request Return Receipts from selected users, rather than all recipients of a mail message.
486001	Provide a user-selectable default for Received Receipts and Read Receipts; currently, NO is the default and YES must be selected on a per document basis.
187012	Provide a menu option: Print INBOX.
187022	Save the default print settings in Electronic Mail messages, rather than forcing the user to set them each time.
287016	Provide the ability to see which Electronic Messages you have sent that have been READ, without having to use Read Receipts. This function would be similar to the Message Search (MS) function from ALL-IN-1 Version 1.3.

287018	Expand the Current Item Block to include the name of the sender of the message.
287020	Allow messages to be deleted before they have been read.
287021	Expand the mail header on "answer" messages to include a reference to the title of the document being answered.
387014	Provide the ability to mail spreadsheets and executable images (binary files).
387015	When Filing an Attachment, if there is only one attachment, don't prompt for which attachment should be filed.
487008	For the ANSWER function, Paper Mail recipients should be identified by name, not just "Paper Mail".
487009	The recipient of a message should be notified who the message is from and that a Return Receipt was requested. The recipient should then have the option of *not* reading the message at that time, so that the Return Receipt will not be generated until it is read.
487010	All Paper Mail should print on the users default printer, NOT the system printer.
487011	In order to save time and keystrokes, there should be a User Profile Option that will cause the user to be prompted at the end of message creation, message attachment, etc. for immediate sending (with the User Profile Option specifying Y or N).
487012	The Return Receipt function should not create a document in the reader's OUTBOX folder.

ALL-IN-1: TIME MANAGEMENT

287025	Provided the ability to make duplicate/recurring calendar entries, i.e. Meetings, Appointments, Reminders, Actions Items, and To Do Lists. A single screen should be used to make the duplicate/recurring entries.
287026	All Time Management facilities should use the same entry screen. This would be consistent with a user having a single calendar page for a day.
287028	In Time Management Action Items, provide the ability to edit the class or item.
287029	In Time Management To Do Lists, provide the ability to print and view the items in priority sequence.
387019	Provide a Multiple Delete/Purge option for Action Items, Reminders and To Do's, similar to the facility in Meetings and Appointments.
387020	Allow Calendar Access (i.e. Management, Two Calendar Access, Meetings) to work across nodes. (Note: Multiple nodes, connected via DECnet, can be located in the same building.)
387021	Provide a Set Owner facility for Action Items and Reminders.
487013	Improve the Index facilities. Allow selection of all meetings/appointments from a specific date forward in time. From that index the user should be able to select the day to be worked on and be able to go directly to the Advanced Calendar function.
487014	If an appointment is scheduled within the bounds of the hours specified in the user profile, the AM or PM notation should be optional, e.g., from 8 to 12 should assume 8AM to 12PM.
487015	Replace the Display Events and Print functions for Weeks and Months Schedule with something more similar in format to the Days Schedule. And, rather than have three menu entries (day, week, and month) have a single menu entry that allows the user to specify the number of days to list.
487016	On the Advanced Calendar display, the selected appointment should be highlighted so the user can easily see which appointment would be edited, deleted, etc.
487017	In the Advanced Calendar function, instead of using the SEL function, the user should be able to position the cursor on the appointment to be operated on and then press the desired function, such as D (delete) or E (edit).

487018	An alternate date format should be provided in the form MM/DD/YY.
487019	The cursor movement keys should be enhanced to allow the right arrow key to move forward one day and the left arrow key to move backward one day.
487020	Prior to scheduling a meeting, a check of the attendees calendars should be made to ensure that they don't already have an activity scheduled.
487022	The meeting scheduler should have the option of being included as a meeting attendee. This will allow the secretaries to schedule meetings from their own account, rather than from their managers' account.
487023	Eliminate the To Do function as it is too similar to the Action Item and Reminder functions.
487024	Add a time field to Reminders so that the user can be prompted while logged on rather than only at the beginning of the session.
487025	Replace the Week Print function for Reminders and Action Items with the format used for Day Print.
487026	For Action Items, provide a Print function that gives a sequential list by action class and date of all open and/or closed action items between two dates.
487027	In Action Items, there is an action item class and item. A non-unique action item should be allowed within an action item class. (Example: If the class is Budget, it would be helpful to have an item of Quarterly Report appear four times within that class.)
487029	Add a 'tentative meeting scheduled' status. This should appear on the user's calendar until an attendee accepts or declines the invitation to a meeting. (This should also appear when the SCAN function is used.) If the meeting scheduler cancels a meeting, the 'tentative meeting scheduled' status should be removed.

WORD PROCESSING: GENERAL

385033	Provide better journaling in WPS-Plus so that a little bit more of the document is left when the system crashes and comes back.
485049	Allow all PC's to transfer files and WPS documents to ALL-IN-1, Rainbow and P/OS, as part of user-friendly application.
485056	Enable DECmates, Rainbows, PRO's and anything else running WPS-Plus to directly exchange documents.
386009	ALL-IN-1 should support *either* WPS or EDT, but not both.
486029	Provide an index function that will work with both WPS-Plus and DECPage.
187015	Provide a prioritized To Do List within WPS-Plus.
187020	Provide an auto-index function for a document within WPS-Plus.
187021	In WPS-Plus List Processing, provide the ability to use multiple forms.
287030	The location of the NEW PAGE marker should be consistent in List Processing Form Documents. Currently, the location differs between DECmate WPS and WPS-Plus/VMS documents.
387022	In WPS-Plus, when the user moves past the bottom or top of the document, "any key" must be pressed in order to continue. Change the function to recognize any Gold-key or arrow sequence as alternatives to the "any key to continue".
387023	The status line should reflect the correct line spacing when using double or line-and-a-half spacing.
387024	Make the Footnote Editor work the same as WPS-Plus, in terms of size, editing features, etc.

487030	Provide a status line for cursor position and insert/overstrike status.
487031	Display the ruler at the top of the screen all of the time.
487032	Provide a small reference card that can be placed next to the terminal to prompt the user on commonly used functions.
487033	In the two dimensional editor, provide the ability to draw diagonal lines.
287038	Allow for multi-level indents. Currently, only one line can be indented with the word wrap tab (W).

WORD PROCESSING: WPS-Plus/PC

485055	Provide the WPS-Plus's DX/DT option on the Rainbow.
486023	WPS-Plus/PC should be more like WPS/DECmate — there are differences in the user interface, keystrokes and functionality.
287037	Provide the ability for print functions to occur in the background.
287039	Provide support for Overstrike Mode, rather than just Insert Mode.
287043	Allow more flexibility with UDP's: the ability to insert a Pause instruction to allow for more input of variable information; the ability to go outside WPS-Plus/PC to DOS; or, the ability to name the keystroke or associate a comment with it (in order to determine its contents and use without going into edit mode and displaying the contents).
287046	Provide more support for printers and simplify the support for printer tables. (Horizontal and vertical movement could be more easily defined by using a horizontal or vertical motion index and having the table calculate the various pitches.)
287047	Provide the ability for proportional printing on printers that support it.
287048	Implement multiple paste buffers so that you can cut and paste more than one item at a time.
287049	Develop a "hot-key" to DOS to allow simple DOS commands to be executed without exiting WPS-Plus/PC.
287052	Allow documents to be stored in File Cabinets.
487034	Incorporate the Spell Checker into the Rainbow Office Workstation.

WORD PROCESSING: WPS/DECmate

386059	Allow a special key on the DECmate that would print "bullets" that are filled in.
287032	New WPS keycaps should be available for consistency with the new functionality available in Version 2.1.
487035	Provide multiple paste buffers.
487036	A Gold Quit option is needed.
487037	Provide a Widow/Orphan option.
487038	Allow for double underline.
487039	Allow editing to occur in View mode.
487040	Provide for auto-hyphenation.
487041	Provide a facility for automatically creating an Index for a document.
487042	Provide a facility for automatically creating a Table of Contents for a document.
487043	Provide a facility for paragraph numbering.
487044	Allow for Line Drawing.

487045	Provide a Gold Write facility similar to that of WPS-Plus.
487046	Current Text Size should automatically be adjusted according to the document's page size and top and bottom margins. Or, the Current Text Size should be located on the Print menu instead of the Editor's menu.
487047	Simplify the use of multiple columns/tables, especially when tables are more than one page.
487048	When using the Delete option, provide the ability to queue several documents at one time, instead of individually.
487049	Change the status so that the line number of each page is displayed when scrolling backwards.
487051	Provide an auto-rewrite facility.
487052	Allow the user to work with a *copy* of a document, not the original.
487053	Provide a statistical column layout feature.
487054	Allow for automatic column centering for column headings.
487055	Enhance the Gold Get option to allow specification of pages within a document or all of the document.
487056	When printing, allow several non-consecutive pages of a document to be queued at the same time.
487057	When doing Reset Page, allow any specified page to be printed.
487058	Provide an ETHERNET interface to the DECmate, similar to that for the IBM PC's.

WORD PROCESSING: WPS-PLUS/ALL-IN-1

287061	Allow WPS-Plus to support the escape <ESC> character, as EDT does; this would implicitly allow users to support their own non-Digital printers.
387025	The Gold-Get facility of WPS-Plus should retain the rulers of an E-mail message.
387026	Make WPS-Plus display text correctly when Mail Notify and Broadcast Messages are received.

WORD PROCESSING: WPS-PLUS/VMS

187025	Remove the ALL-IN-1 references (e.g. scripts) from WPS-Plus/VMS.
287062	WPS-Plus/VMS does not require a Right margin when rulers are defined; a Right margin should be required. This is inconsistent with the other WPS products and can cause problems when editing the document.
287063	The Index function in WPS-Plus/VMS should display the VMS file specification for each document.
287064	The Index function in WPS-Plus/VMS should display the VMS file size (in blocks).
287069	Provide procedures that will reorganize (and optimize) the WPS system files; this function should ensure that each user's default settings are preserved.

MISCELLANEOUS

185019	Provide full intelligent modem support, including looping and if-then-else capabilities.
485058	Document header formats should be identical for ALL-IN-1, DECmate and Rainbows so that a document transfer will retain keywords, subject, author, etc.
386025	Provide a simple mechanism for easily retrieving VAX-11 Datatrieve reports.
386065	The LN03 should not produce controller errors every time pages that are more than 90 characters wide are sent to it.

386067	DECSpell's IGNORE function should not be case sensitive.
187028	The ALL-IN-1/Message Router interface should be better integrated and easier for the System Manager to utilize.
187031	Unbundle the PC/ALL-IN-1 software.
187034	Enhance PC/ALL-IN-1 to provide better access to applications running under ALL-IN-1.
287076	Develop a "gold" keyboard for the Macintosh.
387027	Increase the amount of information provided by the Message Router Manager Utility about mail messages, e.g. name of sender, name of receiver, etc., in order to simplify problem tracking and resolution.
387028	Develop something that provides proportional font printing. The current products are not adequate: font cartridges do not provide correct tab alignments and DECPage is not a viable alternative since "what you see is not what you get".
387029	Allow documents to be cleanly printed on non-Digital printers which are attached to the workstation; currently, control codes print in addition to the text.
387030	On a non-homogeneous cluster, provide the ability to deliver mail messages between the multiple systems without using the Message Router.
387031	Support double underline and change bars in DECPage.
487059	Provide a DISOSS Bridge (Gateway) to DISOSS Distribution Services for RFT documents and Binary (PC file type data) File mail capabilities.
487060	The LA100 printer should have the capability of printing double underscores.

ARTIFICIAL

INTELLIGENCE

DECUS

(THE (LINKED LIST))

The Newsletter of the DECUS Artificial Intelligence Special Interest Group

"... It's The Real Thing"

Vol. 3 No. 5 August 1987

From The Editor:

As this issue of (THE (LINKED LIST)) shows, the past several months have brought a deluge of AI-related hardware and software announcements. Perhaps the most significant development in the Digital community is the recently announced round of price cuts on VAXstation 2000 systems. Taken in conjunction with the growing number of expert system shells that have been ported to VAX systems, the price cuts may well portend the acceptance of low-end VAX systems as industry-standard AI delivery platforms.

Digital's competitors, however, won't sit idly by as users discover that they can purchase VAX performance at personal computer prices, so it's likely to be an interesting summer for artificial intelligentsia and mainstream computer users alike. Be on the lookout for next month's newsletter, which will hopefully provide an after-action report on the AAAI conference held in mid-July in Seattle.

As always, (THE (LINKED LIST)) welcomes your articles, comments, hints and suggestions. Send your contributions to DCS user SHANNON or mail them to me at the following address:

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DIGITAL LAUNCHES SUMMER WORKSTATION OFFENSIVE

By Terry C. Shannon

MAYNARD, Mass.— When is a PC not a PC? When it's a VAX. In a mid-June announcement that caught analysts and competitors by surprise, Digital Equipment Corporation fulfilled Ken Olsen's promise to offer a VAX family whose price and performance span a thousandfold by debuting a VAXstation 2000 equipped with a 15" monochrome monitor and a PC-like pricetag.

Not content to deliver VAX performance at PC prices, Digital unveiled two color VAXstation 2000 systems and dramatically slashed the list prices of the entire VAXstation 2000 family.

Digital vice president Jack Shields claimed that the low-end VAX family is a viable alternative to 80386-based PCs and workstations. "Today's aggressive announcement takes workgroup computing far beyond the capabilities promised for 32-bit PCs," he said.

The vanguard of Digital's assault on the PC price point is a new 15" monitor available in both monochrome and color versions. The new monitors cost about half as much as their VR260 and VR290 counterparts, yet provide the same 1024-by-864-pixel resolution as the 19" monitors.

Scheduled for December shipment are a diskless VAXstation 2000 system equipped with the new 15" monochrome monitor as well as a diskless workstation whose 15" color monitor will display four planes of color graphics.

A color graphics VAXstation 2000 configured with Digital's 19" VR290 monitor will be available in October, the company said. In addition, the price of the 19" monochrome VAXstation 2000 has been reduced 48 percent. The monochrome system is shipping in volume with 30 to 60 day lead times.

All of the low-end VAXes come equipped with 4MB of memory, an Ethernet adaptor, monitor, mouse, keyboard and single-user software licenses. VMS, VAX workstation software (VWS), DECnet and LAVC licenses are supplied with systems running the VMS operating system. Ultrix workstations include UNIX workstation software, X-Windows and Digital's port of Sun Microsystem's Network File System (NFS) software. Also included are C, VAX C, Fortran 77 and Pascal compilers.

Industry observers contend that the June 16 announcement reflects Digital's plans to take the high ground in the workstation arena by preempting the forthcoming onslaught of 80386-based PCs. "DEC's announcement marks the beginning of the 'low-end wars,'" said Don Brown, an analyst with D.H. Brown and Associates in Tarrytown, NY.

Brown contended that Digital's repricing is aimed at IBM's recently unveiled PS/2 personal computer and its 80386 chipset. "We are concerned with hundreds of thousands of units, not tens of thousands. This is 80386 territory; not traditional VAX space," he said.

"At the low end, there's very little profit, but a great opportunity exists for market expansion," Brown explained, adding that Digital can harvest the profits later when customers upgrade to larger VAX systems. "DEC's philosophy and approach is far superior to IBM's from a financial standpoint," Brown added.

While applauding Digital's low-end strategy, Brown noted that the expanded VAXstation 2000 lineup still suffers from the absence of DOS compatibility. "If DEC offered a workstation that runs MS-DOS in a VMS or Ultrix window and price [the product] right, they would have a good 80386 alternative," he said.

Observing that the VAXstation repricing gives Digital a golden opportunity to capture the front end of the engineering workstation market, Brown said that the firm must move swiftly to exploit its position. "This is DEC's last shot at the low-end workstation market. The window of opportunity will close when 80386-based software begins to ship in volume," he concluded.

Fred Cohen, an analyst with L.F. Rothschild in New York City, agreed with Brown's observations. Cohen noted that Digital is using the same pricing gambit that Sun Microsystems adopted when IBM debuted its PS/2 computers last April.

"Sun cut the price of its Sun/3 workstation line to deter VARs from being tempted by the PS/2. DEC is adopting the same approach," Cohen said. Rather than try to hide behind proprietary VAX/VMS technology, Cohen maintained, Digital is meeting the competition head-on. "The repricing strategy will help DEC obtain more VAR agreements and place the firm in direct competition with Sun, Apollo, Apple and IBM," the analyst said.

ARTIFICIAL INTELLIGENCE AND DATABASES

By Becky Selke

Artificial Intelligence and Data Base technology are both receiving a great deal of attention. Many researchers see that an integration of these technologies would reap benefits to both disciplines. This article examines the potential uses of the combined technologies, the benefits of combining the technologies, and some of the approaches being examined to bring the two together.

As AI applications continue to grow, the knowledge bases that store the knowledge grow as well. There is an increasing need within the AI community to find more effective mechanisms to deal with these larger data bases. In addition, issues of sharing information, security of information, and archival of information are becoming increasingly important. Each of these issues has been addressed in the field of data bases.

Additionally, the field of AI can contribute the ideas of natural language interfaces and deduction to the data base field from the standpoint of user query processing. It has been noted that both Prolog (a popular AI language) and relational data bases rely on first order predicate calculus for their foundations. This suggests that there may be a basis for using the two in conjunction with each other. Finally, many of the applications that could benefit from the use of AI techniques operate with huge existing data bases. For these systems to work properly, they must be able to access the data in these data bases.

The data base field can benefit from work in AI as well. There has been a great emphasis placed on letting the end user directly access the information in the data base so reports can be generated quickly. The query languages currently are far too cryptic for the "average" end user to comprehend. Thus, the use of natural language front ends is being heavily investigated. There is also a problem in dealing with data bases in trying to get out all of the information in the data base, both that information which is explicit and that which is implicit. For example, a geneology data base contains information about the relationships between specific people. Inferences can be drawn to determine additional relationships. Additionally, rules could be placed in the data base itself to aid in this inference process. Adding deduction capability would allow more information to be gleaned from existing data bases. Finally, some intelligence could be used in determining if a given query "makes sense" to give more reasonable responses to user queries. In these ways, research in AI can have a positive impact on the field of data bases.

So, how do we go about combining the fields of AI and data bases? There are several basic approaches:

1) Add an inference engine into an existing DBMS

2) Add a DBMS into an existing AI system or language

3) Write a new system incorporating both technologies

4) Allow "call out" access to data bases from AI languages

While alternative 3 will obviously give the best result creating an entirely new environment from scratch ignores all the work to date, and requires a massive investment in time and money. Alternative 4 does not address the more basic problem of allowing a dynamic rule base and knowledge base to be archived. It would provide for the storage of processing information in a data base, but the requirements go much deeper into the AI systems than that.

This leaves the alternative of adding a DBMS to an AI system or vice-versa. The choice here depends more on the application. If it is primarily a data base application which is accessible from a conventional language, the addition of an inference engine could be accomplished to allow some increased level of functionality. Adding a DBMS to an existing AI system would also allow an increased level of functionality.

Some research is already in progress on these alternatives. It is unclear how useful the stop gap measures will be. However, it is clear that the integration is useful, and since many systems are sorely lacking in certain areas, marginal improvements can have tremendous pay offs. Both fields must recognize that each has something to contribute to the other.

EXPERT SYSTEM PROJECT SELECTION AND MANAGEMENT

By Dr. George Humfeld

Introduction

Selecting your first expert system project and writing your first expert system proposal are intimately linked. When selecting your first expert system project, you must keep in mind how you are going to sell management or a customer on the idea. Similarly, the nature of the project effects the proposal. The unifying aspect of these two subjects, and an appropriate framework within which to discus them, is one of expectations: management's (or customer's) expectations, your expectations, the expert's expectations, and the user's expectations.

Selecting a First Expert System Project

When I first got involved in the AI field, I read books and magazines and attended symposia and conferences. There seems to be two ways in which to advise people on selection of their first expert system.

One way is to describe the types of problems which are amenable to an expert system solution: interpretation, prediction, diagnosis, planning, design, repair, etc. This approach is taken by Frederick Hayes-Roth, et. al., in the early chapters of Building Expert Systems. The problem with this approach is lack of specificity. Even if you select a problem which is obviously in one of the magic categories, that does not guarantee that an expert system solution is best, or even appropriate.

A conventional software approach, or even a manual approach, may be less expensive, easier to develop, and faster running than an expert systems approach. It is important to keep these categories in mind as a lower level of abstraction of the idea of selecting a "knowledge intensive" problem, as opposed to a compute intensive problem.

A second approach to advising one on selection of an expert system problem is to give maxims or rules-of-thumb which can be applied to the selection process. Figure 1 is a list of such maxims which I have compiled from a variety of sources. The problem with this approach is that some of these maxims contradict others, some won't apply to particular problems, some (I suspect) aren't useful under any conditions, and some are useful only if you already have broad experience building expert systems. These distinctions are almost never brought to light by the speakers or writers. The result is confusion on the part of those of us who are trying to select our first expert system project. I hope to shed some light on these maxims.

Figure 1: Expert System Maxims and Requirements

o High Pay-back Problem

o Available and Willing Expert

o Expert can Articulate Methods Used

o High Management Visibility

o Failed to Model Using Other Methods

o Solution Requires Expertise

o Complex Problem Which is Too Simple

o Problem with Easy and Hard Versions

o Expert can Solve in Several Minutes to a Few Hours

o Expertise Scarce

o Expertise Soon to Leave or Retire

o Not Beyond Current AI State-of-Art

o Experts' Solution Consistent

o Input Data Readily Available

o Task Repetitive or Boring

o Hostile Environment (Hazardous to Humans)

o Solution Procedure can be Taught (1 Year Rule)

o Solution Does NOT Require Common Sense Reasoning

o Telephone Test

o Fast Response Time Required

o Operation of Expert System can be Evaluated by Experts

Management Considerations

First let us consider six of the above maxims in the light of management's expectations. As you select your first expert system project, you might want to keep some of these in mind in relation to how your management or customer will view your project and how you are going to sell the idea to them. (Hereafter I will refer only to management, mostly due to my particular orientation. Most of these comments will apply equally well if you are dealing with a customer, as long as you bear in mind that we are talking here about the person, or group of persons, with approval, and possibly funding, authority over the project.)

High Pay-back Problem

This is always number one on everybody's list. Texas Instruments has broadcast three satellite symposia on AI. In the first two Dr. Edward A. Feigenbaum of Stanford University referred to these problems as golden nuggets. These are the problems whose solution will save the company lots of money. Normally, these are large, complex problems. Many have defied other types of solutions. But this is not necessarily the type of problem you want to tackle for your first expert system problem.

An alternate approach proposed in TI's second satellite symposium is to look for many "small-payoff" projects. I think this is a more appropriate attitude to take for your first expert system project. And it is being done in industry. In that same satellite symposium Dr. Ed Mahler of Dupont discussed a wide variety of small knowledge-based systems in operation or under development at Dupont. By 1990 they plan to have 2000 such systems in operation and a broad base of personnel trained in their development.

In TI's third satellite symposium Dr. Herbert Schorr of IBM indicated that his company currently has 75 expert systems in operation. It is clear from the way he talks about these applications that IBM is following this small system approach. He said that a project which pays back $200,000 in the first year could be worth doing based on payback-investment ratio if it took only two or three man-months and inexpensive tools. It is interesting to note that IBM seems to be using third party software on PC's rather than their own tools on the mainframes.

The advantages of going for what a friend of mine calls silver bullets, rather than the golden nuggets, are almost obvious: Initial investment is small. Successful applications are usable in short timeframe. Successful applications might be expandable into successful golden nugget applications of which they are a part.

High Management Visibility

The choice of a problem with high management visibility may be important when you need lots of money. Here we are back to the golden nuggets. It is important that your project not get visibility too high in management too soon. Rather, get first-level, maybe second-level, management support early. Then elevate the visibility of the project as success becomes more assured. Wait until your prototype is useful in its existant form. Then elevate visibility as you expand its coverage and usefulness.

Sometimes management visibility can be created as needed. This is particularly the case when expertise is scarce or expected to leave or retire soon.

Expertise Scarce

The engineers in my office spend a lot of time on the telephone giving advice to site personnel who are trying to troubleshoot equipment and procedure problems. We hope to distribute this relatively scarce expertise to the sites in the form of expert systems.

I heard one speaker say to try not to choose a problem where the expert is in the 45 to 55 year age range. People less than 45 generally don't feel threatened because they are confident of finding another job, even if it means learning a new skill. Those more that 55 are close enough to retirement not to worry and are interested in helping the organization.

Expertise Soon to Leave or Retire

Our site personnel are military and are typically on two to three year rotation. Needless to say, incoming personnel normally do not have the same level of technical knowledge as the outgoing personnel. Outgoing personnel often have knowledge about peculiarities regarding particular equipment they have seen on a regular basis during their tour. A dual coverage training period cannot always be arranged.

Although the headquarters engineers generally stick around a little longer, the situation is almost the same. Management is quite concerned that corporate knowledge and expertise is leaving with each engineer who leaves the organization. Knowledge based programming in the form of expert systems can provide a way to capture and retain that corporate knowledge and expertise. These arguments can be used to create and elevate management visibility.

Failed to Model Using Other Methods

There are problems which are so important that conventional programming techniques have been applied to them with no real success. In some cases an expert system approach is just what is needed. In other cases, it's not. So be very careful in tackling such a problem. You may not want to take on such a problem for your first expert system project. These problems often have high management visibility from the start. Failure could effect management impression of expert system technology in general.

Task Repetitive or Boring

This may seem out of place in a listing of management considerations. Naturally you can get better cooperation from your expert if you convince him that is will remove some of the repetitive and boring part of his or her job. I place this consideration here for two reasons. First, it seems to stand in direct contrast to the first two considerations. It is hard to believe that a repetitive or boring task is a high pay-back problem with high management visibility. Second, there is a direct relationship between such tasks and expert productivity. I'd like to use expert systems to dramatically cut the time our engineers spend on repetitive and boring tasks, leaving them freer to tackle real engineering problems. Doing so could favorably effect worker job satisfaction and turnover rate.

Your Expectations

The relationship of the following considerations to your expectations is discussed later in this paper.

Not Beyond Current AI State-of-Art

For your first expert system project you do not want to take on a research project. Choose a problem with a high probability for success. Some typical areas to be aware of include natural language understanding, machine learning, and computer explanation.

In general, natural language understanding exists only for narrow applications and is not integrated into expert system shells. This is a great research area. Even natural language front ends for data bases are restricted to an understanding of how to deal with data base queries and have no understanding of the technical content of the data itself.

Machine learning is used in two different ways. I'm not talking here about intelligent computer-based instruction. Rather I'm talking about your expert system learning by its own experience. Although some research is being done in this area, you should avoid it in your first expert system.

Finally, watch out for the hype. I've yet to see an expert system shell with a really good explanation facility. Some will trace back through the rules which led to the final conclusion. But that is not the kind of explanation you would get from the expert. So, it leaves a lot to be desired. Some will allow you to preposition text files containing the desired explanation and will print out the appropriate file when requested. Sounds like a lot of work to me. This is ultimately a depth-of-knowledge problem.

Solution Does NOT Require Common Sense Reasoning

One of the big research projects of the MCC (considered by many to be the US answer to the Japanese Fifth Generation Project) is construction of an extremely large expert system incorporating common sense reasoning and analogical reasoning. This is a ten to fifteen year project. You don't want to take on common sense reasoning in your first expert system.

What is common sense? I'm hardly one to ask since my dad always said that I didn't have any. But I'd say that common sense reasoning includes those chunks of information and reasoning methods which your expert doesn't tell your about because "everyone knows that". As such, it is hard to recognize when your prospective problem requires it. So, this maxim may not have broad applicability. But if even you can see that solution of the problem will require a lot of common sense, take this as a warning and choose a different problem.

Complex Problem Which is Too Simple

Talk about contradictions! This is actually two separate maxims. And yes, I got them both from the same source. Probably the best way to apply this maxim is to apply the next one in stead.

Problem with Easy and Hard Versions

If you can find such a problem, attack the easy version first. With that success under your belt, you have a useful prototype which you can use to convince management to give you the money and the expert to give you the time to expand toward a solution of the hard version.

Hostile Environment (Hazardous to Humans)

This is a very exclusive condition and will probably not apply to your case. You want to think about this if you are considering what jobs to give an autonomous robot in a radioactive or chemically contaminated environment.

Considerations about Experts

The following considerations relate to the expectations of the expert you will be working with in building your first expert system.

Solution Requires Expertise

If the problem does not require expertise to solve, then where are you going to find an expert? On the other hand, "expert" can be a relative term. Even a task which is accomplished by many people within the industry might be a good candidate for expert system development if you need to distribute the capability more broadly than you would otherwise be able or to lower skilled people. Or you may use an expert system as a way to create and maintain consistency among experts. Repetitive, boring, and hazardous tasks are also good candidates even if the tasks involved require only minimal expertise.

Available and Willing Expert

If an expert is available, you might be able to motivate her or him to be willing to participate in the expert system building project. Consider how the expert system will help the expert— or the user if the expert wants to help others. Perhaps the expert could be interested in the project on the basis of investigation of new technology. For your first expert system you might consider using yourself as the expert. What are you expert at? Many companies are teaching their experts to use an expert system shell, letting the experts build the expert systems, and using the computer personnel (knowledge engineers) in an advisory capacity.

Expert can Articulate Methods Used

Don't build your hopes too high in this area. Few experts are outstanding teachers and communicators. On the other hand, stay away from one who seems to enjoy "showing off" or one who never seems to realize when his or her audience is completely lost. Otherwise, this is not a consideration.

Experts' Solution Consistent

This maxim relates to the case in which you are combining the expertise of several experts. If the experts will frequently arrive at different conclusions when looking at the same situation, or different solutions to similar problems, and if no single expert has generally acknowledged precedence over all others, you're asking for trouble in your development effort. This is certainly nothing you want to get involved in on your first expert system development effort.

Fast Response Time Required

The overused buzzword "real-time" means different things in different situations. In most cases solutions are not required faster than a human can normally provide them. So, you can probably ignore this maxim or place it very low on the priority list when choosing an expert system problem. In fact, avoid choosing a problem for your first expert system project if response time is going to be a prime consideration in evaluation of the project.

End User Considerations

In selecting your first expert system project there are things which you should keep in mind about the effects on the potential users of the final product. Usually we focus too much on the expert and not enough on the users.

Expert can Solve in Several Minutes to a Few Hours

This is a measure of the boundedness of the problem. I've also seen this expressed as "Solution in 500 to 5000 rules" (totally useless if you've never written an expert system before, of marginal usefulness if you have), or "It typically takes the expert 15 to 150 minutes to solve", or "The problem is bounded in numbers of procedures, outcomes, objects, relationships, and attributes". The idea is: If the problem is too simple, expert system technology is too expensive; use conventional technology. If the problem is too complex, an expert system solution is probably doomed to failure. And this is exactly the idea you should keep in mind. Don't get too fixed on a number like 150 minutes. Rather use this maxim as a warning flag that you are reaching too far.

Solution Procedure can be Taught (1 Year Rule)

This maxim has some controversy surrounding it. Some feel that if it can be taught too readily, it is not an expert task. That is where the reference to the 1-year rule comes in. Ask the expert if someone could become reasonably competent at the journeyman level (not an expert) within a year. If so, this maxim is satisfied. This should satisfy most of those who insist that an expert system must emulate the reasoning process of a true expert. There are lots of processes which don't require a scarce expert to solve and which would make fine problems for application of "knowledge based" techniques.

Telephone Test

The test is basically: Can the expert (or does the expert) instruct a reasonably technical person over the telephone in how to solve the problem for a particular situation. The prime application is trouble- shooting equipment failures. In fact, the engineers in my office do this frequently. It may not be a test you could use in other types of problems. I read about one expert system team using a screen between the interviewer and the expert (to simulate telephone conversation) as a method of knowledge acquisition.

Input Data Readily Available

Of course, you'd like to have all input data readily available for any type of computer solution. Very often you won't know until you are well into the knowledge acquisition process that some forms of data (more exactly, information) are not readily available. In fact, in my office we expect the expert system development process to help us identify data availability deficiencies. The best bet here is to look critically at your potential problem. If it is clear that data availability is a major problem, reject the problem. A failure to solve the data availability problems may be interpreted as failure of the expert system technology.

Operation of Expert System can be Easily Evaluated by Experts

This is not a consideration. Usually you will not be able to determine if the operation of the expert system will be easily evaluated by the experts until your first prototype is ready for review. Even then the problem is more likely to be a user interface problem than a bad choice of problem.

First Expert System Proposal

We turn now to the problem of selling the idea of expert system development to management (or a customer). Different situations warrant different approaches to this problem. Different organizations require different paperwork and different levels of management review and approval. I can't cover in half an hour a subject which is appropriate for a one or two day seminar. But I will suggest things you should take into consideration whether you are writing a proposal for your own management or for a customer.

What Is The Political Climate?

The first consideration is a political question which is seldom touched on by those who tell us what characteristics our expert system problems should have. Suppose your boss comes up to you and says, "It's time we advanced to the forefront of technology. Expert systems is the best thing since sliced bread and we've got to have it! Drop everything! Go wherever, whenever you need to and find out what AI is! Get that first expert system started! And, by the way, I'm working on the paperwork for the promotion you've always wanted and never asked for!!!"

Don't you think you'd have a different perspective than if YOU first broached the topic, and your boss replied with "That stuff is pure poppycock! If it's not written in FORTRAN (COBOL?), it's not going to work! Don't waste my time with this unproved, untested junk! Get back to work!!!" You've got to approach the problem differently in these two situations. And, of course, the real world for you is, or will be, somewhere in between these extremes — and will require a different approach from either. The key is "What is your management's expectations regarding expert systems technology?"

As unrealistic as the preceding scenario may seem, it is really not far from the truth in many situations. In fact, that is very close to the situation I found myself in two years ago. As managers read glowing AI success stories in the technical pres, and feels a need to investigate expert systems technology, they tend to turn to their own staff.

What Do You Want?

Actually I lied. The political climate is the second consideration. The first is your personal objective in starting your first expert system project. Why do you want to do it in the first place? What do you hope to get out it? That is, what are your expectations? And how important are they to you? How flexible are you if your expectations have to be modified? If you will quit at the first signs that everything isn't "going according to plan," then don't even start. Why? Because you are getting started on something so new to you that your expectations are probably faulty. So keep an open mind and don't overexpect, or oversell. You might want to refer back to the various factors discussed above relating to your own expectations.

What Do They Want?

In case you haven't realized it yet, the first two considerations apply to any project you are likely to propose, not just your first expert systems project. This is true of the third consideration too. What corporate objectives can be addressed by building this expert system? What are the objectives of your management (organizational as well as personal)? Any project must be justified on the basis of the benefit which will accrue to the organization. In some cases it is sufficient to claim "exploration" or "evaluation" of new technology which may have some long term value. But more often the justification has to be in terms of the "bottom line."

You may think this sounds funny coming from someone who works for the Government, and DoD at that. But please believe me when I say that it is no less true in Government circles than in private industry. The motive is in terms of staying within budget or cutting budget, rather than profit. But the principle is the same. Relate what you want to do to: The Mission, The Charter, The Bottom Line, and even your supervisor's personal objectives. And now the tightrope: In doing so, don't create expectations on the part of management which there is a good chance you can't meet. That is the best way to snatch failure from the jaws of victory and glory.

Figure 2 lists some of the selling points you can use to convince management. Most of these relate back to considerations given above when deciding on a first project. Increased productivity can result from automation of repetitive, boring tasks. Increased consistency is important when several people perform the same task, such as when the resulting expert system is going to be used to distribute expertise currently held by one or a few experts. Preservation of expertise can be correlated to "corporate knowledge bases" which sometimes disappear with departing employees and to training of new personnel. When using the last item on the list, be very careful what you promise. Remember that I recommended against choosing a project like this for your first effort. In addition to arguments in Figure 2, a firm economic analysis can do wonders.

Figure 2: Selling AI To Management

o Increased Productivity

o Increased Consistency

o Reduced Errors

o Preservation of Expertise

o Distribution of Expertise

o Solution of Formerly Intractable Problems

Realize the Importance of Initial Success

These first three principles are absent from almost everything I've ever read on this subject. The next two are always there. Make sure you have an expert at your disposal (and make sure she or he is interested in helping). Choose a problem which has some importance to the organization but is not terribly complex. Use expert and organizational importance to sell the project. Both are satisfied with relative ease in an organization of any size. The trick is getting them satisfied together: The interested expert has to have his expertise in the domain of the important problem.

Who is the Expert?

Does an expert exist? Can you interest her or him in the project? The involvement of the expert is so important that you might think about what you are expert at yourself. There is some trend toward teaching domain experts to use expert system tools and letting them develop their own applications. The computer professionals (knowledge engineers) become a resource to help the expert set up his solution, reformulate it when necessary, suggest alternative tools, provide information on complexities of the tool, and so forth. If you adopt this approach, consider carefully the tools you make available. Remember that the expert is a user of those tools, perhaps not a computer literate user.

What is the Intended User Environment?

Another aspect of choosing and selling of expert system problem too often ignored by authors is a consideration of the intended user environment. Actually, the few who do this are given titles containing the words "human factors" and invited to present their own papers. They seem to have their own corner at AAAI and the like, and their work is not integrated well with other AI research (personal opinion). Simply stated, management expectations will not be met if the project ends with an expert system which cannot be used by those who (in the eyes of the managers) need it most. In essence, you should have a workable delivery plan before submitting, or even hyping, the development effort.

Note: Economics is often a prime consideration here. Purchase of a high-cost workstation for the one user in the organization may not be a workable plan. Why? Because if this thing catches on, the organization can't get one for each engineer. Also, space and power constraints may have an impact.

So, what is involved? Well it doesn't necessarily mean that you absolutely have to restrict yourself to available computer resources. Check with those in the know, and find out what the corporate plans are. If you are in an organization with 35 engineers using a single PDP 11/70 and 15 terminals, your company is probably ready to consider an upgrade. So, talk up the VAX line and individual workstations. In a micro-computer environment, talk up IBM PC compatible. These are the platforms of the present and, I believe, of the next decade for delivery.

That is not to say that you cannot develop your expert system in one environment and deliver in another. But I think you would be wise to choose a development environment which is very close to (i.e., compatible with) the delivery environment. Once the "engineering" part of the project is over and you have a functional expert system on your special purpose LISP machine, try to convince your management that your need another three or four months and another $40K to convert to FORTRAN so it will run on the CDC mainframe your engineers use. (People seriously propose solutions of this kind!!)

Be sure you know what the users' needs are, even if the users don't. Think about what will and what won't meet these needs BEFORE writing your proposal. Use potential increase in user productivity and quality of users' work in selling your project.

About the Author

George R. Humfeld is a civil servant putting together an artificial intelligence program for the Submarine Monitoring, Maintenance and Support Office of the Naval Sea Systems Command in Washington, DC. He is responsible for completion of an expert system for prediction of faults in a high pressure air compressor. Ongoing projects include expert systems applications, development of documentation from knowledge bases, and a concept in machine learning which George feels is "doable in the near future." His educational background includes BS in Mathematics and Physics, MS in Mathematics, and PhD in Operations Research. George's DECUS activities include Session Notes Editor and Steering Committee Member of the AI SIG.

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AUTOMATED REASONING TOOL NOW RUNS ON VAX/VMS SYSTEMS

By Terry C. Shannon

LOS ANGELES, Calif.— In a move that significantly broadens the market for commercial artificial intelligence applications, Inference Corporation has debuted ART/VMS, a C-based implementation of the firm's ART (Automated Reasoning Tool) expert system development tool. The latest member of the ART version 3.0 family, ART/VMS brings to the conventional computing environment capabilities that previously required the use of a dedicated symbolic processor or "Lisp Machine."

The ART/VMS announcement, while somewhat belated, heralds Inference Corp.'s entry into the computing mainstream, an arena which has become populated by expert system development products from a growing number of AI software vendors.

ART is a knowledge engineering language and development environment that provides rule-based, frame-based and procedure-based knowledge representation paradigms. Among the tool's features are forward and backward chaining control schemes, certainty handling mechanisms and a knowledge base structure that permits AI developers to generate hypothetical worlds by defining the contexts in which rules and facts apply.

ARTs' ability to concurrently generate and test multiple hypotheses is based on a unique "viewpoint" mechanism. In ART, a viewpoint is a frame of reference through which the tool views the facts in a knowledge base. Each time a viewpoint is created, ART's rules may view only those facts that have been created for, or inherited by, that viewpoint.

Through the use of viewpoints, ART can reason in parallel about various partial solutions to a problem. This strategy permits the tool to simultaneously evaluate rules that represent multiple courses of action, thereby improving its efficiency. Less sophisticated knowledge engineering tools, by contrast, must commit to one possible solution until it is proved wrong, then backtrack to a decision point and restart the process of selecting and applying rules in a new decision path.

The ART/VMS implementation includes four ART version 3.0 enhancements that boost the tool's performance and efficiency. Chief among these is an improved memory management technique that automatically allocates and deallocates memory to eliminate so-called garbage collection or memory recycling. A new pattern-matching structure called a "generalized join topology" lets ART join rules in its data base from the left, as in other rule-based tools, and also from the right. The improved pattern-matching technique speeds the process of comparing complex patterns within ART knowledge bases, reducing system overhead and application run-time.

ART's object-oriented programming capabilities have been strengthened by a procedural attachment feature that lets developers define specific functions for classes of objects. A new "multi-methods" technique lets groups of objects act in unison, reducing the amount and complexity of code in typical ART applications. According to Inference Corp., ART is the first commercial expert system development tool to implement multi-methods.

The execution speed and security of ART applications is also enhanced by a binary file storage feature that lets developers compile and store ART rules in binary format. In addition to loading up to 10 times faster than source code files, binary files make it possible for developers to deliver customer applications in a format that protects proprietary source code.

ART/VMS also includes two powerful interactive graphics facilities that make the tool more accessible to novice AI developers and end users. The ART Studio helps AI developers construct knowledge systems as well as monitor their execution at run-time. The complementary ARTIST facility lets developers define interactive user interfaces for knowledge systems. For example, a valve or switch created with ARTIST could be interactively manipulated by the user to change a value in the ART knowledge base.

For more information about ART/VMS, contact Inference Corp., 5300 W. Century Blvd., Los Angeles, CA 90045 (213) 417-7997.

FRAME-BASED PC EXPERT SYSTEM DEVELOPMENT TOOL DEBUTS

By Terry C. Shannon

Underscoring the value of the microcomputer as an AI application development and delivery platform, Expert Systems International, a Philadelphia, PA AI software vendor, recently announced an extensible, frame-based software tool for building expert systems. Called the ESP Frame-Engine, the new AI development tool runs on the IBM PC, PC/XT, PC/AT and compatible microcomputers such as the DEC VAXmate.

The ESP Frame-Engine consists of several individual components. A collection of frames and rules, or knowledge base, defines the system's knowledge about a specific topic in the terms of a Knowledge Representation Language (KRL). After being created and edited with a word processor, the KRL code is scanned for errors and translated into an internal format by the KRL compiler. Next, the inference engine, or rule interpreter, makes inferences from known to unknown information using the frames and rules in the knowledge base.

The Frame-Engine and the application developer communicate with each other through a window-based knowledge engineer's interface. Finally, a window-based client interface communicates with the end user by asking questions and explaining why the questions are being asked. The client interface also displays advice and conclusions and checks the validity of user responses.

According to Expert Systems International president Angelos T. Kolokouris, the ESP Frame-Engine's frame-based architecture supports rule and variable groupings as well as inheritance. In addition, the tool lets AI developers write object-oriented programs with numeric, boolean, text, set and instance objects.

The tool also provides set operations and an integrated reasoning mechanism that supports both forward and backward chaining, making it compatible with predictive and diagnostic knowledge system applications. Written in Expert Systems International's Prolog-2, the ESP Frame-Engine features an open architecture that lets programmers interface the tool with applications and routines written in PROLOG-2, C and other conventional programming languages.

Designed for customized applications and enhancements by the end user, the ESP Frame-Engine includes an I/O module that can be modified to conform with existing programs and software packages, making the tool appropriate as an expert system development facility or as an integral component of existing software applications. "For example," Kolokouris said, "a developer can modify the I/O module to access external disk-resident databases or invoke external code routines from within a Frame-Engine application."

The use of a frame-based knowledge representation strategy, a technique pioneered by AI researcher Marvin Minsky, lets AI developers efficiently organize and structure information about the attributes, characteristics, features and properties of an object or event. "The nearest equivalent to a frame in a language such as Cobol or Pascal is the record or structure. These constructs, however, lack the defaults, inheritance capabilities and rules which are implemented in frames," Kolokouris said.

According to Kololouris, the ESP Frame-Engine is designed to meet the needs of a wide variety of AI developers. "Expert system shell users who want to move onto something more ambitious but who are not inclined to use an AI language such as Prolog will be among the primary beneficiaries of the Frame-Engine," he said. "Likewise, experienced knowledge engineers should find that [the tool] permits rapid prototyping of AI applications."

"Because the ESP Frame-Engine is an expert system language, it provides more power than a typical rule-based PC expert system shell. In addition, the product's Knowledge Representation Language provides the flexibility of a programming language such as

Prolog, together with the expressiveness of a frame-based knowledge formalism," Kolokouris observed.

The ESP Frame-Engine is distributed on two MS-DOS floppy diskettes and accompanied by a comprehensive reference manual and user's guide. Commercial and academic licenses are available from Expert Systems International, 1700 Walnut Street, Philadelphia, PA 19103 (215) 735-8510.

LISP TOOLKIT SPEEDS VAX-BASED AI APPLICATION DEVELOPMENT

By Terry C. Shannon

Claiming to shorten the VAX-based AI application development and delivery cycle, Artificial Intelligence Technologies (AIT) has begun shipping Release 1.2 of the AIT Lisp Toolkit.

AIT director of sales and marketing Richard E. Muccini says that the latest release of the AIT Lisp Toolkit features increased efficiency and a variety of new features that help VAX Lisp and Inference Corp.'s Automated Reasoning Tool (ART) developers integrate VAX Lisp applications with DEC layered software products including Rdb, CMS/MMS, FMS, GKS and DECnet. In addition, the Toolkit lets VAX Lisp programs communicate with applications written in conventional languages such as C, Cobol, Fortran and Pascal.

"The ability to access DEC's layered products from VAX Lisp has proven very valuable to expert system developers using VAX Lisp," Muccini said, adding that VAX Lisp-based AI applications frequently need to integrate the knowledge portion of the application with other VAX-resident systems software tools such as relational databases, graphics, networking and conventional programming languages.

According to Muccini, the latest release of the AIT Lisp Toolkit features an enhanced Rdb module that is fully compatible with Rdb version 2.2. "The VAX/Rdb interface lets the VAX Lisp programmer use relational database technology to build large knowledge and data bases. By keeping data in Rdb and calling it into memory only when needed, the programmer frees up virtual address space for more productive uses," Muccini said.

The enhanced Rdb module supports cacheing of expanded macros to increase the execution speed of interpreted Lisp code, the use of arbitrary Lisp code during record selection and automatic database invocation to ensure successful data retrieval.

The Toolkit's Graphical Kernel System (GKS) module has been enhanced to provide several new VAXstation II/GPX features, including GPX/2b support, full output support including segment creation and manipulation, support for multiple workstations and workstation-independent segment storage. "The VAX/GKS module can greatly increase the effectiveness of an expert system's user interface by display information in graphical form," noted Muccini.

Similarly, the Forms Management System interface allows for quick development of video-based forms which are similar in appearance to everyday paper forms. According to AIT, the graphical interface lets the AI developer quickly and easily provide an unintimidating, self-explanatory delivery environment for the end user."

The AIT Lisp Toolkit also provides a natural language processing facility, an enhanced Lisp top level, a Lisp editor window facility and an interprocess communication capability that can be used to develop distributed, cooperative Lisp-based expert systems. "With the AIT Lisp Toolkit's development facilities, developers can use a wide variety of tools that save time and money while providing more flexible, higher performance AI systems that are easy to maintain," said Muccini. "For example," he added, "the Toolkit lets DEC VT240 and VT241 terminals emulate more powerful workstations and fully utilize the Toolkit's windowing facility to display data more efficiently."

The Toolkit's Lisp-based natural language processing facility helps VAX Lisp programmers develop and deliver user-friendly AI applications. "Ultimately, the success of any application is its ability to provide solutions to complex problems while offering a user-friendly environment that gets results," Muccini noted. "When used as a front end to the knowledge base or data base, the Toolkit's Natural Language Processor lets end users get information from expert systems without any knowledge of Lisp or AI programming techniques. This reduces the need for the developer to be on call every time an end user needs a special report," he added.

According to Muccini, the AIT Lisp Toolkit is a minimal garbage implementation that reduces the possibility of sudden system interruptions that occur when an AI program must pause to perform "garbage collection," or the recycling of virtual memory. "This feature provides substantial benefits to VAX AI application developers and end users alike. For example, the Toolkit makes it possible for Lisp programmers to develop and deliver applications requiring high availability," Muccini said.

The AIT Lisp Toolkit is now in use by AI application developers in the aerospace, publishing, process control and energy industries. For further information about the AIT Lisp Toolkit as well as AIT's customer support facilities and consulting services, contact Artificial Intelligence Technologies, Inc., 1 Skyline Drive, Hawthorne, NY 10532 (914) 347-6860.

SECOND-GENERATION CONNECTION MACHINE UNVEILED

By Terry C. Shannon

DEC VAX and Symbolics Lisp machine users whose data-intensive applications require supercomputing power will soon be able to draw upon the resources of an enhanced Connection Machine from Thinking Machines Corp.

A successor to the firm's original 1000-MIPS Connection Machine, the CM-2 is a massively parallel processor equipped with 65,536 one-bit microprocessors and 512 MB of physical memory. The CM-2 provides an I/O bandwidth of 75 to 300 gigabits per second, a substantial improvement over its predecessor.

According to the vendor, the CM-2 will be available with 32-bit single-precision and 64-bit double-precision floating point options that enable the parallel processor to achieve peak speeds of 2500 to 3500 Mflops for applications such as molecular modeling, signal processing and seismic research.

Users with less intensive supercomputing requirements will be able to purchase a scaled-down CM-2 system that employs 16,384 microprocessors and 128 MB of physical memory.

The CM-2 can be front-ended by a Symbolics 3600 processor or a VAXBI-based VAX 8000 system. At a cost of from $1 million to $6 million dollars, the CM-2 is perhaps the most expensive VAXBI-compatible "peripheral" supported by the VAX family.

Thinking Machines also debuted DataVault, a fault-tolerant mass storage system employing multiple hard disks. Similar in concept to a forthcoming array of Digital disk drives, the DataVault system will be available in 42 and 84-spindle versions that store five and 10 GB of data respectively.

The CM-2 can also be equipped with a new high performance graphics display system as well as C, Lisp and Fortran compilers. Thinking Machines will begin shipping the CM-2, the single-precision floating point processor option, mass storage system, display system and C and Lisp compilers during the third quarter of 1987. The double-precision floating point processor option and Fortran compiler are expected to be available in early 1988, a company spokesperson said.

VAX CDD-COMPATIBLE EXPERT SYSTEM SHELL DEBUTS

By Terry C. Shannon

Level Five Research, Inc., an AI software vendor in Indiatlantic, FL, recently debuted PRL3, an easy-to-use, rule-based expert system development and delivery tool that exploits the data management features of DEC's VAX superminicomputer family.

An upwardly compatible successor to Level Five's family of PC-based expert systems tools, PRL3 combines hardware transportability and accessibility to external software and databases with the power and connectivity of VAX systems. In addition to eliminating the need for dedicated processors or graphics workstations, PRL3 is substantially less expensive than other high-end expert system development tools.

According to Level Five marketing manager Cornelius Willis, the multiuser and networking capabilities of the VAX permit the simultaneous use of a PRL3 expert system by an entire organization. Moreover, all knowledge bases developed with PRL3 on a VAX system can be shared by all users.

PRL3 uses Level Five's proprietary Production Rule Language (PRL), a knowledge representation strategy that states rules and facts in English-like "IF-THEN" constructs. Because the Production Rule Language is common to Level Five's entire line of expert system tools, any knowledge base developed with a Level Five PC-based expert system shell can be used on a VAX system with PRL3.

Level Five president Henry Seiler explained that PRL3 is an anomaly in the world of expert systems tools. "AI has always been a solution that was out of touch with the needs of its users. In contrast, our corporate customers were intimately involved with the requirements specification and design phase of the PRL3 project," Seiler said.

One of the most notable participants was E.I. DuPont, which purchased an unlimited world wide license for the tool prior to its release. Du Pont is well known for the phenomenal success of its "AI Task Force" headed by Dr. Ed Mahler. Du Pont has fielded several hundred real-world expert systems based on Level Five AI tools.

"Du Pont's involvement in the design of PRL3 was extremely helpful to us," said Seiler. "It helped us focus on issues that are critical to real world expert systems applications, rather than 'AI esoterica'."

Because few commercially successful expert systems run as standalone applications, PRL3 directly integrates database access with its rule and context management system. Popular VAX databases, including the VAX Common Data Dictionary (CDD), DATATRIEVE, Rdb/VMS, DBMS, and BBN Software's RS/1 database management package can be easily accessed from within PRL3. The tool also provides access to any VAX RMS file through the CDD and is fully integrated with the EDT editor.

PRL3 contains both an object library and a linkable library of utilities. With the object library, users can build and access custom databases with PRL3's database grammar. The linkable library facility manages communications between the expert system and any user-written application.

PRL3 is available as a full expert system development environment or as a run-time application delivery system. Optional interface modules are available for the DEC CDD and BBN Software's RS/1 database system.

IBI FOCUSES ON AI TECHNOLOGY

By Terry C. Shannon

NEW YORK, NY— Fourth generation language and database management system vendor Information Builders Inc. (IBI) is poised to bring AI technology into sharp focus with the acquisition of Level Five Research, a Melbourne, FL, AI software vendor whose products include the VAX-based PRL3 expert system shell.

In a letter of intent signed earlier this month, IBI disclosed its plans to bring knowledge-based capabilities to the FOCUS environment by purchasing Level Five Research and integrating the firm's AI technology into the IBI software family.

Cohen explained that IBI and Level Five address similar data management issues, making the forthcoming merger a mutually beneficial agreement. "Both [IBI and Level Five Research] provide powerful application development tools that are easy to use, and together will offer interfaces to reach data no matter where it resides," he said.

Level Five Research president Henry Seiler said that end users will benefit from the IBI/Level Five alliance because it foreshadows improved connectivity between expert system shells and the knowledge that they manipulate. "The trend in the expert systems marketplace is towards the merger of expert system technology and productivity tools," Seiler said.

"We feel that small expert system tool vendors are spending too much time and effort developing database interfaces. By teaming up with IBI, we can concentrate on complementing IBI's database access and productivity features with AI technology instead of reinventing the 4GL wheel."

Commenting on future product directions, IBI's Cohen said that Level Five's VAX and PC expert system tools, PRL3 and Insight 2+ will be marketed by IBI in the immediate future. "We are planning to port Level Five products to run on IBM mainframe computers as soon as possible," he added.

The next step, according to Cohen, involves the development of interfaces which will allow Level Five AI tools to access FOCUS databases. Ultimately, the firms will integrate rule-based knowledge systems into FOCUS to create a comprehensive decision support and application development system that provides the best features of both products. In addition, Seiler noted that the firms plan to release Macintosh and UNIX versions of Level Five's AI software.

The IBI/Level Five alliance is similar in concept to Cullinet Software's recent acquisition of Distribution Management Systems, a software developer specializing in expert system software that runs on VAXes and IBM mainframes.

Like Cullinet and Distribution Management Systems, IBI and Level Five Research can capitalize on visibility and market penetration. With more than 5,000 software packages installed since the firm was founded in 1984, Level Five Research claims to have the largest customer base in the expert systems industry. Similarly, IBI says that its FOCUS product is the most widely installed 4GL/DBMS for application development and end-user computing on mainframes, superminis and personal computers.

A SILVER LINING IN SYMBOLICS' CLOUD?

By Terry C. Shannon

Beleaguered by its image as a purveyor of special purpose computers that are regarded by a growing number of computer users as overpriced, anachronistic "islands of automation," Symbolics Inc. has thrown down the gauntlet with its new Ivory Lisp microprocessor chip and a new corporate strategy that will emphasize alliance instead of isolation.

According to corporate representatives, Symbolics, the premier vendor of symbolic processors used in artificial intelligence research and development applications, will use its recently unveiled Lisp chip as a gateway into the conventional computing arena.

Although commercial data processing applications and Lisp machines have long been mutually exclusive, Symbolics vice president of marketing Ilene Lang contends that the price and performance of the Ivory Lisp CPU and its successors will have a significant impact on the commercialization of artificial intelligence, expert systems and related symbolic processing applications.

"The market for symbolic processors has been largely technology-driven, with newer hardware and software technologies stimulating innovation in new industries and areas of use. The advent of [the Ivory] chip technology, however, changes the emphasis to a more mature, application-driven market," Lang said.

Lang explained that advances in machine architecture, knowledge representation and symbolic programming languages will continue to drive the upper limits of artificial intelligence research and development— the application area that has traditionally been Symbolics' primary market niche.

At the lower end, however, Lang predicted that price and performance breakthroughs such as those embodied in the Ivory chip will recast symbolic processing technology as a de facto component of the traditional computing environment. "The result will be greater availability [of AI technology] to mainstream users and a proliferation of products in mainstream application areas," she said.

One prominent AI practitioner observed that Symbolics' continued viability is contingent upon the firm's penetration of the commercial computing environment. Noting that Symbolics processors have long dominated academic and government AI research labs, the practitioner indicated that the Lisp machine vendor must cultivate new markets to maintain its cash flow and internal research and development program.

"The artificial intelligence research and development marketplace has become saturated. Symbolics must expand its horizons to compete with mainstream vendors who now offer symbolic processing languages on their conventional hardware offerings," he concluded.

Although more than 3,500 Symbolics Lisp machines are in use at some 500 customer sites worldwide, the prime beneficiaries of Symbolics' effort to make artificial intelligence an integral component of conventional computing have been traditional hardware vendors and AI language and tool developers whose products run on conventional computer systems.

For example, DEC VAXes and IBM mainframe systems support symbolic programming languages such as Lisp, Prolog and OPS5, and vendors of high-end expert system shells are porting their products from dedicated symbolic processors to conventional computers and workstations.

Additional competitive pressures are being exerted on Symbolics by PC AI software developers. Exsys, Inc. of Alburquerque, NM; Level 5 Research, Inc. of Indiatlantic, FL and Neuron Data of Palo Alto, CA, are among the vendors who have fielded VAX/VMS versions of their PC expert system tools within the past six months.

Symbolics has responded to the inroads made by conventional computer manufacturers and software vendors by embracing industry standard networking protocols and programming languages while readying a next-generation family of high-performance, low-cost, multiprocessor-based symbolic computers based on Ivory technology.

THREE-PRONGED ATTACK

In addition to continuing its support for industry standards and developing a series of hybrid processors, Symbolics will base its mainstream computing foray on marketing agreements with as-yet-unspecified third party vendors who want to incorporate Lisp coprocessors into their conventional computer hardware.

According to Symbolics, the Ivory chip's 40-bit word length accommodates full 32-bit addressing and integer lengths. Symbolics VLSI design group director Neil Weste pointed out that Ivory's 32-bit addressing ensures machine-level compatibility with general purpose computers. "This means Ivory can process 32-bit data, which will be very important to anyone who wants to build machines with industry-standard 32-bit processors," he said.

While Symbolics refused to discuss the status of negotiations with third party hardware vendors and potential OEMs, Lang said that the firm is excited about the Ivory announcement and its future ramifications. "We are supporting the 32-bit standard and [we are] talking with a number of third-party hardware vendors," she said.

Don Brown, an analyst with D.H. Brown and Associates, a market research firm in Tarrytown, NY, observed that Ivory's 32-bit compatibility makes the chip an attractive option for conventional computer vendors— such as Digital— who may want to complement their existing hardware with a symbolic coprocessor.

Brown contended that a Lisp coprocessor would give Digital easy access to symbolic computing capabilities without impacting the existing VAX product line. "It's not clear that the VAX architecture is suited to fully capitalize on Lisp and symbolic processing," Brown said.

Noting that the modification of the VAX instruction set would be a difficult decision that would affect all of Digital's mainstream users and create software compatibility problems, Brown claimed that the inclusion of a coprocessor such as the Ivory chip would be a more viable strategy for enhancing the symbolic processing capabilities of the VAX family.

SYMBOLICS UNVEILS NEW SOFTWARE

By Terry C. Shannon

As part of an ongoing effort to bring symbolic processing into the computing mainstream, Symbolics, Inc. has unveiled release 7.1 of Genera, a proprietary operating system and software toolkit that runs on the Symbolics 3600 processor family.

Commonly referred to as "Lisp machines," Symbolics systems are high performance workstations whose architecture is optimized for the efficient execution of programs written in Lisp. These systems feature high-resolution graphics, a sophisticated user interface and a variety of program development tools that speed the development of AI applications as well as programs coded in conventional languages such as Ada, Fortran and Pascal.

According to Symbolics Genera product manager Scott Garren, the latest release of the Genera software environment makes Symbolics processors even more appropriate for the development of traditional and knowledge-based software applications.

Genera version 7.1 offers improved processor performance, multivendor network support and tools that simplify the conversion of Lisp machine-specific programs into code that is compatible with the Common Lisp standard.

The new Genera release provides a variety of facilities for data management and large-scale program development. Chief among these are an improved user interface and windowing facility, enhanced disk performance and more efficient paging and "garbage collection." Garbage collection is the technique through which a Lisp machine reclaims or recycles physical memory that becomes filled with obsolete data structures during the execution of Lisp programs.

The Genera operating environment includes Symbolics Common Lisp, a standardized Lisp programming language implementation that provides built-in extensions for object-oriented programming. "Symbolics has always supported industry standards, and those standards— such as Common Lisp— are even more important now that the commercial market for symbolic processing is maturing," Garren said.

Garren explained that the Genera environment includes a conversion aid that helps users convert Lisp machine-specific Zetalisp programs into Common Lisp to increase application portability. The new conversion aid consists of online documentation and separately loadable software that uses special-purpose editor commands to assist conversions of large blocks of code from Zetalisp to Common Lisp formats.

After noting that over 90 percent of Symbolics' installed base of 3,000 processors are used in heterogeneous computing environments, Garren said that the latest Genera release provides enhancements to the Symbolics Generic Networking System's DECnet and TCP/IP facilities. Because the networking system also supports SNA, Ethernet and Symbolics networking protocols, Garren explained, Symbolics processors can be easily integrated into multinetwork, multivendor computing installations.

The Generic Networking System includes a consistent command set that lets users transparently access files that reside on local or remote Symbolics processors, IBM mainframes, VAX/VMS systems and UNIX workstations. The software also features support for logical pathnames, electronic mail, an interactive communications facility similar to the VMS Phone utility and single-keystroke remote login and device access.

Genera 7.1 software will be offered to all Symbolics customers as a replacement upgrade for Genera versions 6.1 and 7.0. The new release includes all applicable updates to Symbolics' layered products including the Prolog, Ada, Fortran and Pascal programming languages as well as TCP/IP, DECnet and SNA networking protocols.

MEETING PORTENDS COMMON LISP STANDARD

At a meeting held during mid-March in Palo Alto, CA, the National Technical Committee for Standardization of Lisp (X3J13) began to lay the groundwork for an object-oriented Lisp programming system. According to the committee, "X3J13 is chartered to produce an American National Standard for Common Lisp. It will codify existing practice and provide additional features to facilitate portability of code among diverse implementations."

Resolved in March by the National Technical Committee for Standardization of Lisp (X3J13) were the following:

(1) The committee believes that object-oriented programming will be incorporated as part of a future Common Lisp standard;

(2) The committee believes that Chapters 1 and 2 of the Common Lisp Object System (CLOS) specification (collectively, X3J13 document 87-002) captures the essentials of the future standard object facility.

AISIG PERSONAL COMPUTER WORKING GROUP INITIALIZED

By Bob Woodward

At the Nashville Symposium, a working group was formed in the AISIG to the use and exchange of information about personal computer based AI tools, particularily expert systems. The purpose of this group is to establish a network of communication among DECUS members doing work in this area and to encourage participation at future symposia. Ultimately, we would like to do the following:

o Compile and distribute a list of people, tools and applications related to PC-based artificial intelligence. This list would also include people who are interested but have no current applications.

o Solicit and compile articles for (THE (LINKED LIST)) relating actual applications and product evaluations.

o Ensure that our interests are adequately represented at future DECUS symposia. What kind of symposia topics would be helpful to you? Would you be able to present a symposium session relating to this area?

To join this working group, write:

Robert Woodward
Conoco Inc.
OASIS 2018
PO Box 2197
Houston, TX 77252

AI EVENT CALENDAR

By Jim Sims, DECUS AISIG Steering Committee

August 1987

3-7

Stanford Short Courses

Computer Graphics, Giving Programs Common Sense, Compiler
Construction/ Programming Language Translation
Joleen Barnhill
Western Institute in Computer Science
P.O. Box 1238
Magalia, Ca. 95954
(916) 873-0575

4-7

2nd International Conference of Applications of AI in
Engineering
Boston, MA

10-14

Stanford Short Courses

Code Optimization & Code Generation

Joleen Barnhill
Western Institute in Computer Science
P.O. Box 1238
Magalia, Ca. 95954
(916) 873-0575

10-15

Human Computer Interaction
Honolulu, HI

17-20

2nd Intl. Workshop on Natural Language Understanding and Logic
Programming
Vancouver, BC

23-28

IJCAI-87 10th International Joint Conference on Artificial
Intelligence Milan, Italy

Alan Bundy
Dept. of Artificial Intelligence
University of Edinburgh
80 South Bridge
Edinburgh, EH11HN, UK

24-26

International Workshop on Petri Nets
Madison, WI

31-Sept 3

European Conference on AI in Medicine Marseilles, France

Theory, Design, and Application of AI in Medical Systems

Viviane Bernadac
AIME 87 IIRIAM
2 rue Henri Barbusse 13241
Marseille Cedex 1 FRANCE

September 1987

21-25

European Congress on Simulation Conference and Exhibition
Prague, Czechoslovakia

ECS '87
c/o Director, Institute of Computer Sciences
Czeckoslovak Academy of Sciences
182 07 Prague
P.O. Box 5
Czeckoslovakia 846669

October 1987

5-7

Spatial Reasoning and Multi-Sensor Fusion
Pheasant Run Resort St Charles, Ill.

Spatial Reasoning, Multiple Sensor Inputs, Spatial Planning,
Formal Theory, Fusion of Sensory Inputs, Evidential Reasoning

CFP to: Su-shing Chen
Dept. of Computer Science
University of North Carolina
Charlotte, NC 28223

5-7

Workshop on Computer Architecture for Pattern Analysis and
Machine Intelligence
Seattle, WA

5-7

Workshop on Spatial Reasoning and Multi-Sensor Fusion
St. Charles, IL

Topics to include: Reasoning about shapes from partial evidence, fusion of photometric and
range data for mobile robots, fusion of 2D, 3D, tactile, and F/T sensing for assembly
robots, evidential reasoning for verification vision, reasoning architectures for spatial data,
programming paradigms for spatial reasoning, formal theories of spatial reasoning, spatial
planning and problem solving.

Avi Kak
Robot Vision Lab EE Building
Box 121
Purdue University
W. Lafayette, IN 47904

5-9

Aerospace and Commercial Applications of AI
Dayton, OH

Michael Johnson
The BDM Corporation
1900 Founders Drive
Kettering, Ohio 45420
(513) 259-4434

14-17

2nd Intl. Symposium on Methodologies for Intelligent Systems
Charlotte, NC

19-23

2nd Knowledge Acquisition for KBSs Workshop
Banff, Canada

Topics to include: Transfer of expertise from experts, manual knowledge acquisition methods and techniques, apprenticeship learning techniques, issues in cognition and expertise
that affect the knowledge acquisition process, induction of knowledge from examples, and
knowledge acquisition methodology and training.

Jeffrey Bradshaw
Advanced Technology Center
Boeing Computer Services
PO Box 24346
Seattle, WA 98124

28-30

AI East
Atlantic City, NJ

Tower Conference Management

November 1987

1-6

Advances in Intelligent Robotics

Hyatt Regency Cambridge
Cambridge, MA

Conferences on: Optics, Illumination and Image Sensing for Machine Vision; Intelligent
Robots and Computer Vision; Space Station Automation, Automated Inspection and High
Speed Vision Architectures; and Mobile Robots.

SPIE Technical Program Committee/Robotics '87
P.O. Box 10
Bellingham, WA 98227
(206) 676-3290 Telex 46-7053

9-12

1987 International Conference on Computer Aided Design
Santa Clara, CA

Topics to include systems, simulation, layout, and test of CAD
systems for electronic circuit design.

ICCAD-87 Secretary
Mentor Graphics Corp.
1940 Zanker Road
San Jose, CA. 95112
(408) 436-1500

30-Dec 2

IEEE Workshop on Computer Vision
Fountainbleau Hilton,
Miami Beach, FL

Keith Price
Institute for Robotics and Intelligent Systems,
MC0273 Electrical Engineering - Systems
University of Southern California
Los Angeles, CA 90089
(213) 743-5526
EMAIL: price@ganelon.usc.edu

December 1987

9-11

Frontiers in Computing
Amsterdam, The Netherlands

Latest developments in Numerical and Symbolic Processing,
Parallel Computing, Optical, Molecular, and Biological
Computing.

Frontiers in Computing
c/o CWI
P.O. Box 4079 1009 AB
Amsterdam, The Netherlands

January 1988

5-8

21st Annual Hawaii Intl. Conference on System Sciences (HISC
21) Kona, Hawaii

Topics to include: Automatic Deduction, Knowedge Representation, Learning, Natural
Language, Planning, Rule-based Systems and Search, as applied to software design and
implementation with emphasis on large-scale software systems.

Prof. Gail E. Kaiser
Columbia University Dept. of Computer Science
New York, NY 10027
(212) 280-3856
EMAIL: kaiser@cs.columbia.eu, ...!columbia!cs!kaiser

NEURAL NETWORK DEMONSTRATION PROGRAM AVAILABLE

By Shirley Bockstahler-Brandt
AISIG Steering Committee

I have translated (most) of Jorgensen's neural net program to VAX Fortran. It does work
and can offer some insight into how neural nets work.

For those of you who did not make it to Nashville, Jorgensen was one of our speakers at
the Symposium. He passed out copies of a simple net simulation written in Basic. The
software may be "freely used for educational purposes only."

H M S

HARD NEWS

The Newsletter of the DECUS Hardware/Micro SIG

CONTENTS OF THIS ISSUE

FROM THE EDITOR

That's right . . . singular, not plural.

At the spring DECUS symposium in Nashville this past April, we were delighted to learn that our long-time SIG chair, Tom Provost, had been elected to the DECUS Board of Directors. As a result, Bill Walker, my illustrious partner-in-crime on this rag, got kicked upstairs to the SIG chairmanship--and yours truly became the editor of the HMS Newsletter.

What does all this upheaval in the ranks of the HMS SIG mean? Well, as far as the newsletter is concerned, hopefully not too much. I'm implementing a few graphical changes: Starting with this issue, the newsletter will have a name (HARD NEWS) and start-ing with the next issue (or whenever I get the cartoon done), a mascot. But the publication's mission will remain the same--to provide you with good, solid technical information about DEC and DEC-compatible hardware. I plan to put out at least six issues in 1987-88, material (and sanity) permitting.

This issue of HARD NEWS contains quite a few tantalizing tid-bits from the Nashville symposium, including some extremely helpful information about living with the TK50, and a summary of recent FCOs and ECOs. Look for more goodies from Nashville over the next few months.

Of course, things do happen outside DECUS symposia, and HARD NEWS always appreciates contributions from readers, especially of the hints-and-kinks variety. There is a form at the back of the book that tells you how to send your material to the newsletter. The deadline for the next issue is July 24, 1987.

                                        Carmen Wiseman
                                        Editor

TK50 PROBLEMS AND SOLUTIONS

EDITOR'S NOTE

This material has been excerpted from a Nashville DECUS presentation by Digital product developer Bernie Ruck. More material from Bernie's excellent presentation will appear in future issues of HARD NEWS.

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PROBLEM	SOLUTION(S)
Thermal cut-out (a rare occurrence in normal operation)	o Drive requires 5 cfm of air. Thermal sensor may cut out if system cover is removed or TK50 bench is tested without cooling fan o Drive automatically recovers when it cools down

****

Leader-latching failures; caused by:	
-Dropped cartridge (leader misplaced) o Design change to tolerance to shock	o Operator inspects for leader position o Design change to increase tolerance to shock
-Tolerance stack	o Code and mechanical design improvements
-Power off with cartridge inserted	o Remove cartridge before power down

****

Cartridge cannot be fully inserted; caused by:	
-Hesitation during cartridge insertion	o Insert cartridge fully to mechanical stop o Cartridge shell redesigned to accommodate tentative insertion o To recover, remove cartridge, drop handle, and push button twice to clear error

-Faulty repair: buckling link caught under receiver	o Be certain buckling link is fully retracted

****

Handle can't be lifted to remove cartridge when green light is on	o Problem can be avoided by lifting handle only when green on/red off o Latest drive code will automatically reset drive o To recover, cycle cartridge to BOT by pressing switch in and out once

****

Cartridge can't be removed from drive after handle forced open with red light on	o Avoid by not lifting handle until green on/ red off o To recover, lower handle and press switch in and out twice to clear error

****

Terminal hangs with error message "MUA0 not software enabled" (phantom device MUA4224); caused by:	
-Inserting cartridge while MOUNT or INIT command is executing	o Load tape before issuing MOUNT/INIT commands o Fixed by FCO to controller code o To recover, reboot system

****

Brand-new cartridge can't be mounted and drive error results; caused by:	
-Test patterns left on cartridge that confuse drive	o To recover, clear drive' error, remove cartridge, and either degauss it or return it to Digital

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EVERYTHING YOU EVER WANTED TO KNOW
ABOUT THE MICROPDP-11/53

CPU	KDJ11-DA
MICROPROCESSOR	DCJ11-AC
BOOT ROMS	Version 1.0: LB 23-204E5-00 (there goes that HB 23-205E5-00 Micronote!)

This version supports standard ASCII characters in English and
Spanish. Standard terminals and settings can be used.

Version 2.0: LB-23-261E5-00
HB-23-262E5-00

This version supports both standard ASCII characters and the DEC
Multinational Character Set (MCS), which VT220s set to VT200 mode
will accept. The version 2.0 ROMs support most "normal"
languages--sorry, no Chinese, Japanese, Korean, Hindu, etc.

RQDX3   Version 2.9 microcode

FORMATTER   ZRQCC0

RD31-A   Top drive jumpers (view from rear):
(REV. 1A)

```
                 _
    . . . |.| . . . .
    . . . |.| . . . .
                 _
```

Bottom drive jumpers (view from rear):

```
               _
    . . |.| . . . . .
    . . |.| . . . . .
               _
```

The top drive's read/write board has a plug-in connector, which
appears to be a terminator of some sort. When adding or replacing
an RD31 drive, users must be aware of the plug and either transfer
it from the old drive to the new one--or be ready to purchase a new
drive. It's very easy to invert the drives or screw up the
terminator or drive-select jumpers when attempting to add a second
drive to a single-drive 11/53 system, so watch out!

The cables are standard BA23 cables (17-00286-00 and 17-00282-00).
There's one crucial difference: The cables for drive zero have blue
headers, while those for drive one have gray headers.

RX33   Bottom drive jumpers:
(REV. A1)

```
               DS0
                _
    . . . |.|
    . . . |.|
                _
```

In this space, we're going to try to keep you apprised of DEC field
change orders (FCOs) and engineering change orders (ECOs) as we
hear about them. (The difference, of course, is that ECOs are
taken care of at the factory and FCOs require intervention by your
friendly field service rep.) A few items from the Nashville sympo-
sium follow.

KA630 (M7606-AH)

Under Ultrix-32m version 1.1, this MicroVAX II/VAXstation II CPU
board exhibits a system crash bug. The error is logged on the sys-
tem console and in Ultrix system message file machine check 80.
ECO No. M7606-ML006 (dated April 4, 1986) corrects the problem by
replacing funky memory chips.

To make sure you have an OK board, look for a module numbered
M7606-AS (a new build with NEC chips), M7606-ZS (a reworked
M7606-AH with NEC chips), M7606-ZF (a reworkd M7606-AH with Hitachi
chips), M7606-ZC (a reworked M7606-AH with Fujitsu chips), M7606-AP
(a new build with Mitsubishi chips), or M7606-ZP (a reworked
M7606-AH with Mitsubishi chips).

Wait, there's more: yet another ECO for this much-plagued
module. ECO No. M7606-ML007 (dated November 10, 1986) fixes some
typos on the circuit schematic and replaces a low-yield DC333 chip.

KDJ11-A

The dual-height MicroPDP-11/73 CPU module exhibits a bus-contention
problem when the DCJ11 exits from an FPJ11-provoked stall while a
DMA bus transaction is current. ECO No. M8192-TW007 (dated Oc-
tober 7, 1986) corrects the condition by reworking the boards and
updating the documentation.

MICROVAX MEMORY BOARDS

Mike Allen, HMS Symposia Coordinator, has learned from his DEC
field service rep that there is a problem with some of the "older"
MicroVAX II CPUs and memory boards. The following FCO list shows
which field change order (FCO) applies to which module:

o MicroVAX II CPU with module no. M... AH -- EQ-01358-01

o DEC 1MB memory board M... BH -- EQ-01358-02

o DEC 2MB memory board M... BH -- EQ-01359-01

o DEC 4MB memory board M... BH -- EQ-01359-02

Look for the module number on the metallic spine of the board.

If you have any of these boards, DEC field service will re-place them free. Use the FCO number if you need to clarify things with your field service person.

Rumor has it that the reason DEC is replacing these modules is because the third-party memory chips used on the listed boards don't meet specs.

NIBBLES AND BITS

If you've been wondering what happened to MicroNotes, wonder no longer. DEC printed up a new edition around the beginning of June 1987--and we hear that it was the last to carry the MicroNotes moniker.

The June MicroNotes included a software features comparison, a comparison of Digital system buses, and a KXJ11-CA performance com-parison, as well as information about DMA on the MicroVAX II, VAX/VMS real-time programming and RQDX controllers.

A new name for the publication hasn't been selected yet, but Applications Notes might be a possibility. Whatever it ends up be-ing called, it will come out in June and December, and will go to the current MicroNotes mailing list. Stay tuned for further developments.

SUBMITTING ARTICLES TO HARD NEWS

The purpose of HARD NEWS, the HMS SIG newsletter, is to serve as a forum to share information related to DEC hardware with the members of the SIG. As such, the existence of the newsletter is entirely dependent on your contributions. If you have an HHK item, a better or safer way to do something, product news, a tutorial article of general interest, etc., we are interested in publishing it in the newsletter. It is intended that HARD NEWS be published at least six times a year.

You can submit material to the editor, Carmen Wiseman, or to the HMS SIG chair, Bill Walker. We can accept submissions in a wide variety of formats:

o Items can be sent to the editor on VMS-format RX50s, TK50 cartridges, or IBM PC format 5 1/4" floppies. The SIG chair prefers RT-11 floppies but can handle any reasonable media.

o Hard copy, like cash, is always acceptable. Camera-ready copy will save us a lot of typing, but we don't insist on it. You can also use the Hardware Submission Form in the "Questionnaires" section of the combined SIGs Newsletters.

o Those of you with access to DCS can send things to WALKER or WISEMAN. DCS is usually checked on a daily basis.

o You can reach the SIG chair on CompuServe as "Bill Walker 71066,24" or via EasyLink mailbox 62752448. You can reach the editor via EasyLink mailbox 62960090 (be sure to say ATTN: or TO: Carmen Wiseman somewhere in the message).

If you have anything to submit, send it! If it is a mess, but we can read it, we will get it into the newsletter somehow. Finally, if you have any questions about submitting material, call one of us. The telephone numbers are listed below.

Contributions can be sent to:

```
William K. Walker              Carmen D. Wiseman
Monsanto Research Corp.    OR  Digital Review
P.O. Box 32   A-152        ==  Prudential Tower, Suite 1390
Miamisburg, OH   45342         800 Boylston Street
(513) 865-3557      (work)     Boston, MA   02199
(513) 426-7094/0344 (home)     (617) 375-4361 (work)
```
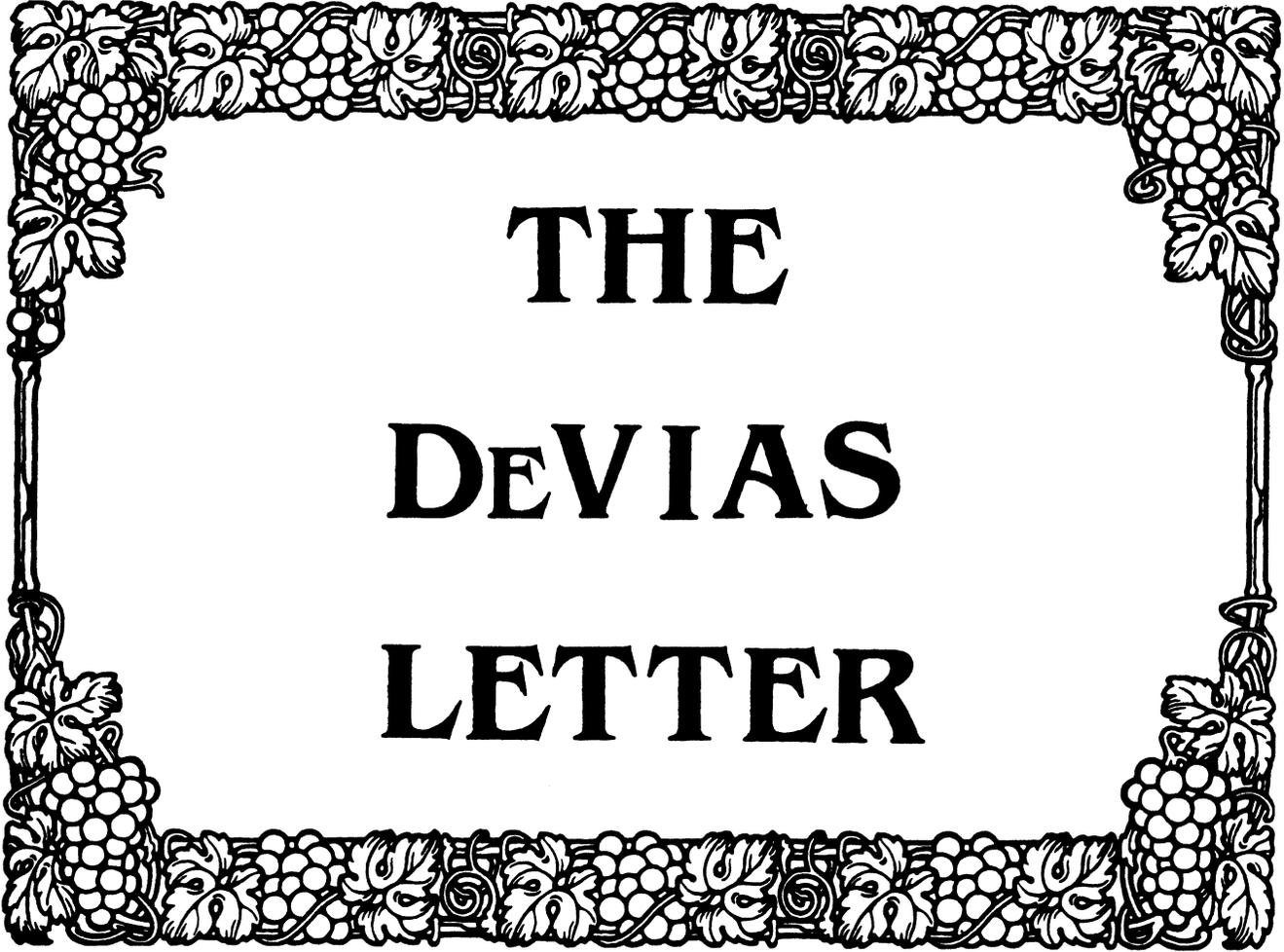
THE DeVIAS LETTER

IAS

CONTRIBUTION GUIDELINES

Contributions for the newsletter should be sent to:

Frank R. Borger
Michael Reese Medical Center
Department of Radiation Therapy
Lake Shore Drive at 31st St
Chicago, IL 60616

Contributions of letters, articles, important SPR's etc will be accepted in any form, (including notes jotted in pencil on gravy-stained tablecloths.) Contributions will be much more graciously accepted in one of the following formats:

1. Non machine readable sources, (SPR's etc,) should be reasonably dark to insure good photocopying. Text whatever should be the equivalent of 66 lines at 6 lpi, with 4-line top margin, 5-line bottom margin, left-margin 10, right margin 74 at 10cpi. If using a DEC LN03 for output, use left-margin 8. right margin 72.

2. Machine readable sources may be submitted on 9-track Mag-tape, (800,1600, or 6250 BPI,) DEC-tape II, DecMate floppies, or whatever. We're not fussy, we'll even accept paper tape or cards. Preferred format is DOS or BRU for tapes, Files-11 for DEC-tape II.

3. 1200 baud dial-up modems are available on our IAS system and our VAX, with KERMIT servers available. Give the editor a call at (312)-791-2515 (preferably later in the day,) to obtain access information, etc.

4. If long distance dialout is not possible on your system, we'll be willing to call your system and do the work, (unless you want to transfer the entire manual set at 300 baud.)

Any media sent to us will be promptly returned.

ASK THE DEVIAS WIZARD

If you have a problem you would like to submit to the Devias wizzard, write a letter or fill out a copy of a standard SPR and send it to the Editor at the above address. Answers to problems from members (or anyone) should also be sent to the Editor.

From the Editor's Terminal

All the News That Fits, we print

IAS

Mr Spot   Network   Mr Vax   VMS   Rover
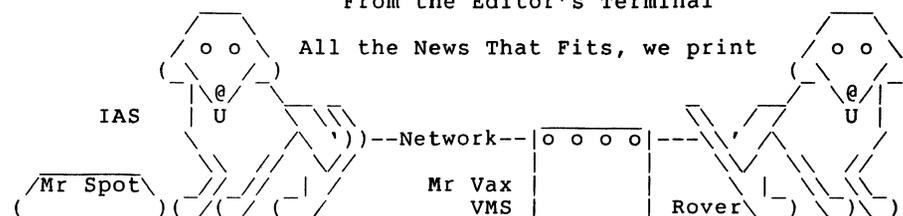
It's only co-incidence I'm sure, but the only time we have hardware problems is right around deadline time. Last month it was the disks and the LN03, (Rover at least looks normal again, a couple of days and 1200 bucks later.) This month we're just coming back to normal from an air conditioning failure that occured late Saturday AM, and left the room at 100 degrees plus. DEC makes damn good hardware. Our 11/44 system came right back up, (although we pinched a disk cable when we closed things up, after opening the racks to do some service,) and our 13 year old 11/45 only lost one power supply.) We're running on a loaner air conditioner that can't hack the load and room temp is up in the 80's, and the equipment is solid. Oh well, what do you expect of your editor's THIRTEENTH issue. At least they finally seem to have fixed the leaks in the roof, (the NEW roof that is,) that caused rain water to pour onto the printers and the CPU.

This month's program of the month is a simple basic program to turn the printer port on a VT100 or VT220 or compatible terminal on or off. It is especially nice because it lets you use the "Print scrolling region only" function, which works great for accessing the Digital Store and getting hard copy, etc.

An IAS user who sent in a membership survey form mentioned that they wanted command line recall. Any users interested in this should look at our ECR, (Editing Console Routine.) An abstract is included herein. The program is available from DECUS, (11-870,) and from the Spring IAS/RSX sig tape. We will also push to get our fearless leader to submit his version of command line recall to the library and the sig tapes.

Finally we have the slides for the guide to an IAS handler talk from the Spring DECUS.

Now that Summer is here, the air conditioners are breaking down.

Ten Years Ago Today

The August 1977 Multi-Tasker contained:

A letter from a user trying to move from RSX11D version 6B to version 5.2 stated among other problems:

1. The DSC utility does not work on files generated by version 6.B. They booted the new distribution tape and DSC'd their system disk to 6 TU10 mag tapes, then put a fresh disk in, BAD'ed it, and copied everything back to their system disk. After running for a week or so, they started to see corruption of their system disk. (Strangely enough, they never mentioned using VFY to check their disks.)

2. Tasks running under Time Slicing sometimes took up to 5 minutes to load.

3. The heavily overlaid 6.2 task builder was much slower that under 6B.

4. As with 6B, they were never able to get preserve to work properly with their system, (11/70, TU10, DB: disks.)

The resumed "New Installations" section listed a very interisting new user. An Australian installation, consisting of an 11/70 with all of 128K words, (they were hoping to expand to 192K,) two TU10's, (one 9-track one 7-TRACK,) and several terminals. Among the shortcomings they mentioned were being one of only 3 IAS users in the whole of Australia.

A report on the IAS workshop at the Spring Boston Symposium stated that there were about 50 IAS users present, compared to 19 at the fall Las Vegas Symposium. Some of the things in the IAS wish list were:

1. Improved file backup facilities, including incremental backup and migration of unused files to tape, (archiving.)

2. Improved batch, including conditional execution, submission of batch jobs from programs, routing of batch output to a file rather than a printer, and better monitoring.

3. Improvements to CLI's including parameter passing to indirect files, editable PIP directory output, provision for user added PDS commands.

The Program of the Month

MICHAEL REESE MEDICAL CENTER - DEPARTMENT OF MEDICAL PHYSICS COMPUTER

LISTING OF DR2:[102,006]PRON.BAS;11   ON 25-JUN-87 AT 14:06:30 PAGE :

```
10 print "Printer on menu. Enter selection number"
20 print "0= Buffered copy print"
30 print "1= Buffered transparent print (does not show on screen)"
40 print "2= Bi-Directional copy print mode"
50 print "3= Bi-Directional transparent print mode"
60 print "4= Auto print mode"
70 Print "Enter choice";::input i
72 print "Print scroll region/full screen (1=Scroll region)?";::input :
80 if i<0 goto 10
82 if i>4 goto 10
84 if i=1 goto 200
86 if i=2 goto 300
90 if i=3 goto 400
92 if i=4 goto 500
100 print chr$(27);"[?7i";:break
110 goto 999
200 print chr$(27);"[5i";:break
210 goto 999
300 print chr$(27);"[?261";chr$(18);:break
310 goto 999
400 print chr$(27);"[?26h";chr$(18);:break
410 goto 999
500 print chr$(27);"[?5i";:break
999 if j=1 then print chr$(27);"[?191":break
1000 exit
```

MICHAEL REESE MEDICAL CENTER - DEPARTMENT OF MEDICAL PHYSICS COMPUTER

LISTING OF DR2:[102,006]PROFF.BAS;7 ON 25-JUN-87 AT 14:06:39   PAGE 1

```
10 print chr$(27);"[?4i";chr$(27);"[4i";chr$(27);"[?19h";: break
20 exit
```

ECR, Enhanced Console Routine

ECR Enhanced Console Routine

AUTHOR: F. Borger, Michael Reese Medical Center, Chicago, IL

Operating System: IAS, Version 3.2

Source Language: MACRO-11

Abstract: ECR is an intelligent monitor console routine. It is an enhancement to the AUX program as originally written by Robin Miller for operation on RSX. It provides the following enhancements.

o The last 20 command lines can be recalled and edited.

o Often used commands are defined by numeric keypad keys.

o Up to 48 command line mungers can be defined. Typical uses for these would be to define a command that expands:

```
KEF NAME          to      KED NAME.FOR
FOR NAME          to      F77 NAME,NAME/-SP/CR=NAME
LINK NAME         to      TKB @NAME.CMD
```

o A default file name option lets ECR remember the last name used and use it again if no name is given in the command. This would further reduce the commands required to edit, compile and link a fortran program to the following:

```
KEF NAME
FOR
LINK
```

As an added goodie, we have included the program QUOTE. This is a cookie/dammit program that provides notable quotations such as:
     "Now we've got them. - Custer at the Little Big Horn"

Distribution: 600' 1600bpi magtape, BRU format

An Introduction to Writing an IAS Device Driver

(I018)

Normal Program APR Mapping

Program		User Mode Library		Global Common

0	1	2	3	4	5	6	7
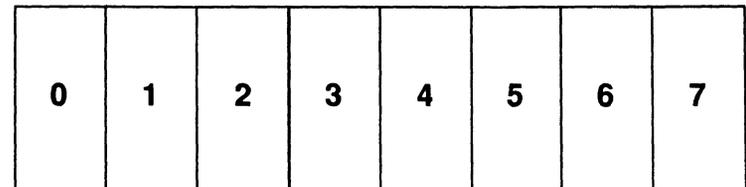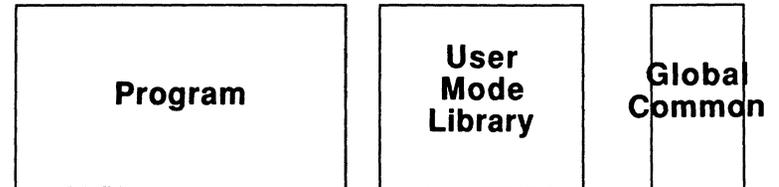
Privileged Program APR Mapping

Program Data and Code	SCOM I/O Page	

0	1	2	3	4	5	6	7

QIO Interface

User Task → IAS Executive → Handler Task

(with arrows returning: Handler Task → IAS Executive → User Task)

Handler APR Mapping

Handler Code	Mapping HNDLIB	SCOM	I/O Page
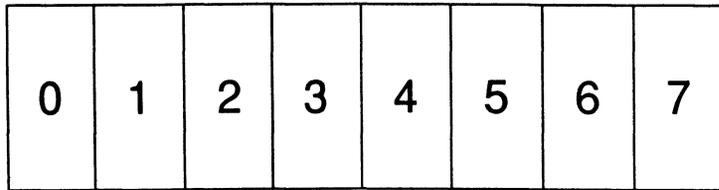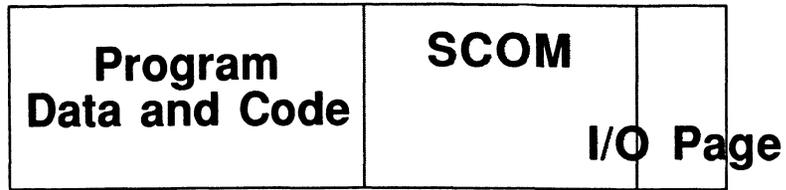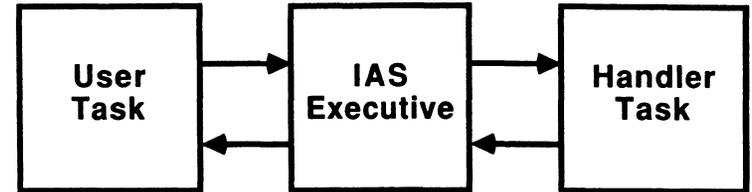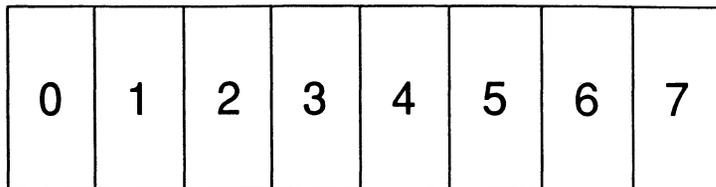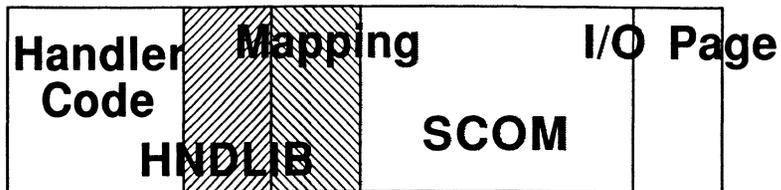
0	1	2	3	4	5	6	7

Unit Identification Table (UIT)
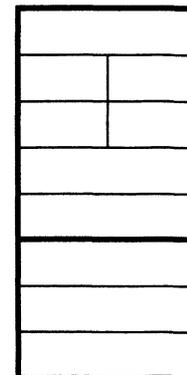
Dispatch Table Address
Max/Actual Number of Units
Last Normal/Express Request
Reserved
Reserved
Unit Number or Validity Mask
Normal Request Node Pointer
Express Request Node Pointer

Dispatch Table

```
┌─────────────┐
│             │      Send/Request Failure address
├─────────────┤      Send/Request Success address
│             │      Volume Characteristics Mask
├─────────────┤      Function Handler address
│             │
├─────────────┤
│             │
│             │
└─────────────┘
        •
        •
        •
┌─────────────┐
│             │
├─────────────┤
│             │
└─────────────┘
```
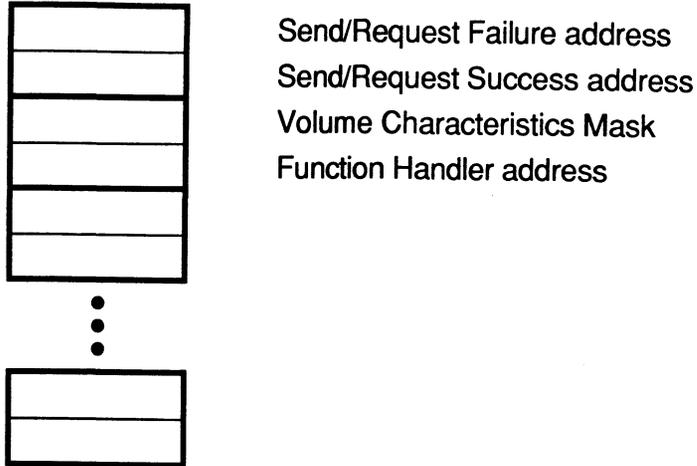
Initialization

Declare Handler Residency (..DSUT/..DSMU)

Connect to Interrupt Vector (..CINT)

Perform specific and/or Peculiar Initialization

Specify a Power Recovery AST (SPRA$)

DECLARING HANDLER RESIDENCY

```
init:      mov        #uit,r0
           mov        #"XX,r2
           mov        #uf.rh,r3
           call       @#..dsut
           call       @#..dsmu
```

ALLOCATING UMR'S

```
bitb       #on.um,umr22+1
beq        10$              ;dont need
mov        #1,r3            ;get 1
mov        r3,mrb+m.df ;save->mrb
call       ..ural           ;get 1
bcc        5$               ;br if OK
  .
  .
mov        r3,mrb+m.pw ;save slot
clc                         ;show succ
return
```

UMR MAP REGISTER BLOCK

```
.blkw    6


m.rn    ;owner's req node add
m.pw    ;pre-allocated slot/len
m.df    ;# of pre-allocated
m.sl    ;slot/length word
m.ul    ;low 16-bit address
m.uh    ;high 2-bit address
```

SETTING UP POWER FAIL AST

```
mov     #uniten,r4  ;1st unit
mov     (r4),r5     ;pud ptr
beq     failed      ;no pud
mov     #pwr,-(sp)  ;push dpb
emt     377
bcc     pfok        ;br if ok
jmp     exit



pwr:    spra$
```

CONNECTING TO INTERRUPTS

```
mov     #uniten,r4 ;first unit
mov     (r4),r5       ;pud add
mov     u.tv(r5),r0;vect add
mov     #isrin,r1  ;isr add
clr     r2            ;isr base
clr     r3            ;
bis     u.ip(r5),r3;priority
call    @#..cint    ;connect
bcs     exitcf      ;if failed
```

possibly 2nd connect here

Main Code

WAIT!

    Perform I/O Completion (..IODN)

    Dequeue a request (..DQRN/..DQRE)

    I/O Function in Dispatch Table

    Validate Function (..VACC)

Data Transfer

..VXFR

    Transfer is to/from contiguous memory
    Transfer is to read/write memory

..BLXI/..BLXO

    uses APR3 as scratch area

    R1 = Request Node Address
    R2 = Virtual Starting Address
    R3 = Transfer Byte Length
    R4 = Handler Address

IO FUNCTIONS

```
mov      r.pb(r1),r2       ;start
mov      r.pb+2(r1),r3     ;length
bit      #on.um,.umr22+1;22bit?
beq      18bit
call     ..vxur            ;..vxfr
bcs      error
mov      r4,r.pb(r1)       ;change
mov      r5,r.pb+2(r1)
mov      r3,r.pb+4(r1)
mov      r2,-(sp)
mov      #mrb,r2
call     @#..almr
mov      m.ul(r2),r5       ;low 16
mov      m.uh(r2),r4       ;high 2
```

DOING THE TRANSFER

1/ Let the system do the walking

```
mov     r.pb(r1),r2
mov     r.pb+2(r1),r3
mov     #mybuff,r4
call    ..blxi/..blxo
```

2/ Do it yourself:
```
    r5 = low 16 bits
    r4 = high 2 bits (bit 4,5)
```

```
ash     #-4,r4      ;shift 2 down
ashc    #12,r4      ;back up
ash     #-12,r5     ;justify it
bic     #177700,r5 ;mask garbage
add     #offac3,r5 ;apr offset
mov     #cpdr3,-(sp)   _
mov     r4,-(sp)
call    ..spd3      ;swap par/pdr
mov     (sp)+,oldpar
mov     (sp)+,oldpdr
```

IO COMPLETED

```
mov     r2,-(sp)
mov     r4,-(sp)
clr     r2          ;adjust dec
mov     number,r4;number sent
call    @#..iodn ;all done
mov     #mrb,r2   ;for umrs
call    @#..demr ;give back
mov     (sp)+,r4
mov     (sp)+,r2
```

Exiting (Gracefully)

Do final housekeeping and cleanup

    Turn off interrupt enable bits
    release all nodes used

Disconnect from all interrupts (..DINT)

Declare Nonresidency (..DNRC)

EXIT$S

What to Watch for

Read only code

MACRO-11 .PSECT Specifications

Adjusting your stack

               MOV   #HERE, SP
      HERE:

The "NEW" SCOMM

```
mov     uniten,r1    ;get pud
mov     u.da(r1),r1  ;get hdw
bic     #100,@r1     ;int off
bic     #100,4(r1)   ;(both)

mov     uniten,r0    ;unit en
mov     u.tv(r0),r0  ;trap vec
call    @#..dint     ;disconnect
add     #4,r0        ;to xmit
call    @#..dint

mov     mrb+m.pw,r3  ;umrs
call    @#..urda     ;dealloc

mov     #uit,r0
call    @#..dnrc     ;non res
```
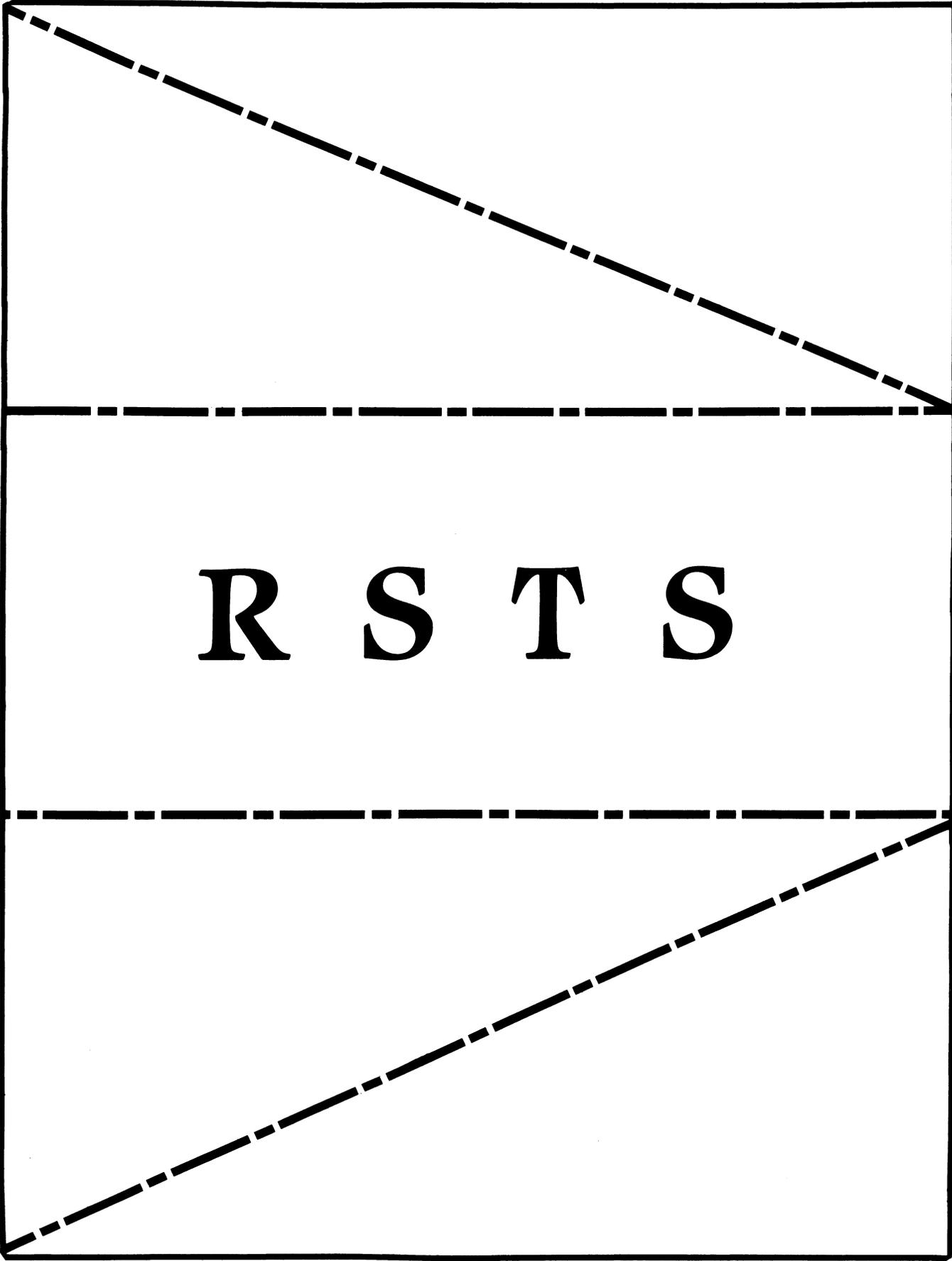
RSTS

Table of Contents

Next month's theme - DECNET/E

From the Editor
Terry Kennedy

"I don't think there's anybody back there"

The above phrase may have been made famous by a fast-food chain's advertising, but recently I have heard (and thought) the same thing about some areas of DECUS, particularly this SIG. This impression was caused by several things: Our SIG's section in the newsletter was sporadic at best, and seemed to contain mainly reprints of articles. There seemed to be no editorial direction. When I called some of the SIG leaders to ask why this was, I found that many of the SIG leaders had changed jobs, or were otherwise unreachable. I developed a view of the SIG as a remote, detached entity. The SIG leader I finally reached told me "Go to the Nashville Symposium - you'll change your mind."

He was right - I have to tell you that there is a VERY active RSTS SIG. If you go to the symposia, you already know this. For those of you who have never attended, it's a real eye-opener. Our SIG had about two dozen sessions, which were very well attended. Almost all sessions had extensive handouts. I found the SIG leadership to be very involved and responsive.

However, that doesn't do a lot for the 90% or so of the DECUS membership who cannot attend symposia. That's where this Newsletter comes in. I volunteered as Editor because I was, until recently, one of that 90%. My job is to communicate to you the activities of the SIG, and spread around some of the material generated by the symposia.

As my first task, I have updated the SIG listing in the back of the Newsletter. You should notice that the information for each person is now more complete. If you have a need to communicate with one of the SIG leaders, you now have the information you need. However, it is generally unreasonable to expect extended return long-distance telephone calls or free advice regarding non-SIG topics. More on advice later...

Each issue after this one will have a theme topic (for as long as I can come up with good themes). Next month's theme will be DECNET/E. Please feel free to suggest topics, or especially to submit articles. Remember, each newsletter is only as good as the articles submitted to it.

I would like to thank the SIG leadership for providing a newsletter during the time that there was no editor.

Newsletter Dialup System now Available

As of now, the RSTS SIG has a dedicated system available for the electronic submission of articles (hint hint), letters to the editor, etc. The Spring/Fall combined SIG tape is also on-line and available for downloading. KERMIT is available for uploading and downloading files. To use the system, dial (201) 435-2546 at either 300 or 1200 baud. Hit a few RETURNs until you get the RSTS banner, then sign on with account 2,1. No password is required. You may request a private account by sending MAIL to NEWS. If you need help or advice on some aspect of RSTS, you can leave a message to NEWS as well. I will try to answer all questions I get. In order for you to receive a reply, I will need a 'real' address to send it to. Any questions submitted may be published in the Newsletter if considered of general interest.

The system is up 24 hours a day, seven days a week, except after power failures, which seem to happen too often. If you are having a problem with the system, call (201) 435-1890 and leave a message. This is a VOICE number, not a DATA number.

Readers Desperately Needed

Did you know that the information in this newsletter reaches a very small percentage of RSTS users? That means that they'll be missing all of this information we'll be publishing - information which will make them more productive. You already know the benefits of subscribing, so you are our best way to reach these people who aren't DECUS members, or who don't subscribe to the Newsletter.

If you know of another RSTS site where there isn't a DECUS member, give them the DECUS application and newsletter subscription form found in the back of this issue.

Every SIG seems to be publishing DCL 'goodies' lately. I'll try to have some of the more interesting ones here. As usual, this is not restricted to RSTS DCL, any DCL trick will be included. However, preference is given to RSTS-unique ones.

This month's trick is with SET VERIFY. It is only available on RSTS 9.0 and later. In addition to turning console logging of commands on and off, it can show you the command line after symbol substitution:

```
$ DISPLAY == "SHOW"    ! define display as a synonym for show
$ SET VERIFY/DEBUG     ! turn on debugging display
$ DISPLAY NETWORK      ! issue command
(SHOW NETWORK)         ! displays substituted command
... output ...
```

It can also show you the actual command that DCL issues to perform the task:

```
$ SET VERIFY/WATCH     ! turn on translation display
$ SHOW NETWORK         ! issue command
(NCP SHO ACT NOD)      ! displays actual command issued
... output ...
```

These two options can be very useful when you have a command procedure which isn't acting as planned. The /DEBUG option will rapidly show you if you are experiencing undesired symbol substitution. The /WATCH option will show you exactly what command is being executed - in the example above, it explains why DECNET/E only shows active nodes rather than all nodes, which would be NCP SHO KNO NOD.

Next month, I'll show you how to use /WATCH to locate commands in DCL and change them.

Software Problem Report (SPR) Log

Please send the newsletter editor copies of any SPR's (and Digital's answer) on RSTS/E, DECNET/E, or RSTS layered products. We will print any that are of general interest. The reason for this is that many SPR's are answered with a patch or a notice of restriction, but due to space considerations, they are not published in the Software Dispatch. Since we're desperate for material, this should be useful information and we will print it.

Questionnaire

In the back of this newsletter, you will find a questionnaire. Please fill it out and return it to the editor. This will help us serve you better by defining the areas you're interested in. There is a section for your comments, as well.

===

CUSP of the Month

Every month, we'll pick a CUSP (Commonly Used System Program) and show you new things to do with it. This may be either in the form of patches, or simply a new way to use it. When we provide modifications to the source, we will only show the lines which need to be changed. If you decide you want the patch, edit a COPY of the program (NOT the original). Please remember that Digital can't be responsible for modified programs.

This month's victim is SYSTAT.BAS. This is a reprint of an earlier patch which allows the 'account name' field of a user's account to be displayed for each job. The author of the patch is Mark Hartman, of Jadtec Computer Group.

Modify the line as indicated by underscored text:
```
"Job";TAB(6%);"Who";TAB(13%);"Name";TAB(26%);"Where";TAB(33%);&
"What";TAB(41%);"Size";TAB(47%);"State";TAB(56%);"Run-Time"; &
\ IF PRIV.TUNE% THEN &
        PRINT #0%,TAB(66%);"Pri/RB";TAB(75%);"RTS" &
ELSE    PRINT #0%,TAB(68%);"RTS" &
```

Replace the line:
```
\ PRINT #0%,TAB(3%);S0$;TAB(9%-C%);S$; &
```
with:
```
\ PRINT #0%, S0$;SPACES(5%-C%);S$; &
\ PRINT #0%, SPACE$(8%-(LEN(S$)+(4%-C%))); &
\ PRINT #0%, FNACCOUNT.NAME$(PROJ%,PROG%);" "; &
```

Modify the line as indicated by underscored text:
```
\ PRINT #0%,TAB(26%);S$;TAB(33%);RAD$(UU.SYS0%(17%)+ &
SWAP%(UU.SYS0%(18%)));RAD$(UU.SYS0%(19%)+SWAP%(UU.SYS0%(20%)));&
TAB(39%);FNN$(4%+PRIV.TUNE%,UU.SYS1%(13%)); &
\ PRINT #0%,"/";FNN$(2%,UU.SYS1%(19%)); IF PRIV.TUNE% &
\ PRINT #0%,"K";TAB(47%); &
```

Modify the line as indicated by underscored text:
```
\ PRINT #0%,TAB(65%-(PRIV.TUNE%*9%)-((NOT PRIV.TUNE%)*2%)); &
RAD$(UU.SYS0%(27%)+SWAP%(UU.SYS0%(28%))); &
```

Add the following before line 15100:
```
15010   DEF* FNACCOUNT.NAME$(PROJ%,PROG%) &
\ ON ERROR GOTO 15020 &
```

```
\ Z$=SPACE$(13%) &
\ LSET Z$="<No name>" &
\ LSET Z$="<Logged out>" if proj%=0% and prog%=0% &
\ LSET Z$=CVT$$(MID(SYS(CHR$(6%)+CHR$(-25%)+CHR$(-1%)+CHR$(5%)+&
CHR$(PROG%)+CHR$(PROJ%)+STRING$(16%,0%)+"SY"+ &
STRING$(2%,0%)),8%,13%),5%) UNLESS PROJ%=0% AND PROG%=0% &
\ GOTO 15030 &

15020    RESUME 15030 &

15030    FNACCOUNT.NAME$=Z$ &
\ ON ERROR GOTO 19000 &
\ FNEND &
! RETURN THE ACCOUNT NAME BLOCKETTE DATA &
```

You should then re-compile SYSTAT with Basic-Plus 2 (if
you have it) or Basic-Plus. If you don't use BP2, you will
have to rename $SYSTAT.TSK to something like $SYSTAT.OLD so
that RSTS will use $SYSTAT.BAC. The output of SYSTAT will then
look like the following:

```
RSTS V9.x-yy SPCCSPDP status at 27-Jun-87, 10:47 PM Up: 2:01:06

Job   Who    Name          Where  What    Size   State    Run-Time
 1    1,2    (SYSTEM)       Det    ERRCPY  5/64K  SR NSw    1:11.2
 2    1,2    (SYSTEM)       Det    NPKDVR  9/64K  SL          54.6
 3    1,2    (SYSTEM)       Det    PBS...  19/64K SL           3.1
 4    1,2    (SYSTEM)       Det    EVTLOG  18/64K SL           2.6
 5    1,2    (SYSTEM)       Det    MAILQ   32/64K SL          18.6
 6    1,254  Terry Kennedy  KB26*  SYSTAT  15/64K RN Lck       8.5
 7+   1,3    Operator       Det    DISPLY  17/64K SL        5:50.8
```

Of course, the rest of the display has been truncated. You
may now want to set the [1,2] account's name to '(SYSTEM)' as I
have done here.

RSX

MULTI-TASKER

DECUS

RSX

The RSX Multi-Tasker

August, 1987

"It's Because They're the Same People"

Fine Realtime Commentary Since 1975

Table of Contents

Opinions expressed in the editorial section of the Multi-Tasker are those of the Editor. They do not represent the official position of the RSX SIG or that of DECUS leadership in general.

Food for Thought

"DECtape II, TU58, is a low cost mass memory device offering random access on block-formatted, pocket-size cartridge media. DECtape II is ideal for small system mass storage, diagnostic loading, and software update distribution."

(Any 11/44 or VAX 750 owner will tell you so ...)

Digital Equipment Corporation
PDP11 Peripherals Handbook

The Editor's Corner

Bruce R. Mitchell

Oh, my word, it's hot out here in Minnesota. It's so hot that the gophers aren't coming out until midnight, and then only for short sprints to the nearest corncrib. The carp have all packed up and left for parts south of here. Even the mosquitoes - the venerated Minnesota State Bird - are loath to leave their nice cool ponds.

It's so hot out here ... but perhaps we'd better let sleeping dogs lie.

We have more good information for you this month. For those of you who program in commercial control environments, check out the article on monitoring task status in multitask systems. And, of course, the serialization of the "Hitchhiker's Guide to RSX" continues. That pretty well fills up the 40 page quota for this issue. Which reminds me ...

Haul out your fire extinguishers and check the Halon, my

dear readership, because this month's editorial dragonflame is aimed at YOU.

----- Contributions to the MT -----

Your editor is pleased as can be that more contributions are arriving at the plush MT offices. I have a 40 page allocation each month, and few things please me more than filling those 40 pages - few, that is, other than asking for a bigger allocation.

I do note, however, there are still some of you - yes, I must say it - some of you who haven't yet written an article for the Multi-Tasker.

So maybe it's time again to blast away what appear to be common misconceptions about writing for this publication:

o You do not have to be a genius or wizard to write an article.

o Nobody laughs at articles submitted to this newsletter.

o No article submitted is ever too elementary to publish.

o No article submitted is ever too short to publish.

If you send me something for the Multi-Tasker, it will be printed in the first available issue, or I will see that it gets to the editor of the appropriate newsletter.

Some of my correspondents complain that there aren't enough introductory, how-to, non-technical and general interest articles. There's a simple explanation: The people who submit now are interested in the technical side of RSX. They know the basics, so they don't want to write about them. They're solving today's problems so that you don't have to when you come to that point.

If you want to see general interest articles, you have to submit them to me. That means you with the newsletter in your hands! If you have problems with Indirect or TKB, if you just discovered system-wide login command files, if you just found out how to bypass Files-11 protection by building a task /PR:0 - come on, *write it up* and *send it to me!* Great Ghu, what I wouldn't give to have an article on A-to-Z!

I don't care how rough your writing is. I do my best to see that misspellings are corrected, dangling participles are cut off, and that code and text is vetted for correctness. But without an article to start with, I can't provide these services. Come on, you RSX rookies, write! I just love it when there's a name I don't know in a byline!

Now, here's a challenge for you: I'm no longer going to ghostwrite articles. Over the past year, I've ghostwritten at least ten articles to fill space. No more. This is your newsletter, and from this point out, all articles will be *your* articles. *You* now have 36 pages a month to fill. I'm just going to write editorials and glue things together. If nobody submits articles, all you will see is the editorial. *So write, dammit!*

Now, smite the keyboards of your terminals! Don't put it off! Show them slimy VAX LUsers what real timers do! And be assured that our cause is righteous, our hearts are pure, and that if you send me something, future issues will have more than just ranting in this column. Thank you.

----- Answer to Last Month's Quiz -----

Embedded in the Editor's Corner. Congratulations from the Multi-Tasker staff, and the entire SIG's best wishes as well, Linda!

----- Submitting Articles to the Multi-Tasker -----

Please submit machine readable media. RK05, RK07, RL01/2, RM03, RX01/2, RX50, TK25, TK50, 9 channel 800/1600 BPI magtape or paper tape are OK. All RSX volume formats are acceptable. Anything I can't read I can get converted; don't let that stop you from submitting.

The Editor can now Kermit articles in. The reverse is not true; the Multi-Tasker host is normally an isolate. If you want to submit via Kermit, call beforehand with phone number, login for the host machine and system uptimes.

Submissions which aren't machine readable may take longer to get into print. The editor is lazy and types mass quantities only once a month when progress reports are due.

If you preformat a submission in RUNOFF, please set page size 58,80; left margin 10; right margin 75; and, when changing margins, use incremental changes rather than absolute. The editor blesses you for the consideration.

Send your articles and other submissions to the luxurious new Multi-Tasker offices c/o:

Bruce R. Mitchell
4-416 Alfred, St. Mary's
Mayo Clinic
Rochester, MN   55904
(507) 285-5753

----- And That's The Way Things Are -----

... this month in Pool Lowbegone, where the account file password encryption algorithm is strong, the FMS screens are good-looking, and the system manager's private TKB priority is above average.

A Cheap Way To Monitor Task Status

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Ever hear a bank talk?

RSX can be a very effective solution to the types of multi-tasking problems that occur in typical process control applications. I would like to describe one way in which I used some of the RSX parent-offspring tasking directives in an application called Banktalk.

Banktalk is a voice response system which uses the DECtalk DTC03 voice terminals to provide home banking functions. A customer can access account data (eg. savings balance), rate information, and perform account transactions by calling from a Touch-Tone phone.

A typical system can serve anywhere from one to 64 phone lines. Each line is managed by its own DECtalk and its own phone server task. Each server task runs under a unique terminal line. There is also a monitor task which tracks the status of each of the possible 64 server tasks.

I needed a simple way for each server task to communicate its current status (i.e., is it speaking, waiting for a call, crashed, etc.) to the monitor task.

The Server Task Table

I create a table in the monitor task that maintains information about each task.

```
;  Server Task Table Entry Format
;
;      +-------------------+
;  00  |  Status           |  2 bytes
;      +-------------------+
;  02  |  Taskname in R50  |  4 bytes
;      +-------------------+

   T$STAT = 0              ; Offset to task status
   T$ID   = T$STAT + 2     ; Offset to task name
   T$LEN  = T$ID + 4       ; Length of a table entry
   T$MAX  = 64.            ; Maximum entries in table

TTABLE:  .BLKB  <T$MAX * T$LEN>   ; The Server Task table
```

The table format is simple. Each server task maintains an entry in the table. The entry describes the task name and the current status.

Given this information, what I need now is some way to fill in the status part of the corresponding task's entry. The problem is each task is in its own data space and can't access the server task table.

Emitting Status

RSX provides several ways to communicate between tasks; I wanted a cheap one. Fortunately, the CNCT$ and EMST$ directives provide us with one such way. The CNCT$ directive allows us to make a one way, one time connection between tasks. In fact, this connection is closed whenever the connected task either exits or emits status. The same mechanism that returns exit status can be invoked at any time. In the case of our server task, all it has to do is:

```
EMST$S        #status
```

If things are set up right, "status" can be picked up at the task that initiated the connection. Incidentally, "status" is preferably some number greater than 4, since 0 through 4 might be confused as one of RSX's reserved task exit status codes.

```
0        EX$WAR        Warning; task may have succeeded
1        EX$SUC        Success
2        EX$ERR        Error
4        EX$SEV        Severe error; system may be compromised
```

I don't know what happened to status 3, but the above info should be in section 4.2 of the Exec reference.

You might have noticed that in the above EMST$ example I did

not specify any first parameter. This informs RSX to pass status
to any task connected to this one. You can also pick a specific
task to receive status by placing the task ID here.

Connecting It Up

So how does this status word get to the connector task?
Let's walk through an example. Assume two tasks A and B. Task A
executes a CNCT$ to task B. This causes RSX to create and queue
an Offspring Control Block (OCB) to task B.

Some time later, task B emits status. RSX fills the OCB
with whatever task B specified via the EMST$, and returns the OCB
to task A. Now the OCB is accessible to task A. Thus a simple
method of intertask communications is completed.

The connection between A and B, however, is lost. In order
to do it again, task A must respecify the connection to task B
(assuming that B is still hanging around, of course). One way of
doing this is through the AST option in the CNCT$ directive. We
can set up a piece of AST-driven code that reconnects to whatever
task emits status to it.

Enough talk, let's see some code.

```
;     Test program

NAME:    .RAD50   / FIDO/

START:   MOV      #TTABLE, R3              ; Point at table
         MOV      NAME, T$ID(R3)          ; Load taskname in
         MOV      NAME+2, T$ID+2(R3)      ;  table entry
         CALL     STASK                   ; Start task up
         ... code continues ...


;     Start Task Subroutine
;
;     Inputs:  R3 - Points to task table entry
;
;     Outputs: R0 - DSW status

SNAME:   .RAD50   /...SRV/                 ; Server taskname

STASK:   RPOI$S   #SNAME,,,,,,,,,,, T$ID(R3)   ; Start task up
         BCS      1$                      ; Handle failure

         CNCT$S   T$ID(R3),, #UPAST, T$STAT(R3) ; Make connection

1$:      MOV      $DSW, R0                ; Get status
```

```
         RETURN

;     Table Update AST Service Routine
;
;     Inputs:  R3 - Points to task table entry
;
;     Outputs: Table updated

UPAST:   MOV      R3, -(SP)                ; Save R3
         MOV      2(SP), R3                ; Point at entry
         CNCT$S   T$ID(R3),, #UPAST, T$STAT(R3)  ; Reconnect task
         MOV      (SP)+, R3                ; Restore R3
         TST      (SP)+                    ; Clear stack

         ASTX$S                            ; Exit from AST
```

"START" sets up a task name of "FIDO" in the first record of
the Task Table. It also sets up R3 to point to that record. Now
we can call STASK.

At STASK the RPOI$ directive requests that a task be created
from the prototype task at SNAME. In this case I call it
"...SRV". It should be installed prior to the call, otherwise
the directive punts and STASK returns IE.INS status in R0. I
have elected to specify what task name "...SRV" clone will be
called.

(Note that this option exists only on M-Plus and Micro/RSX.
If this option is omitted, the created task's name is based on
which terminal it runs on; e.g. if on TT10:, the task is called
SRVT10.)

If all goes well with the RPOI$, we proceed to connect to
task FIDO. Note how we do the CNCT$. We specify that an AST be
queued when the connection is completed. We also set up
T$STAT(R3) to have FIDO's status written into. If all goes well,
we should return to START with R0 set to IE.SUC. We can now go
on our merry way, confident that T$STAT(R3) contains the emitted
status from FIDO.

Whenever FIDO emits status, UPAST is called. It should find
a pointer to the OCB at (SP). Because ASTs can occur at almost
any point in the program, I save R3 for later use, and loaded it
with the top of stack. R3 now points to the appropriate task
table entry, in this case FIDO's. Then I execute a CNCT$ back to
FIDO and set up the OCB at FIDO's record address. Next, I
restore the state of things so I can exit from the AST.

Notice that it doesn't matter which task emits status,
because I can tell which task it is by looking at the OCB

address. (Which happens to also be the address of the appropriate server task table entry.)

When Connecting is Not Enough

Now that we have created what amounts to a reusable link with the EMST$ / CNCT$ pair, how can we improve on it? Let's try a few ideas I have used in my application.

Running on Other Terminals

In the above example, the prototype task "...SRV" is set up to be cloned a number of times. However, they are all running on the same terminal line. It would be nice if there were some way to also specify to the created task which terminal it should attach to. We can solve this problem by using one of those many parameters in the RPOI$ that we previously ignored.

The RPOI$ directive allows us to specify which terminal the created task runs under. This is done with the "dname" and "unit" parameters, where "dname" is the ASCII device name of the terminal (typicaly "TT") and "unit" is the unit number. By using this parameter, the "...SRV" task can be written as if it were doing I/O to its standard TI:. There are three caveats, however.

Note that in order to run a task on terminal other than one's own, the task executing the RPOI$ has to be Taskbuilt or, at the very least, installed privileged. In this case I specify a /PR:0 option in my TKB command.

A task can be created only on a physical device. For instance, you can use "TT" for a device name, but it doesn't really work for a pseudo device.

If the task is running on a terminal that isn't logged in (most of the time in my application), there is no User Block for the task. This causes all sorts of problems if you use named directories since RSX tries to use your UIC as a default directory name. Just remember if you open any files to specify the full filename.

Passing a Command Line

With RPOI$ we can also pass a command line on startup to the cloned task. We use the "bufadr" and "buflen" option, where "bufadr" is the address of a string to be passed to the task and "buflen" is the length in bytes. This command line can be picked up by the target task by executing a GCML$ directive. This is useful for passing filenames and options to the server tasks.

Timestamping Status

It is sometimes useful to know when was the last time a task emitted status. We can get this information by doing a GTIM$ in the AST. A logical place to put it would be in the appropriate task table entry. Then, the next time we check a task's status, we can also find out how old this information is.

Display Update Flag

If the task table is used to provide information for a real time display, it is very helpful for the redisplay algorithm to have a quick way of knowing if something has "recently" changed in an entry. A good way to do this is by having the AST set something in the task table entry whenever it runs. The display routine can then update the corresponding screen field and clear the table entry.

Use Your Imagination

I have talked enough about what I have done. The best way to find out about what RSX can do for you is to sit down, code it up and try it out for yourself. I include here some code which improves on the previous example and includes some of the ideas just mentioned. Happy Hacking.

```
;     Server Task Table Entry Format
;
;        +------------------+
;     00 |    Status     2  | T$Stat
;        |------------------|
;     02 |  TaskId (r50) 4  | T$Id
;        |------------------|
;     06 |     TTn       2  | T$TTn
;        |------------------|
;     10 |  Command line 2  | T$Cmd  (Null Terminated)
;        |------------------|
;     12 |  Update Flag  1  | T$Updat
;        |------------------|
;     13 |  Time HMS     3  | T$HTime, T$MTime, T$STime
;        +------------------+
;

T$STAT  = 0                ; Task status
T$ID    = T$STAT + 2       ; Task name in R50
T$TTN   = T$ID+ 4          ; Terminal Number
T$CMD   = T$TTN + 2        ; Command line arg
T$UPDAT = T$CMD + 2        ; Update byte
T$TIME  = T$UPDAT + 1      ; Timestamp field
T$HTIME = T$TIME           ;  Hours byte
T$MTIME = T$HTIME + 1      ;  Minutes byte
```

```
            T$STIME = T$MTIME + 1          ; Seconds byte
            T$LEN   = T$STIME + 1          ; Length of entry
            T$MAX   = 64.                  ; Maximum entries

TTABLE: .BLKB   <T$MAX * T$LEN>            ; Server task table


SNAME:  .RAD50  /...SRV/                   ; Server taskname


; Start task
;
;           Inputs:  R3 - Points to task table entry
;
;           Outputs: R0 - DSW status

STASK:  MOV     R3, R0                     ;
        ADD     #T$CMD, R0                 ; Get cmd line arg
        CLR     R1                         ; Zero line length


;       Find length of string by looking for terminating null

1$:     TSTB    (R0)+                      ; Is this a null?
        BEQ     2$                         ; If so, exit loop

        INC     R1                         ; Bump string lngth
        BR      1$                         ; And go look again


;       Request offspring task, pass OCB, and connect to offspring

2$:     RPOI$   #SNAME,,,,,,T$CMD(R3),R1,,#"TT,T$TTN(R3),T$ID(R3)
        MOV     $DSW, R0                   ; Get status
        BCS     3$                         ; On failure go die

        CNCT$S  T$ID(R3),, #UPAST, T$STAT(R3) ; Connect to task
        MOV     $DSW, R0                   ; Get status
        BCS     3$                         ; On failure go die

;       Task started OK.  Save status about it in the task table.

        MOV     #5, T$STAT(R3)             ; Set status of 5
        GTIM$S  #TIMBUF                    ; Get system time
        MOVB    SEC, T$STIME(R3)           ; Set up start time
        MOVB    MIN, T$MTIME(R3)           ;  in table entry
        MOVB    HOUR, T$HTIME(R3)          ;
        CLRB    T$UPDAT(R3)                ; Clear update flag

3$:     RETURN                             ; Return to caller


;       Table Update AST Service Routine
;
;
```

```
;           Inputs:  R3 - Points to task table entry
;
;           Outputs: None

UPAST:  MOV     R3, -(SP)                  ; Save R3 on stack
        MOV     2(SP), R3                  ; Task entry pntr
        CNCT$S  T$ID(R3),, #UPAST, T$STAT(R3) ; Reconnect to task
        GTIM$S  #TIMBUF                    ; Get system time
        MOVB    SEC, T$STIME(R3)           ; Set up start time
        MOVB    MIN, T$MTIME(R3)           ;  in task entry
        MOVB    HOUR, T$HTIME(R3)          ;
        CLRB    T$UPDAT(R3)                ; Clear update flag
        MOV     (SP)+, R3                  ; Restore R3
        TST     (SP)+                      ; Clean off stack

        ASTX$S                             ; Exit AST state
```

Erratum: Security of the RSX-11 Operating Systems

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In my article on RSX security (see "Security of the RSX-11 Operating Systems") in the June 1987 issue of The Multi-Tasker, the section on protecting the system console terminal recommended that the console be slaved at SYSVMR time via the following VMR command:

VMR>SET /SLAVE=TTO:

to ensure that the system comes up with the console terminal slaved and therefore unresponsive to attempted startup command file aborts.

This technique sounds good but, as it turns out, is a bum steer. It is defeated - deliberately! - by the SAV task. As part of its system startup processing, SAV selects a console terminal and explicitly marks it logged on, unslaved, and privileged. This negates the effects of the recommended VMR command.

I know of no particular reason why the console terminal must be unslaved on startup. The code in SAV that unslaves the terminal is the statement:

BIC   #U2.LOG!U2.SLV, U.OW2(R3)

at label FINDCO: in [12,10]SAVE.MAC on the SYSGEN kit. The
obvious modification is to remove U2.SLV from the bit clear,
producing the modified statement:

BIC   #U2.LOG, U.OW2(R3)

then reassemble SAVE.MAC, library the new module, rebuild SAV,
and re-VMR the system.

    I have NOT tried this; it may leave your system brain dead
for some obscure reason. But if you're desperate to close that
little window between the time the system comes alive and the
time that STARTUP.CMD cranks up, here's a starting place.

The Hitchhiker's Guide to RSX, Part II

A-to-Z Base Product Marketing
Digital Equipment Corporation
Continental Boulevard, MKO1-2/E25
Merrimack, NH 03054

    Through the kind intervention of a Digital employee, the
Multi-Tasker is pleased to present "The Hitchhiker's Guide to
RSX". This is probably the best overall coverage of the current
RSX environment available. It is also a valuable reference for
all application programmers, not just business application
developers.

    This document is being serialized due to its length.   This
is the second of three parts, covering chapters 5 through 8.

An Introduction to RSX for Business-Application Developers

Revision 0.0

Disclaimer

This is a preliminary version and is not quite one-hundred
percent complete.   Please send comments, questions, and
recommendations -- on this document -- to A-to-Z Base Product
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September, 1986

Chapter 5

Record Management Services (RMS)

In the early days of RSX there was little in the way of facilities for file or record management. File Control Services (FCS) offered routines to open and close files, and a Macro program could issue QIO requests directly to the disk driver. There was provision for sequential access to records and random access to disk blocks – but otherwise application developers were left pretty much to themselves. The need for something more was apparent and eventually RMS-11 was developed.

5.1 Introduction to RMS

Record Management Services (RMS) is a language-independent set of file and record management routines which may be linked into a user program to perform a variety of file and record related functions. Since the in-file format is determined by RMS and not by the host language processor, records within the files are also language independent, thereby providing a ready mechanism for exchange of data between applications.

RMS has undergone several revisions since its inception, primarily to take advantage of more advanced hardware and operating system features. The first versions of RMS were a collection of object modules that had to be linked into, and carried about with, the task image. Modern versions take advantage of memory management hardware and CPU operating modes for improved speed and reduced disk space requirements and activity.

The current version of RMS may be linked as a shared library which reduces disk requirements for task images and eliminates the overhead of disk overlays for the RMS routines. Another option is clustering the RMS library with the language OTS; this increases the amount of virtual address space available to the application. Lastly, it may be linked as a supervisor mode library on processors which support supervisor mode operation; this does all of the above and reduces the time required for context switching between libraries. For further details, see the chapter on linking.

Full access to all RMS features is really only available

through Macro. Each higher level language makes trade-offs in mapping traditional semantics of the language statements to facilities provided by RMS. Some languages allow the developer to specify the characteristics of a file being created with great precision; others do not. Some permit update of files opened for input; some do not.

Some language statements may cause the run-time library to execute hidden RMS operations. The DIBOL WRITE statement, for instance, stores a record into both occupied and un-occupied cells, executing either an RMS PUT or UPDATE operation, as required.

Utility programs are provided with RMS which provide for creating, converting, and re-organizing RMS files. These utilities can be used interactively or can be spawned from an application to perform their various functions.

5.2 File Organizations

RMS provides support for three major and two minor file organizations. The major types are sequential, relative and indexed. The minor types are "stream" and "undefined"; these are not discussed further here. Types of access allowed to a file depend on its organization.

5.2.1 Sequential

Sequential files are the simplest format and, in some circumstances, offer the highest performance. A sequential file consists of a header and a number of data records. The file is loaded by writing a series of data records. Later, the records may be retrieved in the order in which they were written.

When you create a sequential file you may specify that the file contains fixed or variable length records. Fixed length format offer the most efficient packing. Variable length format offers the greatest flexibility and is by far the more common format.

Sequential files are appropriate for serial writing or reading of records. Very high performance may be attained with languages which support the multiple buffering and deferred write features of RMS.

There is no provision for deleting, replacing or updating records once a sequential file is created. Some languages permit opening a sequential file to append data to existing records. Sequential files with fixed length records do allow limited facilities for random access, but record interlocks are limited and this use is not encouraged.

5.2.2 Relative

Relative files consist of a file header, a prologue and data records. The header and prologue contain information about the file and the records.

Data records are stored in groups known as "buckets". The size of the bucket is declared when the file is created, and each bucket is divided into as many record cells as will fit. Cells are all the same size and can hold the largest record. Maximum record size must be declared when the file is created. Data records within the cells may be fixed or variable length, but unused space in a cell containing a short record cannot be put to other uses.

Once the file is created, the records may be loaded serially or randomly. There is a flag byte in each record cell which indicates whether a record is present, has never been stored or has been stored and then deleted.

Records may be stored, retrieved, updated and deleted, randomly or sequentially. RMS automatically maintains a current record context which determines which record is selected for the next sequential operation. If a record is written to a cell beyond the end of the existing data, the file is automatically extended. New buckets are created and initialized by RMS, as required.

Relative files represent a good compromise between convenience and efficiency. As long as buckets are densely populated data is stored with comparatively little overhead and access to any record in the file requires only a single I/O operation (not counting window turns). Interlocks are provided for files which have been opened for write access by one or more programs. Interlocks are maintained on a bucket basis.

5.2.3 Indexed

Indexed files offer the most flexibility to the programmer. You may access records directly or sequentially, by a primary key and any of up to 254 secondary keys. The keys may be located anywhere within the record, may be contiguous or segmented, and may be one of several data types. The index structure is dynamic, increasing in size and number of levels to accommodate new records as they are added to the file.

Access time for all records is uniform whether the file is loaded in sequence by primary key, randomly across the file or in clusters. The number of I/O operations required to reach any record in the file is a minimum and is approximately equal to the number of levels in the index.

In effect, RMS exchanges CPU time required to manage the (comparatively complex) index for more costly mechanical movements of the disk head. For small files there is little benefit to using this organization, but for files which contain tens of thousands of records the savings are substantial. There is a substantial amount of overhead carried with indexed files, both in terms of disk space and the code required to manage the file.

Indexed files require the most attention to their design. There are a large number of design parameters associated with indexed files and unless values for these parameters are selected carefully, the file performance may prove disappointing. Due to the complexity of indexed files and the great variety of usage patterns it is impossible to provide defaults which are universally suitable and the burden of design is left to the developer.

5.2.3.1 Structure

An indexed file consists of a header, a prologue and two or more index levels for each key. The header describes the location of the file extents, and the prologue describes the structure of the records and the index levels.

The lowest level of the primary index contains the data records themselves which are grouped together into buckets. Higher levels of the primary index contain copies of data record keys and pointers to the appropriate buckets at the next lower level. The highest level of the index is called the root, and consists of a single bucket.

Each alternate key defined for the file has its own index structure. The structure of an alternate key index is the same as the primary key index except that, in place of user data, the lowest level contains Secondary Index Data Records (SIDRs). SIDRs contain alternate key values and pointers to data records in the primary index.

There is only one copy of a data record in a file, but there may be several copies of the key field. Data records are collated in the buckets by primary key and the buckets are linked together so that sequential access can take place without any references to the index.

5.2.3.2 Population

A newly created file may be populated by writing records sequentially or randomly throughout the file. The index is dynamic, expanding both horizontally and vertically as required. When the initial allocation is exhausted RMS expands the file

automatically by allocating buckets as required. As buckets fill
up they are split to make room for new records.

Populating a file with an application program is not
necessarily the best way to proceed, however. There are certain
features of RMS pertaining to indexed files, such as Bucket Fill
size, which are only available to Macro. In addition, secondary
key indexes are often convoluted since even if the records are
added to the file in order of ascending values for primary key,
the values for the secondary key are unlikely to be in an optimal
order. Both these problems can be overcome with the Indexed File
Load (RMSIFL) utility.

5.2.3.3 Index Activity

When a new record is added to the file, the primary index is
scanned to find the proper bucket and the record is inserted
according to its primary key value. If there is insufficient
room to store the record, the bucket is split and half the
records are moved to a newly created extension bucket. The next
higher level index is updated to indicate the existence of the
new bucket and the record is inserted. If the index bucket is
filled, it too is split; and if the bucket being split is the
root, a new index level is formed.

If the file contains alternate keys, then each alternate key
index must be searched until the lowest level is reached, a SIDR
record added or updated, splitting the SIDR bucket if necessary,
and so on. The amount of I/O required to store a new record or
update an old one is a direct function of the number of keys.

5.2.3.4 Storage Overhead

The storage overhead in a bucket is a significant factor in
indexed files and, unlike relative files, may increase over the
life of a file. One of the features of RMS is that each data
record in a file has a unique address, and, if the record is
deleted, the address is never re-used. Because of this, deleted
records leave behind residue which can be as little as two bytes
(fixed length records, no duplicates for the primary key) or as
much as the entire record (fixed length records, duplicates
allowed for primary key).

Similarly, if a record moves from its original location in a
file when a bucket is split, a Record Reference Vector (RRV) is
left in the original location. If you expect to be splitting
buckets or deleting records frequently you must carefully
consider the record type and key locations and the implications
for bucket overhead.

5.2.3.5 Interlocks

RMS provides full interlock support on a bucket-wide basis.
Each program which opens a file declares the operations that it
wishes to perform and also the operations that it allows other
programs. These declarations are often supplied by the language
runtime system depending on the particular statement used and the
default values may differ from one language to another. If the
access declarations of all programs accessing a file are
compatible, processing proceeds. Otherwise, the program opening
the file with the incompatible access code receives a protection
violation.

5.3 File Design

The design and tuning of RMS files is an area of study unto
itself. The number of possible usage patterns for files is large
and it is not possible for RMS to anticipate the manner in which
a particular dataset is accessed. There is no obvious limit to
the amount of effort you may put into improving your files, but
there is usually a point beyond which additional effort might be
better expended elsewhere. You must decide for yourself when you
have reached the point of diminishing returns.

This section is not intended to be a comprehensive tutorial
on file design but rather to point the way to those areas where
small changes may have major impact on the performance of an
application as a whole. See the RMS User Guide for further
details about file usage and design.

5.3.1 Which Files to Design

Although it may seem obvious, you should limit your design
efforts to those files which are most critical to the performance
of your application. If a particular file is used only
occasionally there is little benefit to spending a great deal of
effort on optimizing its performance. Concentrate efforts on
large files, files which have many simultaneous users, or files
which have high levels of insertion and deletion activity.

5.3.2 Selecting an Organization

In general, the amount of processing and overhead necessary
to manage a file increases with the flexibility of the available
access methods. Sequential and relative file organizations are
very fast and carry little or no overhead, but they do not
provide all the access paths of the indexed organization. You
almost always attain the highest performance by choosing the
simplest file organization which can be made to provide the
access features you require.

5.3.3 Common Design Factors

The design parameters of a file are set when the file is created. The more complex the file organization, the more parameters there are to consider. There are some parameters, however, which are common to all file types.

5.3.3.1 Allocation

All files allow an initial allocation of disk blocks to be specified when the file is created. In the case of relative and indexed files, this allocation is mandatory since storage space must be provided for the file prolog.

Allocating space for a file when it is created has two benefits. The allocation takes place all at one time and the disk blocks are likely to be located close together. The file can also be loaded without the interruption of extend operations.

Unused space allocated to a file cannot be used for anything else. Once the file is fully populated, you may return any excess blocks to the operating system by truncating the file. If your language does not support the RMS truncate facility, you may spawn DCL with a SET FILE/TRUNCATE command.

5.3.3.2 Extend Quantity

If a file is created with less than the amount of space required for storage of the data, you may wish to specify an extend quantity. This is the amount by which the size of the file is increased when additional space is needed. The extend operation is carried out automatically by RMS so your application may not be aware that it is happening.

The default extend quantity for all files on a disk is set when the volume is initialized; this value may not be appropriate for a given file. If the extend quantity is too big you may waste space. If it is too small the file must be extended frequently, which means frequent interruptions in file processing, scattered file fragments and reduced performance of subsequent file processing.

A commonly used rule of thumb is to specify an extend quantity derived from some unit of processing such as a day's worth of records.

5.3.3.3 Contiguity

The best single action you can take to assure optimal file performance is to make the file contiguous.

To make a file contiguous you must allocate all the required disk blocks when the file is created, which may result in some wasted space until the file is filled. It may also require that you re-organize the disk with Backup (BRU) to gather the unused fragments into a larger, contiguous space.

5.3.3.4 Carriage Control

If the file is ever to be printed or otherwise output to a record I/O device (printer or terminal) you may wish to specify a carriage control attribute for the file. Carriage control determines the way in which RMS separates the records as they are being output. Instead of carrying the formatting information with each data record, RMS stores a single format setting in the file header and this setting is interpreted by the system utilities when the file is printed.

The default setting is CarriageReturn which means that as each record is output it is preceded by a line feed and followed by a carriage return. You may override this setting by specifying None. If you specify None you must store the formatting characters as data within your records, that is, you must explicitly include carriage return or line feed characters within your data records. Some languages have special file qualifiers which are used for this purpose.

5.3.4 Designing Sequential Files

Sequential file design is primarily a matter of allocation. Most such files are created with variable record lengths, and that's the end of it. You are allowed to specify that records may not span block boundaries but in most cases this practice is wasteful and not recommended.

There is a special case situation involving fixed length records which you may wish to use. If you declare the records to be of fixed, defined length when you create the file you may use a limited form of random access to the file. You may store and retrieve records either sequentially or randomly. Access to this facility depends on which language you are using, and there is no record interlock protection.

5.3.5 Designing Relative Files

Designing relative files is also comparatively simple. Like sequential you choose an allocation and extend size. Records may be of fixed or variable length, but the record cells allocated are of uniform size and large enough to contain the longest record. RMS keeps track of the byte count of variable length records so the application never sees anything except real data.

One additional design factor is determining the bucket size. A bucket is the logical structure within which records are grouped and the size you choose can affect the performance of the file. RMS reads and writes buckets in their entirety so that when you read a record from a file the entire bucket is loaded into a buffer in your program space.

Bucket sizes are specified in blocks, 512 bytes. RMS fits as many record cells in a bucket as possible. Record cells are equal to the defined maximum record length plus one flag byte plus two length bytes if the records are variable length.

Large buckets are good for access which is generally sequential or clustered. If your program reads a record and then reads an adjacent record which is in the same bucket, RMS fetches the record without re-reading the bucket, thus saving an I/O operation.

Small buckets give better performance if the access patterns are random or if the file is shared between two or more programs. Interlocks are maintained by RMS on a bucketwide basis so that reading a record from a file with large buckets ties up more records than if smaller buckets are used.

RMS also keeps a flag byte for each record cell in the bucket. This byte tells whether the cell has ever been used and whether it is presently occupied. RMS can therefore distinguish between records which have never been stored, have been stored, and have been deleted.

5.3.6 Designing Indexed Files

Designing indexed files can be a complex process. You must define key fields, decide on optimal bucket sizes, partition the file into areas and populate the file. Any or all of these decisions may affect the performance of the file. Here, more than anywhere else, you must consider each feature in light of its associated cost and use only those facilities which are really necessary.

5.3.6.1 Specifying Key Fields

When you create an indexed file you must specify how many keys you intend to use and a number of parameters for each key. You must indicate how many segments each key has and where they are located, whether the key may be duplicated, what type of data it is, and an optional null value.

Key placement within the record is not critical for static files. If, on the other hand, records are to be deleted, the primary key should be located at or near the beginning of the

record to reduce the amount of residual overhead in the bucket.

The length of the key is also important. Index buckets contain key values and bucket pointers. The shorter the key, the more index entries fit in a bucket; the index is shallower as a whole. Shallow index structures mean fast access.

Keys may be string, integer or packed decimal fields. Whether or not you allow duplicate values depends on the application but you should be aware that allowing duplicates can slow down writing of records and increases the amount of overhead due to deleted records.

Null values can be specified for alternate key fields. If a record is stored and an alternate key field contains only the null character then no entry is made for that record in the alternate key index. If many such records are stored the overhead of the alternate key index processing can be kept to a minimum. If at some later time the record is updated and a real key value is supplied, the alternate key index is updated accordingly.

5.3.6.2 Sizing Buckets

The same general rules govern bucket sizes in Indexed files that pertain to Relative files. If access is expected to be primarily sequential or clustered around certain key values, make the buckets large. If access is expected to be random or the file is heavily shared, make the buckets small. The memory penalty for large buckets is greater for Indexed files since RMS allocates two bucket-sized buffers when an Indexed file is opened.

Furthermore, you should consider the relationship of bucket size and the number of levels in the index. The time required to process an index bucket (computation) is negligible compared to the time required to move to the next index level (I/O). Therefore, the time to access a record is directly proportional to the number of levels in the index.

Larger buckets mean a shallower index and faster operations. You should set the bucket size to the smallest size (program size considerations) that results in an index with three or four levels including the data. Very large files may require five levels total.

You must anticipate the amount of activity overhead in the bucket due to splits and deleted records. If you expect the file to be static, that is, it is loaded once and then read many times, you need not allocate space for the overhead. If, on the other hand, you intend to insert and delete a lot of records you must allocate additional space.

Finally, you may specify a Bucket Fill Size when you create the file. This factor is the percentage of each bucket that is used if the Mass Load bit is turned on during the initial load of the file. This is of most benefit when records are added uniformly across the file. Leaving the extra space in each bucket reduces (but not necessarily eliminates) the number of bucket splits which occur and therefore the RRV overhead. There is still probably unused space in some buckets, however.

5.3.6.3 Areas

RMS Indexed files may be partitioned into Areas as part of the initial allocation. An Area is a portion of the file which is set aside for a specific purpose. Each index may have up to three areas allocated to it. Each Area may have its own allocation, extension size and bucket size. The primary advantage of this partitioning scheme is that logically related buckets are grouped closely together in a file and head movement while traversing an index tree or scanning sequentially through data buckets is minimized.

In the simplest case a file could be divided into an Index and a Data area. When bucket splits occur, the extension buckets are allocated from the appropriate area. Without Areas, index buckets are scattered throughout the file in such a way that moving from one index level to another may require moving the disk head a considerable distance.

Areas also allow a certain amount of optimization. You may be able to improve performance by specifying a smaller index bucket if data records are very large and access is primarily random. Large index buckets should be used if records are small or access to the file is clustered.

5.4 Tuning RMS Files

File design is only one aspect of what makes an application mix go fast or slow. But it's a highly visible aspect, and is one with which developers feel most familiar and comfortable.

It is often the case that poor file performance results from a lack of understanding that every feature of a system has an associated cost and, in some cases, the cost may not be obvious or may be described in such a way that its significance is not properly marked.

This section points out some of the more common areas in which unneeded features can burden an application. See the RMS-11 User Guide for more details.

5.4.1 Avoid File Opens

One of the most expensive things you can do with a file is to open it. RSX supports lots and lots of files in any given directory and developers who are moving over from CTS-300 may not be making effective use of the directory structure.

Once you have a file open you should avoid closing it since the close usually means another open at some later time. There is more program space available on RSX than any other PDP-11. You may be able to keep files open on RSX that memory constraints caused you to close on other systems.

5.4.2 Use the Simplest Possible File Structure

If you use a multi-key index structure the file is necessarily larger and slower than if you use a single key. A single key file is more complex than a relative file and access to a record with a known key is slower. Sometimes developers discover that they can live without ISAM after all and the performance difference is considerable.

5.4.3 Beware of Overloading Directories

Directory searches are no different from scanning any other sequential file and records at the end take the longest to find. Keep your directories small and balanced for fast access.

You should also realize that when you create a new file the system has to search through the entire directory to see if a file of the same name already exists. Consider re-using an old file in place of creating a new one.

5.4.4 Pre-Allocate the File

If the file is to be static and the amount of data to be stored therein can be estimated then you may wish to allocate the entire file when it is created. This keeps fragmentation to a minimum and improve processing speed. Such allocations must be judged in light of total disk capacity and their affect on free space.

5.4.5 Make Critical Files Contiguous

The cost of locating the different parts of a file can represent up to 30% of the disk activity. Make your file contiguous. Failing that, make the extents of the file as large as possible.

If a file which is contiguous is extended then it is no
longer strictly contiguous, although some of the benefits of the
initial contiguity still pertain in that the initial allocation
is a single large extent. If the file is further extended over
time you may wish to periodically restore it to a contiguous
state. You can do this from your application by spawning a
COPY/CONTIGUOUS command.

5.4.6 Substitute Code for Mechanical Movement

Disk activity almost always involves some mechanical
movement, often requiring tens of milliseconds to complete. It
is often possible to replace disk operations with program code.
If you are suffering a performance problem, try to determine
whether you can simplify the file by doing a little more work in
your program.

5.4.7 Distribute the Load

Multiple disk spindles very often can provide more
throughput than a single drive for a given total storage
capacity. The disk head itself is subject to a number of demands
in addition to data transfer such as directory manipulation and
program overlays and consequently may become a significant
bottleneck. Even though timesharing continues while the head is
moved, all other disk I/O requests are delayed; and, since
commercial systems depend heavily on I/O, this is a serious
problem.

RSX supports overlapped seeks if multiple disk drives are
available so that a number of disk requests can be processed
simultaneously.

5.4.8 Avoid Going Overboard

Multiple keys are costly if records are being stored or
updated in a file. The number of disk operations required to
store a record is proportional to the number of keys.

Very long keys consume extra storage and can increase the
number of levels in an index by reducing the number of key
entries in an index bucket.

Keep the keys near the beginning of the record. For certain
types of files, deleted records leave behind a fragment which
includes the record from the beginning through the end of the
primary key.

Load the file in order of ascending key value. Doing
otherwise causes more frequent bucket splits and a more complex

index.

Avoid duplicate keys, if possible. Duplicate primary keys
increase the overhead of deleted records. Duplicate alternate
keys can result in long chains of pointers in the SIDR records.

Chapter 6

RMS Utilities

Most programming languages on RSX lack support for one or more RMS features. Moreover, there are a number of operations which should be carried out on a regular basis for creating and maintaining RMS files. Therefore, special utility programs have been provided which may be invoked interactively or may be spawned with a command file.

What follows is a brief description of three of these utilities. For details about the operation and use of these programs see the RMS-11 Utilities Manual.

6.1 RMSDES File Design Utility

RMSDES is an interactive utility for designing and creating RMS files. You design a file by issuing commands to set, clear and display file attribute values in a file design buffer workspace.

Attributes are arranged in functional groups which pertain to the target system, file, record, key and areas for the file. You may enter or change the attributes in order from beginning to end, by section, or individually. You may enter the attribute values directly, load them from a description file or copy them from an existing data file. You may create a file directly or save the workspace in a description file for use at another time.

When the attributes are arranged to your satisfaction you may create an empty file. RMSDES checks to see that all required values are present and performs sanity checks on the values.

6.2 RMSIFL Indexed File Load Utility

RMSIFL reads records from any type of RMS file and loads them into an empty Indexed file. RMSIFL is superior to other loading methods in that it bypasses the standard RMS mechanism and exploits the underlying file structure to produce an output file quickly and with optimal packing of buckets. Use of RMSIFL is the most common way of honoring the Area Fill values specified for the indexed file when it is created.

RMSIFL operates in a number of phases. It optionally sorts the input records by primary key value before loading them into the indexed file. During the load it extracts any alternate key values and stores them in a temporary file. When the data records are completely loaded, RMSIFL sorts the values for each

alternate key and then build the alternate key indexes. The resulting file is optimized for the fastest possible access along all index paths.

RMSIFL has some limits. The index structures are created without the assistance of RMS which means that the output file must be empty at the beginning of the load. RMSIFL can handle no more than 20 keys per record and may be limited to bucket sizes of five blocks or less depending on the format of the record and the keys.

These restrictions aside, RMSIFL is absolutely the fastest way to load a high performance indexed file.

6.3 RMSCNV File Conversion Utility

RMSCNV can read data records from any RMS file organization and load them into any other, either locally or over a network. RMSCNV uses the standard RMS facilities to read the data and build the output file. It is not subject to the same limitations as RMSIFL.

RMSCNV can be used to append records from one file to another, re-establish contiguity and convert data from one file format to another. If the output file is to be sequential, RMSCNV can create it. Otherwise the file must be created before RMSCNV can be used.

A number of switches are available (and may be required) which determine such operations as record truncation and padding, recognition of bucket fill size and mass insertion mode, block mode operation and so on.

When used with Indexed file structures RMSCNV is not subject to any of the restrictions of RMSIFL but does not provide the same level of performance.

Chapter 7

RMS for CTS-300 Developers

Since many commercial users are migrating their applications from CTS-300, this section is set aside to point out some of the more commonly encountered problems caused by the differences between DMS and RMS files.

7.1 Record Locks

The biggest single difference encountered by developers moving from CTS-300 to RSX is the way record interlocks are managed.

CTS-300 (and VMS) were created with the record management facility tightly integrated with the operating system; therefore, it is possible to control access to shared files in such a fashion that potentially dangerous operations are avoided.

The most common such case is allowing one program, which has opened a file for input, to read a record or bucket which has been locked by a second program which has the file open for update. This is permitted on both CTS-300 and VMS such that read operations issued to a file opened for Input never encounter a record lock. There may, in fact, be delays in the read operation if the request occurs at a difficult time but these delays are temporary and are invisible to the application.

RMS on RSX is more of a layered application than an integral part of the operating system. It is possible, therefore, that a program which has a file open for input might try to traverse an index tree which is being updated by another program and if this happened, the program issuing the read might crash. To prevent such an occurrence, any access to a file which has been opened for update or write operations is subject to record locks.

7.2 Access Modes

As explained earlier, DIBOL makes certain assumptions in mapping the various language statements to RMS facilities. One commonly encountered example has to do with access modes declared when a file is opened. When a program calls upon RMS to open a file it must declare both the operations it intends to perform (Read, Write, Update, Delete) and also the operations it allows other programs to perform. RMS matches these access declarations with those of any other program which has the file open and only permits the latest program to proceed if the access codes are compatible.

This has certain side effects. A common example is the complaint that DIBOL on RSX is much slower than DIBOL on RT-11 or RSTS since it takes longer to read sequentially through a file. For some reason that is not clearly understood the sample file chosen for such experiments is always a relative file which results in an unexpected condition.

When DIBOL opens an existing file for input it tells RMS that it wishes Read only access and, because of the traditions of CTS-300, it allows other programs write access. RMS interprets this as a hint that the data in the file may change (even though no other programs have the file open at that moment) and consequently re-reads the entire bucket each time the DIBOL program tries for the next record.

If the DIBOL program were to open the file in Update mode, the bucket would be locked when the first read occurs, and subsequent reads take place directly from the bucket in memory. There would only be I/O when moving from one bucket to the next. The difference in processing speeds between input and update mode is directly proportional to the number of records in each bucket.

That the open mode should affect the speed with which a program may scan a file is just one example of how "poor performance" may be due to a simple misunderstanding.

7.3 Interchanging Sequential and Relative Files

It is a common practice on CTS-300 to create a file as sequential, fill it with records and then close the file and re-open it for random access. This is also possible with RMS except that the file must be created with a Relative structure. While RMS permits limited random access to a sequential file with fixed length records, the use of Relative files offers more capability and is the preferred method.

There is one consideration in transporting such an application from CTS-300 to RSX or VMS. It is sometimes the case that such files begin with a header record which is a different length than the transaction records. Since RMS relative files are allocated in record cells, each large enough to contain the largest possible record, it is wasteful to write a very large record followed by a number of smaller ones. It is much more efficient to write the header data into a number of smaller records and adjust the transaction record numbers accordingly.

7.4 Extending Files

RSX permits files to be extended regardless of the internal structure while CTS-300 does not. This means that you need not allocate all the space required for a file initially.

Performance suffers somewhat if the file is extended many times but you can overcome this by periodically using RMSCNV to restore the contiguity.

7.5 Print Files

It is common practice on CTS-300 to write records in fragments using mixtures of WRITES and DISPLAY statements. This is done partly for coding convenience and partly due to the increased flexibility of formatting. This practice is possible because DMS files are really an unstructured stream of characters whereas RMS files (on VMS as well as RSX) are a series of records.

Formatting of reports on RMS is provided through the Print Mode files (O:P) which use the NONE declaration for Carriage Control when the file is created. Each subsequent output operation, whether a WRITES, DISPLAY or FORMS creates an individual record and the application program is responsible for adding all the carriage control characters. While these files are somewhat lacking in storage efficiency, the programmer has full control over the output format.

A consideration when using such files is that attempts to re-read the file must be made with care. On CTS-300 it is possible to create a record in a file with a number of DISPLAY statements followed by a WRITES. On re-reading the file, all of the information is returned as though it had been written as a single record. With RMS this is not the case. Each field is stored as an individual record and is therefore returned as individual records in exactly the order with which they were written.

Chapter 8

Flow Control

Most small system commercial applications are broken down into a (possibly very large) number of program modules, each of which fits within the bounds of a limited hardware configuration and CPU architecture. Flow control is that aspect of application design which determines the manner in which these logic modules exchange information and control.

One of the dimensions along which operating systems differ most widely is the variety and comparative efficiency of the flow control mechanisms. CTS-300 (RT-11) and RSTS are limited to program Chaining. VMS allows a primary program module to Chain to a secondary, spawn a secondary in a sub-process or, when the secondary module permits, call it as though it were a subroutine. RSX permits both chaining and spawning - each in a variety of flavors. Each of these mechanisms has its advantages and disadvantages.

RSX originated in the scientific / industrial marketplace where realtime response is a top priority. The design point was to create a system in which a particular program module (Task) could be activated as quickly as possible upon the occurrence of some event. Consequently, the flow control architecture is more complex than the other systems, and it requires a bit of understanding before it can be used to greatest advantage.

8.1 Concept of a Task

The fundamental unit of execution on RSX is the TASK. System utilities are tasks. Compilers and editors are tasks. Application programs are tasks.

Activation of a task is a two step process.

8.1.1 Installing a Task

Before RSX can do anything with a task it must be Installed. Installation is the process by which the location and characteristics of the executable module are made known to the system Executive. Once installed, a task is available for execution and remains so until it is removed.

Each task on the system must be installed with a unique, six character name. During installation the Executive records the task's location on disk (by File ID for very fast access), priority, the name of the partition in which the task executes,

and several other items which reduce to an absolute minimum the number of operations which remain before the task can actually begin to execute.

Contrast this with other systems in which a RUN command causes the Executive to begin looking through disk directories just trying to find the program image.

8.1.2 Task Names

Installed tasks are identified by name and therefore the name must be unique on the system. Multiple programs may have the same task name but only one of them may be installed at any time. The name of the task may be established when it is linked, when it is installed, or when it is requested and run.

A special case of task naming is the "Prototype" name which consists of three periods followed by three alphabetic characters such as "...PIP". This is the mechanism by which multiple terminals can be executing independent copies of the same program.

When a particular terminal invokes a task installed with a prototype name, the Executive creates a private copy of the task for the requesting terminal and gives it a unique task name by combining the prototype name and the terminal name. Thus, a copy of PIP running at terminal 11 becomes "PIPT11". The prototype task name is an important facility for systems where multiple copies of job streams may be executing simultaneously.

8.2 Requesting an Installed Task

Once a task is installed and brought to the absolute brink of execution, all that remains is for some entity on the system to request its execution. Some tasks are requested as a result of a command typed at a keyboard. Others are requested via system directives issued by another program. There are a number of different mechanisms involved but the functionality of all of them falls into one of three categories.

8.2.1 RUN a Task

The simplest way to invoke a task is to RUN it. The RUN command has four forms.

8.2.1.1 Running an Installed Task

If a task is already installed you may invoke it with the RUN command and the task name:

RUN taskname

8.2.1.2 Running a Task from a File

If a task is not installed you may invoke it directly from the task image file:

RUN filespec

This form of the RUN command invokes a special facility known as Install-Run-Remove. Before the task actually runs it is installed with your terminal name (e.g. "TT11") as the taskname. The task is then run and when it exits, it is removed. You may pass a command to the task with the /COMMAND:"command string" qualifier.

8.2.1.3 Running a System Utility

You may invoke the system utilities by preceding the task image filespec with a dollar sign:

RUN $RMSDES

This tells RSX to look in the system library for the image file. You may pass a command to the utility with the /COMMAND:"command string" qualifier.

8.2.1.4 RUN as a Scheduling Command

The last form of RUN allows a privileged user to schedule the execution of an installed task for some future time:

RUN/SCHEDULE:hh:mm:ss taskname

8.2.2 Chaining between Tasks

The chain mechanism on RSX is the RPOI$ directive - Request and Pass Offspring Information. All the popular implementation languages provide support for this directive in one form or another. Check the User Guide for details.

There are two options associated with the RPOI directive of which you should be aware. One option determines whether the program issuing the directive exits. The other determines whether RSX Parent-Offspring connections are passed to the target task. Unless there is a good reason to do otherwise, both these bits should be set.

The directive itself may be used in two ways according to whether the offspring task has been installed.

8.2.2.1 Indirect Chaining (to a non-installed task)

You may chain to a non-installed task image file indirectly by forming the task image filespec into a pseudo RUN command and then RPOI to either MCR or DCL passing the string as a command. This is how DIBOL and BASIC implement the STOP 'filespec' and CHAIN 'filespec' statements. This form is the most familiar to developers used to working with CTS-300 and RSTS, but it is also the least efficient. This is really a special case of the RUN filespec command and because of the number of intermediate tasks which must become involved it is the slowest form of chain.

8.2.2.2 Direct Chaining (to an installed task)

You may chain directly to an installed task by using the installed task name as the object of the RPOI$ directive. DIBOL supports this form with the CHAINI subroutine. You may pass a command string to the offspring and the performance is much, much better than the indirect chain.

8.2.2.3 Chaining to a Command File

You may chain to a command file by issuing an RPOI$ to the Indirect Command File processor and passing the the name of the command file to be executed. The last action of the command file should be to invoke the next section of your application.

8.2.3 Spawning an Offspring Task

Developers who are moving from CTS-300 or RSTS may, at first, have difficulty understanding the significance of the Spawn facility but it is one of the principal reasons that RSX was chosen as the first operating system for A-to-Z.

It is the foundation of the A-to-Z application integration architecture in which commonality of form and function is attained by spawning the appropriate module to perform an operation such as spawning Business Graphics to display some data.

It also serves as the mechanism by which otherwise unrelated applications may be nested such that the operator may request an ongoing task to be suspended while another function is performed. That function may also be interrupted and so on.

With or without A-to-Z, Spawn allows an application to invoke almost any facility on the system without losing any context other than, possibly, the contents of the screen. You can spawn a system utility with a command to create an ISAM file, for example, and wait for the exit status to determine the success or failure of the operation. You can spawn infrequently used sections of your own code as independent tasks to avoid having to build them into the mainline images. You can spawn the CLI tasks to execute commands as though they were being entered from the keyboard. The possibilities go on and on.

Like Chain, Spawn has two forms depending on whether the offspring task is installed or not.

8.2.3.1 Indirect Spawn (of a non-installed task)

You can spawn a non-installed task indirectly by spawning your favorite command line interpreter with a 'RUN Taskname' command. You can include the /COMMAND:"command string" qualifier for the RUN command to pass a command string through to the task.

You should also use the /STATUS:TASK qualifier as this assures that the exit status passed back to the parent task is that of the task and not the RUN command itself. Because it carries all the overhead of the RUN command entered from the keyboard, this is the slowest of the two forms of spawn.

8.2.3.2 Direct Spawn (of an installed task)

Direct Spawn of an installed task is the fastest way to invoke an external facility on RSX. You may pass the task a command string and you may wait for exit status. You can spawn more than one offspring task at a time if your implementation language interface to spawn permits.

The designer of the parent task is responsible for deciding whether to wait for the offspring task to exit and for correctly interpreting any status which is returned. If task A spawns task B which in turns chains to task C passing all connections and task C exits, the status returned to A is that of C, not B.

8.3 Parent-Offspring

You may choose to create a library of spawnable tasks for your application. These tasks may perform infrequently used functions or they may serve to centralize certain functions as in the case of multiple front end tasks feeding transactions to a single (or multiple) background processor. The two most commonly used means of communication with the parent task are the command line buffer passed from the parent task to the offspring and the status code passed from the offspring back to the parent task.

8.3.1 Command Line

RSX provides for passing a 255 byte command line to any offspring task. The offspring must retrieve this buffer through use of the GMCR$ directive. Access to this directive is available in the more popular implementation languages. This buffer may contain function codes, filenames or any other data in a format agreed upon by the parent and offspring task designers.

8.3.2 Status Code

RSX provides for a task which is Exiting to pass back a 16-bit status code to the parent task. The directive is EXST$ and access to this directive is available in the more popular implementation languages.

The low order three bits of this code are defined (by convention) to be the error code and severity level. The remaining bits may be used to communicate any other information in a format agreed upon by the designers of the parent and offspring tasks.

A-to-Z has established a convention by which this 16 bit value is divided into fields, each with a particular meaning. You might consider adopting this convention.

8.4 Intertask Communication

RSX provides two principal mechanisms for communicating between tasks running on the system.

8.4.1 Send/Receive

Send and Receive can be used to pass blocks of information between cooperating tasks. The block can consist of up to 500 bytes of information. If more data is to be passed it can be done with multiple blocks or by storing the information in a file and passing the name of the file in a message.

A second, more complex mechanism allows passing of a memory common between two tasks. This feature is more complex than most applications require and the memory mapping requirements make its use in commercial applications uncommon.

Support for Send Data and Send By Reference varies from one language to another. Some languages provide support through library subroutines while others allow access to the requisite system services.

8.4.2 Global Event Flags

RSX supports a second intertask communication mechanism which is specifically intended for synchronization of task execution. It is possible for a program which has access to system services to define and manipulate event flags on a task, group or system wide basis.

Event flags are one bit registers which can be set, cleared or interrogated via system services. Typically one application sets a flag whenever data is available for processing by another. The waiting application clears the flag when all available data has been processed.

Support for event flags is limited or non-existent in some languages. It is mentioned here because it is the highest performance intertask signaling mechanism available on RSX.

RT-11
SIG
DECUS
U.S CHAPTER

RT
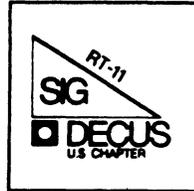
RT-11 Minitasker
August, 1987

From the editor:

Special thanks to all who contributed to this issue of the Minitasker. Rally Barnard has composed the SIG Tape from the Spring DECUS Symposium at Nashville. The contents of the tape, along with descriptions of the submissions is included here complete with cross-reference index.

Nick Bourgeois has put together what may well be the first document describing in one place all of DEC's magtape formats. If you've ever tried reading or writing a TYPE A magtape on a TYPE B operating system, you'll appreciate Nick's article.

Yes, even after all these years, there are still bugs in RT-11. (Surprise!) Each month I'll compile any bugs I find or that have been reported to me. Mopreover, I'll try go get some official response from some appropriate person at Digital. With luck there'll always be a fix, a work-around or a "tsk=tsk."

It is generally assumed that anything we publish in the Minitasker is open for public consumption. Copyrights, if any, remain with the original author of each submission. DECUS, the DECUS Newsletter, and Digital Equipment Corporation take no responsibility for accuracy, timeliness, or copyright infringements of any articles you find in the Minitasker. (My shyster says I can't be blamed either!)

Needless to say, I'm always looking for stuff to print. If you've got anything you think might be of interest to other RT-11 users, send it in. Camera ready copy is nice, but scribbling on a scratch-pad is acceptable. I can take machine readable articles and code on a variety of media - RX01, RX02, RX50, RL02 (!), 9-track tape (any format), and TK50 (any format). RT-11 files would be appreciated on machine readable media, but can, under duress, accomodate files produces by inferior operations systems.

Send submissions to:

John M. Crowell
RT-11 Newsletter Editor
c/o Multiware, Inc.
2121-B Second St. Suite 107
Davis, CA 95616

Summary of the Spring, 1987, RT-11 SIG Tape

```
*********************************************************************
```

DECUS Symposium RT-11 SIG Tape

Spring, 1987
Nashville, TN

Annotated Directory

```
*********************************************************************
```

IMPORTANT
NEW INFORMATION

Subdevice files on this tape are now allowed to be as large as
800 blocks (the size of a RX-50). (For the sake of convenience,
the data files for the TIMING submission are in slightly larger
subdevices). This improves efficiency. If you need to copy a
file larger than 494 blocks to a RX01, use the COPY/MULTIVOLUME
command.

Read the file TAPCOP.TXT if you need SIG Tape copy instructions
or information for retrieving files using RT-11 version 4, or
RSTS.

If you have any comments, corrections or contentions with any of
the submissions on this tape, please discuss them directly with
the authors.

```
***********************************************
* Please look at the WSHLST submission *
*           and respond to it!          *
***********************************************
```

VIRTUL - Subdevice retriever for RSTS.

E.F.Beadel, Jr., Manager
CAUSE Instructional Computer Center
SUNY at Oswego
Oswego, NY 13126
(315) 341-3055

This program allows RSTS/E users to break down the subdevice
files from this tape after they have been copied to disk. It has
been modified by David Smith, Galileo Computer Center, to remove
a few bugs and to be able to read multi-segment directories. See
TAPCOP.TXT for details.

VIRTUL.BAS   1 File,   43 Blocks
```
*********************************************************************
```
DIRTWO - Annotated tape directories, part 2.

R. W. Barnard
Sandia National Laboratories
Minicomputer Software Division 7523
P. O. Box 5800
Albuquerque, NM 87185
(505) 844-5115

DIRTWO contains annotated directories of the DECUS Symposia
RT-11 tapes from the Fall of 1981 through the Fall of 1986. The
most recent SIG tape on which the directory of previous tapes is
located is the Spring, 1985, and is called DIR1.DSK.

DIRTWO.DSK   11 Files, 558 Blocks
```
*********************************************************************
```
WSHLST - RT-11 Wish List Survey.

Robert Walraven
Multiware, Inc.
2121-B Second Street, Suite 107
Davis, CA 95616
(916) 756-3291

The RT-11 SIG is very interested in your responses to the
wish list items contained in WSHLST. From your responses will be
determined some of the new features of RT-11. Please take the
time to review and respond to this submission.

WSHLST.DSK   2 Files, 101 Blocks
```
*********************************************************************
```

FONT - Downloadable VT-200 character font.
SPELL - Spelling-Checker with Dictionary.
CALEND - Calendar Display Program.

Harold Z. Bencowitz
810 Hospital Drive, Suite 240
Beaumont, Texas 77701
(409) 835-3770

FONT is a program written in Whitesmith's C to allow one to easily create or alter downloadable fonts/character sets for VT200 series terminals. It can be used to edit a previous character set (stored as a disk file). One character at a time is edited while each pixel change is observed both at the normal size and double high/double wide.

CALEND is a program written in Whitesmith's C to display the calender for a selected month. It will accept any month and year from 1583 - 32000.

SPELL is a spelling checker written in Whitesmith's C. Words in the input file are compared to one or more dictionaries (files of alphabetized words) and an alphabetized list of the unmatched words is sent to the output file(s). The output list can include each word as many times as it is used or optionally only once.

The file README.1st and the common files are contained in the VTFONT.DSK file.

VTFONT.DSK 12 Files, 406 Blocks
CALEND.DSK 3 Files, 50 Blocks
SPELLR.DSK 6 Files, 475 Blocks
****
DFIND - Subdevice Directory Program.

Carl Lowenstein
U. C. San Diego
Marine Physical Lab, P-004
La Jolla, CA 92093

DFIND is a utility for searching through an RT-11 structured file system and the subdevices on it. Upon a successful match, the filename, size, and date are printed, as well as the file path (sequence of subdevices) leading up to it.

DFINDO.DSK 7 Files, 122 Blocks
****

RDMF77 - Directory and Other Utilities.

Walt Shpuntoff
Institute for Resource Management, Inc.
PO Box 869
Arnold, MD 21012
(301) 757-6503

This submission provides Fortran-77 interface subroutines that make it possible to read and write RDM database file records from an F77 application. The routines allow you to retrieve and write back out active records, convert dates to and from RDM format, and open and close RDM files.

(RDM is a trademark of Interactive Technology, Inc.)

RDMF77.DSK 18 Files, 154 Blocks
****
MAIL - On-Line Message Facility for TSX+.
TAPE - Tape Utilities.

Mike Marak, David Gaudine, Dr. S. J. Kubina
EMC Lab, Room AD-532
Loyola Campus
Concordia University
7141 Sherbrooke St. W.
Montreal, Que. H4B 1R6
Canada
(514) 848-3118

MAIL is on online message sending system which allows users to send messages to other users and to read messages that have been sent to them. It is designed to run under TSX-PLUS. Mail can be run from a logon command file or as a keyboard command. The system consists of a common file that contains the list of current users and any messages for each user, a maintenance program that allows the postmaster to maintain the mail file, and a MAIL utility which allows users to read, delete, or send mail to another user. A system command file is used to tell the utility program if MAIL has been invoked from LOGON or by the user.

The programs TAPE%% are utilities to back up specific disk
devices to magtape. TAPERK backs up 4800-block devices (RK05's),
TAPEDL does RL02's, and TAPEDU does RD52's. Once a disk is
backed up by these utilities it can easily be restored; in
addition, the directory name can also be changed. Individual
files from the backup can be retreived. These programs run under
TSX+; they are too big to run under RT, but may work using
VBGEXE. This submission also includes ANSIR and ANSIW, for
reading and writing unlabelled ANSI magnetic tapes, and T20IBM,
for reading EBCIDIC IBM tapes.

TAPUTL.DSK 10 Files, 500 Blocks
MAILUT.DSK 10 Files, 289 Blocks
****

ACODES - On-Line Telephone Area Codes Retriever.

Bill Leroy
The Software House, Inc.
P. O. Box 52661
Atlanta, GA 30355
(404) 231-1484

ACODES.TXT is a list of North American telephone area codes
and major cities in those area codes. It also lists FTS on-net
to off-net phone numbers. The file is accessed by means of the
GREP program. Combined with a UCL symbol, you can retrieve area
codes by state or city, or retrieve all the area codes in a
particular state.

Editor's Note: In typical UNIX/C fashion, the documentation
for GREP is so abysmal that most people will not be able to
decipher it. To implement an on-line retrieval of area codes,
define the following UCL+ symbol:

ACODES == r GREP\-f "' SY:ACODES.TXT

You can then type

aco 505   to get the information about area code 505, or

aco texas   to find out all the area codes in Texas, etc.

ACODES.DSK 4 Files, 49 Blocks
****

TIMING - RT-11/TSX+ System Timing Studies.

Jim Crapuchettes
Omnex Corporation
2483 Old Middlefield Way
Mountain View, CA 94043

This submission contains the data files generated for RT-11/
TSX-Plus System Timing tests that were described in the session
presented at the Spring, 1987, DECUS Symposium in Nashville TN.
It also includes files describing the test procedure and some data
reduction programs. These tests are to determine the EMT-level
responses of RT-11 and TSX+, and include tests on 11/23 and 11/73
processors, RT-11 SJ, FB and XM monitors and TSX+.

TIMING.DSK 10 Files, 94 Blocks
TMNG01.DAT 21 Files, 861 Blocks
TMNG02.DAT 23 Files, 943 Blocks
TMNG03.DAT 23 Files, 943 Blocks
TMNG04.DAT 23 Files, 943 Blocks
TMNG05.DAT 23 Files, 943 Blocks
TMNG06.DAT 23 Files, 943 Blocks
TMNG07.DAT 23 Files, 943 Blocks
TMNG08.DAT 23 Files, 943 Blocks
TMNG09.DAT 23 Files, 943 Blocks
TMNG10.DAT 23 Files, 943 Blocks
TMNG11.DAT   3 Files, 123 Blocks

****

TSXLIB - Fortran-Callable TSX+ EMT's.

N. A. Bourgeois, Jr.
NAB Software Services, Inc.
P. O. Box 20009
Albuquerque, NM 87154

TSXLIB is a library of FORTRAN callable routines that implement
the TSX-Plus system services which are unique to TSX-Plus. The
library has been updated to include all TSX-Plus unique services
through TSX-Plus V6.2. The TSXLIB distribution kit includes the
MACRO-11 source modules for all the routines, a user's manual in
machine readable form, an indirect command file to build the
library, and the implemented library.

TSXLB1.DSK 4 Files, 500 Blocks
TSXLB2.DSK 12 Files, 448 Blocks
****

DROIDS - The new Game Sensation.

Robert Walraven
Multiware, Inc.
2121-B Second Street, Suite 107
Davis, CA 95616
(916) 756-3291

DROIDS is a game which pits your (or your kid's) skills against a planetfull of droids bent on your destruction. Future Symposia will include sessions on current DROIDS strategy and reports on the current champion status as recorded in DROIDS.SCR.

Note added in proof:
It is necessary to SET TERM NOCRLF for proper operation of DROIDS.

DROIDS.DSK   4 Files, 92 Blocks
****

UCLPLS - User Command Language (UCL) Program.
PM - RT-11 Monitor Prompt Handleroid.

William K. Walker
Monsanto Research Corp.
P. O. Box 32
MS A-152
Miamisburg, OH 45342
(513) 865-3557

UCL+ is upward-compatible with the UCL distributed with RT-11, Version 5.1B and later. The version submitted to this tape is V07.55 b, an update from all previous versions. This version of UCL+ includes a fix of an obscure bug. Otherwise it still includes all the extra features which make it so useful.

PM is a RT-11 "handleroid" which permits user-defined KMON prompts (replacing the "."). Read the documentation before using it!

UCLPLS.DSK 22 Files, 698 Blocks
PMHDLR.DSK   4 Files, 37 Blocks
****

PLT - File-Oriented Plotting Utility for RT.

Peter E. Bodmer
Boys' Town National Institute
555 N. 30th
Omaha, NE 68131
(402) 449-6711

PLT is a RT-11 program that translates a user-specified text file consisting of plotting commands into Tektronix 4662 language. The set of Tektronix 4662 language commands are placed into an output file which can then be sent directly to a Retro-Graphic terminal. The output files or .TEK files can also be sent to a DataSouth Line Printer or to a HP 7475A pen plotter. The typical input to PLT is a standard ASCII text file that contains plotting parameters, keywords, data, and comments. The user may obtain data from another program, or may call another text file as a virtual subroutine, or have PLT request parameter/data entry during execution. PLT files may be created by entering the text into a file manually, using an editing program, or by writing and executing a program that creates, writes into, and closes the file.

RTPLT1.DSK 11 Files, 540 Blocks
RTPLT2.DSK 64 Files, 600 Blocks
****

FLXIND - IND Control Files for FLECS Processing.
F77IND - IND Control Files for Fortran-77 Compilations.

Edward L. Hendrickson
258K Metals Development
Ames Laboratory ISU/USDOE
Ames, IA 50011
(515) 294-3590

FLECS.IND is an IND command file that automates the use of FLECS. Without FLECS.IND the user must remember the FLECS command string syntax, then wait for the source to be translated to Fortran, then compile the .FTX (Fortran) code into object code using the correct Fortran command string syntax. With FLECS.IND the user types one command string and the entire process is completed transparently.

F77.IND is an IND command procedure that simulates all of the FORTRAN switches available. F77.IND can either be used as a stand alone command procedure or as an /F77 switch with FLECS.IND file. This also inlcudes a resubmission of the INDEX program.

Compiler switches may go either before or after the file name; there is an on-line display of the F77.IND help documentation.

If F77.IND is used as without FLECS, then there are 17 switches available:

/A*ssemblylist[=<filespec>]
         -- Same as /L but with a listing of assembly code.
/B*ounds   -- Checks for array references out of bounds.
/C*ontinue=n -- Sets the maximum number of continuation lines.
/D*ebug   -- Lines with D in column 1 are compiled.
/E*xtendlines -- Compiler interprets source text in cols 73-132
/F*ulltrace -- Generates very detailed traceback (see Trace)
/L*ist[=<filespec>]
         -- Creates a list file with source listing, program
           section summary, and storage map.
/Nos*wap   -- Inhibits swapping of USR over the program.
/Noo*bject   -- Suppresses creation of an object file.
/O*bject=<filespec>
         -- Change the default device, name, and/or extension
           of the object file.
/R*ecordlength=n
         -- Specifies the maximum record length (in bytes)
           for run time I/O (4 < n < 4095).
/S*tatistics -- Produces a stat report.
/T*race   -- Generates extra code for OTS error traceback.
/U*nits=n   -- Sets the number of logical units available.
/Wa*rnings   -- Enables printing of W-class warning diagnostics.
/Wi*demap   -- Produces a 132-column map listing.
/Wo*rkfile=n -- Sets the length of the workfile in disk blocks.

FLXIND.DSK 10 Files, 622 Blocks
F77IND.DSK 4 Files, 76 Blocks
****
BAKALL - IND Control File to Automate Backups.

Edward L. Hendrickson   Paul Lustgraaf
258K Metals Development   32 Carver Hall
Ames Laboratory ISU/USDOE Iowa State University
Ames, IA 50011   Ames, IA 50011
(515) 294-3590   (515) 294-1832

BAKALL.IND is an IND command file that automates the backup process. It backs up a complete device to magnetic tape using the BACKUP/DEVICE command. The code currently keeps track of 5 complete backup tape sets and 2 devices, DU0 and DU1. BAKALL will open a LOG file and record all necessary data needed to document each individual tape.

BUPRES is a FORTRAN IV program which reads individual files from a magnetic tape created by the RT-11 version 5 BACKUP command. The program has been modified since it was originally submitted to the tape. The DIR function has been changed so that it is compatible with the output from DIR/COL:1 which allows you to look for differences without restoring the whole volume. The program now works directly with the magtape handler instead of using EXTMT.

BAKALL.DSK   5 Files, 46 Blocks
****
THESIS - RUNOFF Macros for Formatting a Thesis.

Mark M. Mehl
Department of Biomedical Eng
IOWA STATE UNIVERSITY (ISU)
Ames, IA 50011

ISU RNOTHESIS is a collection of Bonner Lab RUNOFF macro commands that can be used to format a thesis. There are commands for generating floating tables and figures, in-line equation lists, footnotes, points, quotations, and a bibliography. Although RNOTHESIS is being used to format theses according to the Iowa State University thesis office requirements, its macros can be adjusted to support any large document layout.

THESIS.DSK 15 Files, 427 Blocks
****

GKS - RT-11 Implementation of GKS Plotting Standard.

James V. Flatten
2581 Metals Development
Ames Laboratory, ISU/DOE
Ames, IA 50011

This document describes an implementation of the Graphical Kernel System (GKS) for the RT-11 operating system running on a PDP-11 computer. This implementation is the lowest level of GKS, which was chosen to keep the graphical subroutine library small and efficient for applications running under RT-11. Three device drivers are provided for the HP7475 6 pen plotter, the Tektronix 4107 color terminal and the Visual 550 terminal.

GKS020.DSK 20 Files, 560 Blocks
****

INDFIL - IND Control Files for Manipulating Subdevices.

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The following IND control files have been extensively updated since they were last included on the SIG Tape.

DOWN and UP can be used to conveniently move among subdevices. Using these facilities, you can have the equivalent of subdirectories on a VAX. DOWN will mount a subdevice file using the Logical Disk handler and assign either the default or a user-selected logical name to that device. If the device is not specified, DOWN will search through a predetermined list of devices to look for the file. UP moves "up" one level of subdevice nesting. DOWN uses PARSE, an IND procedure which is a comprehensive filespec parser. It also uses the program READLD to determine the LD units currently associated with files, and the corresponding logical assignments. HOME is a special case of UP which is implemented with a UCL+ symbol. OVER is a UCL+ symbol to move from one subdevice assignment to another. CUR is a UCL+ symbol to report what your current subdevice assignment is. The file UCL.UCJ provides UCL+ symbol definitions for DOWN, UP, HOME, OVER and CUR.

NEWLD can be used to easily create a new file to be used as a subdevice. NEWLD accepts the parameters file name, size, logical name, number of directory segments, and whether the file is to be "net" or "gross" size. Defaults can be used for many of the parameters. File sizes can be specified in either of two ways - as a numerical value or as a disk type (RX01, RX02, RX50, RL01, etc).

INCBUP does incremental backups (i.e., backs up only files created since the previous backup) and catalogs the directories of the backed-up files for rapid retrieval. Backups can be done from any size or type of disk (including LD's) to any other disk. The backup target device can be a subdevice file on a larger disk, thereby permitting several "backup sets" to be on one physical disk. The volumes on which the backed-up files are copied are identified by a unique name and extension as the "backup set identifier". A printed directory of the backed-up files is also made. Backups of several devices can be done in one INCBUP "session". You have the option to use the same parameters for subsequent backups. File cataloging is done with the DSKLIB program. This package has been included on previous tapes, such as the Fall, 1986 RT SIG tape.

INDFIL.DSK 18 Files, 258 Blocks
****

DIAL - Terminal Emulator Front End.

Maarten van Swaay
Kansas State University
Department of Computer Science
Nichols Hall, CS
Manhattan, KS 66506

DIAL is a package that can be used in front of terminal emulators. DIAL is designed to retrieve its input from a command file, which can direct it to initialize a HAYES-type modem and to penetrate through a layer of data switches, transport services, logon dialogs, etc.

DIALER.DSK 3 Files, 38 Blocks
****

KERMIT - File transfer protocol for PDP-11's.

Brian Nelson
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2801 West Bancroft
Toledo, OH 43606
(419) 537-2841

The Kermit files for RT-11 which are included on this tape have been taken from the Fall, 1986, SIG Tape. This is not a new submission.

This is release 2.44 of Kermit-11. Major changes from previous versions include long packet support, BREAK and DTR control for RT, a DIAL command, and other small fix-ups. It runs on all PDP-11 operating systems. For RT-11, you must have multiterminal support if you are using version 4.0. For RT version 5.1 and later, multi-terminal support is not needed if you use the XL or XC handler. For TSX+, you must use the CL facility for outgoing lines. See the files K11AAA.AAA, and K11INS.DOC for more information. Edit history is given in the file K11CMD.MAC.

```
KERDC1.DSK   9 Files, 355 Blocks  (Documentation Files)
KERDC2.DSK   5 Files, 428 Blocks  (Documentation Files)
KERCM1.DSK  12 Files, 486 Blocks  (Common Files)
KERCM2.DSK   6 Files, 486 Blocks  (Common Files)
KERCM3.DSK  17 Files, 222 Blocks  (Common Files)
KERRT1.DSK  18 Files, 380 Blocks  (RT Files)
KERRT2.DSK   2 Files, 390 Blocks  (RT Files)
```
****

The Spring, 1987, RT SIG tape contains 46 Files, 20417 Blocks.
It was prepared by: R. W. Barnard
                        Sandia National Laboratories
                        Division 7523
                        P. O. Box 5800
                        Albuquerque, NM 87185
DCS - BARNARD

It is available from the following sources:
DECUS NLO TAPE TREE   DECUS LIBRARY
c/o Robert N. Perry
Tektronix, Inc.   DECUS Program Library
PO Box 500   BP02
MS: 19-333   249 Northboro Road
Beaverton, OR 97077   Marlboro, MA 01752
(503) 527-5410

DCS - PERRY

Cross-Reference Index

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EXCHANGING INFORMATION WITH OTHER SYSTEMS
VIA
MAGNETIC TAPE UNDER RT-11 [1] AND TSX-PLUS [2]

Introduction

The need for the exchange of information between unlike computer systems is constantly growing. Many governmental and commercial organizations, such as the Federal IRS, various health related agencies, and some insurance carriers, are requiring smaller and smaller business firms to report data in machine readable form. The 1/2-inch 9-track magnetic tape is generally the preferred medium.

Magnetic tape is the preferred medium because it provides a most convenient means for exchanging large amounts of information between unlike computer systems. Aside from selecting one of several bit densities, it is a true device independent medium. The only other viable alternative that comes to mind is the serial line. Even at 9600 baud, the serial line transfers less than three and a half megabytes per hour.

[1] RT-11 is a trademark of Digital Equipment Corporation.
[2] TSX-Plus is a trademark of S & H Computer Systems, Inc.

There are computers out there that speak in EBCDIC instead of in ASCII. Hence, if information is to be exchanged with one of those machines, the data must be converted. This is not a difficult task, but it is rather tedious. Conversions in both directions may conveniently be accomplished with a single table.

Tape Formats

Much of this form of interchange is done on simple non-ANSI magnetic tapes. These tapes contain some number of fixed length records and no labels. Some agencies, however, do require ANSI formats with volume label, file header label, and end-of-file label records, each of which is 80 bytes in length. On just about all tape formats, the logical end-of-tape (EOT) is indicated by two consecutive tape marks.

The following information has been taken from the indicated paragraphs of ANSI X3.27-1978, "Magnetic Tape Labels and File Structure for Information Interchange", and annotated:

1.2.2 The VOL1 label record may be 80 characters or more in length. (The RT-11 VOL1 label is 512 bytes in length.)

5.2.3 A label record may be extended by padding. (RT-11 label records are padded out to 512 bytes.)

6.1   Only ANSI X3.4-1977 characters (ASCII) may be used. (Tapes written in either EBCDIC or binary are are not ANSI!)

6.3.3 Padding may be with any desired characters. (RT-11 pads label records with random characters and data records with nuls.)

6.5   Data record length ranges are specified in the following ANSI standards and not in X3.27-1978. (Both RSTS [3] and VMS [3] documentation state otherwise, 18-2048.)

X3.14-1973 (200 cpi, NRZI)

X3.22-1983 (800 cpi, NRZI)

X3.39-1973 (1600 cpi, PE)

X3.54-1976 (6250 cpi, GCR)

[3] RSTS and VMS are trademarks of Digital Equipment Corporation

ANSI X3.27-1978 specifies four levels of labeling and structure. RT-11 does not adhere to any one of these defined levels but uses a subset of the several levels combined.

At times the information as written to a tape may contain more than one data record per tape record. This is known as record blocking. Where data records are relatively short, tape utilization is made more efficient by blocking a number of data records into one tape record. On occasion, the blocking factor is optional and may be used to circumvent some of the RT-11 imposed limitations to be discussed later.

Some of the tape formats likely to be encountered are the RT-11 "not quite ANSI" structure with its 512-byte label records, true ANSI structures with both single and multiple label records, the old DOS-11 [4] and ROLLIN structures with their 14-byte label records, and simple unlabeled structures. The VMS COPY command produces a tape with multiple label records. The following attempts to diagram some of these structures for comparrison.

Simple Unlabeled

```
xxx \
  .  >  Data Record(s)
xxx /
0         Tape Mark
yyy \
  .  >  Data Record(s)
yyy /
0         Tape Mark
0         Tape Mark
```

----
[4] DOS-11 is a trademark of Digital Equipmen Corporation.

RT-11		ANSI
512	Volume Label Record	80
512	HDR1 Label Record	80
0	Tape Mark	0
512 \	/	xxx
. >	Data Record(s) <	.
512 /	\	xxx
0	Tape Mark	0
512	EOF1 Label Record	80
0	Tape Mark	0
512	HDR1 Label Record	80
0	Tape Mark	0
512 \	/	yyy
. >	Data Record(s) <	.
512 /	\	yyy
0	Tape Mark	0
512	EOF1 Label Record	80
0	Tape Mark	0
0	Tape Mark	0

VMS (ANSI)

```
80        Volume Label Record
80        HDR1 Label Record
80        HDR2 Label Record
80        HDR3 Label Record
80        HDR4 Label Record
0         Tape Mark
2048 \
  .  >  Data Record(s)
2048 /
0         TAPE MARK
80        EOF1 Label Record
80        EOF2 Label Record
80        EOF3 Label Record
80        EOF4 Label Record
0         Tape Mark
0         Tape Mark
```

DOS-11			ROLLIN
14	Header Record		14
512 \		/	4096
. >	Data Record(s)	<	.
512 /		\	4096
0	Tape Mark		0
14	Header Record		14
512 \		/	4096
. >	Data Record(s)	<	.
512 /		\	4096
0	Tape Mark		0
0	Tape Mark		0

All DEC [5] operating systems, except for RT-11, are capable of reading and writing magnetic tapes in DOS-11 format. Therefore, this format has become quite useful for exchanging information between DEC systems.

RT-11's DIRECTORY command is capable of producing a directory of an ANSI magnetic tape. The /VOLUME option will not recognize the 80-byte volume label record. The tape may have either single or multiple label records. However, only the information in the first file header and the first end of file record for each file is used. The file size indicated is the number of data records rather than the number of 512-byte disk blocks.

RT-11 Restrictions

As mentioned earlier, RT-11 does impose its own set restrictions or limitations on the use of magnetic tape. All records on an RT-11 tape are 512 bytes or one disk block long. Only the first 80 bytes are meaningful in the volume label record, each file header label record, and each end-of-file label record. Actual data records frequently span a tape 512-byte tape record boundary. Record blocking is not a user controlled option.

[5] DEC is a trademark of Digital Equipment Corporation.

All RT-11 device handlers deal in byte pairs or words. Hence, data I/O buffers must start on even byte boundaries. To the MACRO-11 programmer this means that all read/write programmed requests deal in words. To the high level language programmer the same restriction applies to all SYSLIB and MTLIB [6] read/write calls.

The MTLIB sample application programs are written in FORTRAN using direct access files. This results in a further restriction for these utilities in that tape records must occur in four-byte chunks. However, the library routines contained in MTLIB are restricted to two-byte chunks.

Programming Considerations

The following program fragments compare some of the requirements for transferring data to or from a magnetic tape using MACRO-11, and FORTRAN with either SYSLIB or MTLIB calls.

MACRO-11:

```
        .
.FETCH  addr,dnam
.QSET   addr,qlen
.LOOKUP area,chan,dblk,seqnum
        .

.SPFUN  area,chan,func,buff,wcnt
        .

.CLOSE  chan
.RELEAS dnam
        .
```

where: addr   is the address at which the handler is to be loaded or the new elements are to start.

        area   is the address of an EMT argument block.

        buff   is the address of the I/O buffer.

        chan   is a channel number.

----

[6] MTLIB is a product of NAB Software Services, Inc.

dblk	is a the address of a 4-word RAD50 descriptor block specifying the dev:filnam.ext to be operated on.
dnam	is the address of the RAD50 device name.
func	is a numerical code indicating the function to be performed.
qlen	is the number of new elements to be added.
seqnum	is the sequence or file number.
wcnt	is the number of words or character pairs to be transferred.

FORTRAN/SYSLIB:

```
    .
I = IFETCH (dnam)
I = IQSET (qlen,area)
chan = IGETC ()
I = LOOKUP (chan,dblk,0,seqnum)
    .
    .
I = ISPFNx (func,chan,wcnt,buff)
    .
    .
I = ICLOSE (chan)
I = IFREEC (chan)
    .
```

where:	area	is the address at which the new elements are to start.
	buff	is the name of the data buffer.
	chan	is the integer number of the I/O channel.
	dblk	is the name of the array containing the RAD50 dev:filnam.ext.
	dnam	is the RAD50 device name.
	func	is the integer number of the code for the function to be performed.

qlen	is the integer number of new elements to be added.
seqnum	is the sequence or file number.
wcnt	is the integer number of words or character pairs to be transferred.

FORTRAN/MTLIB:

```
    .
I = IFETCH (dnam)
    .
    .
CALL MTFOR (unit,func,brc,buff,iret)
    .
```

where:	brc	is the integer number of bytes or characters to transfer or records to skip.
	buff	is the name of the data buffer.
	dnam	is the RAD50 device name.
	func	is the integer number of the code for the function to be performed.
	iret	is the integer number of bytes or characters read or zero if a tape mark was encountered.
	unit	is the ASCII name and number of the magnetic tape device.

It should be noted that with both MACRO-11 and FORTRAN using SYSLIB calls, the programmer must be concerned about the availability of Q-elements and I/O channels. The approach offered by MTLIB is much simpler, requiring from two to five arguments, depending on the function being requested. In all programming situations the device handler may be LOADed with the monitor command rather than be FETCHed by the running program.

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The Flit Gun

John M. Crowell

Quick, Henry, the Flit!   We've got BUGS!

I hope that this is not too regular a feature of the Minitasker. Any RT-11 bugs that come to my attention from month to month will be included here. They may be problems with RT-11 itself. Or they may be hardware problems that manifest themselves in unexpected ways in RT-11. Or they might be bugs found in DECUS Library programs or RT-11 SIG tape submissions. We have at one of each this month.

****

A problem with the **MS** handler was reported by **Terry Compton**. This one seems to have been around at lease since V5.1, and it's still there in V5.4. Under certain conditions (I think that one of them is when the device goes off-line in the mmiddle of an operation.), a system crash results. The following exerpt of the handler code illustrates the problem.

```
.MODULE TS,RELEASE=V05,VERSION=02,COMMENT=<TS11 Magtape Handler>

;                   COPYRIGHT (c) 1984 BY
;            DIGITAL EQUIPMENTCORPORATION, MAYNARD, MASS.
;                    ALL RIGHTS RESERVED.


            BNE   TCL2ER
10$:        JMP   MSDONE
TCL1ER:     BIT   *FL$CIP,TB$FLG(R5)
            BNE   5$
            RTS   PC
5$:         BIC   *FL$CIP,TB$FLG(R5)
                                        <-----
.IF DF MS$FSM                                |
            MOV   MSCQ,R3                     |
            JMP   $MT                         |
.IFF                                          |
            .FORK     TSFBLK      -----------
            JMP   MS
.ENDC
```

Clearly, if you have file-structured magtape support, R3 is getting clobbered. Our best guess is that moving the .FORK as indicated will solve the problem, but so far nobody's tried it. If you're having the problem, try it, and do let us know.

Dr. Bob Schor of the University of Pittsburgh reports that there's yet even another problem with the FPJ-11 floating-point accelerator chip for the 11/73 and 11/83. It seems that whenever the **STCDF** instruction causes the exponent to change, the sign bit is dropped. So if the double-precision number is negative and nearly equal to a power of 2, the sign will change. (e.g. -511.999999999 becomes +512.) So far, I haven't found that RT-11 FORTRAN-IV V2.8 doesn't exhibit, the problem (I don't know about V2.6.), but FORTRAN-77 does because it uses the STCDF comand in it's generated code. If you use the FPJ chip, try the following FORTRAN-77 program.

```
real*8 almost minus 1,epsilon
data epsilon /1.d-8/
almost minus 1 = -( 1.d0 - epsilon )
x = almost minus 1
if(x .lt. 0.) then
  type *,'x has proper value: ',x
else
  type *,'x has wrong sign: ',x
endif
end
```

As of the date of this submission, nobody at DEC has admitted that there is a problem, let alone announced an(other) ECO for the chip. As soon as I get word from DEC, it'll appear in this column.

****

On the Spring '86 SIG Tape there were some useful programs submitted by H. Reints of the Netherlands. There was, nowever, a time bomb. They don't work with Version 5.4 of RT-11. The programs DISK.SAV and RDIR.SAV both use a routine LOGDSK which attempts to read the LD translation tables. Unfortunately, the structure of the LD tables changed with V5.4 along with the way .SPFUN 372 works. **DO NOT** use the programs on the SIG Tape with V5.4 of RT-11. It will do unnatural things to your LD handler. Below is an updated version of the LOGDSK routine which returns the file name of a mounted LD device. This one works with V5.4, but no earlier versions. If you're using DISK, RDIR, or LOGDSK, rebuild them using this module before trying them on V5.4 of RT-11.

```
.TITLE    LOGDSK
.MCALL    .CSTAT,.DSTAT,.LOOKUP,.SPFUN,.PURGE,.SERR,.HERR
;
;    FUNCTION LOGDSK(UNIT,FILBLK,SIZE,WRLOCK,AVAIL)
;    INTEGER UNIT,FILBLK(4),SIZE,WRLOCK,AVAIL
;
;    This subroutine gets information of a logical disk unit LDn:
;
;    Input arguments:
;      UNIT  : contains the LD unit number of which info is wanted
;
;    Output arguments:
;      FILBLK : contains the physical device and file name in Radix50
;               or 4 zero words when the LD unit is not mounted
;      SIZE   : contains the size of the file in blocks
;      WRLOCK : 0 if write enabled, -1 if write locked
;      AVAIL  : 0 if file available, -1 if not, +1 if handler not loaded
;
;    Function value:
;      +1 : LD Table size mismatch: results meaningless, maybe fatal
;       0 : normal return
;      -1 : error reading LD translation tables
;      -2 : no channel available

.PSECT    USER$I

Idunit   = 8.              ; Number of entries in LD tables
                          ; (This may change!)
; LD.FLG bits

Id.rdo   = 40000          ; If set, LD unit is read-only
Id.unt   = 37400          ; Unit number of physical disk
                          ; assigned to this logical disk
logdsk::
    mov    #-2,funval      ; Initialize function value
    .serr                  ; Disable EMT error abort
    movb   #14.,r4         ; Find an available channel
1$: .cstat    #area,r4,#ldtbl
    bcs  2$
    decb r4
    bge  1$
    br   7$               ; Oops, all channels in use
```

```
2$: inc    funval          ; OK, we got a channel
    .lookup  #area,r4,#dblk  ; Open it to LD
    bcs  3$
    .spfun  #area,r4,#372,#ldtbl,#1  ; Read LD tables
    bcs  3$
    clr    funval          ; Normal so far
3$: .purge   r4            ; Free the channel for later
    tst    funval          ; If error, bail out now
    blt  7$

    cmpb   Id.num,#Idunit  ; Do tables match?
    beq  4$
    inc    funval          ; No, set error, but data MAY be valid
    br   7$

4$: mov    4(r5),r3        ; Get address of FILBLK argument
    clr    (r3)+           ; Clear FILBLK
    clr    (r3)+
    clr    (r3)+
    clr    (r3)+
    clr    @6(r5)          ; Clear SIZE
    clr    @10(r5)         ; Clear WRLOCK
    clr    @12(r5)         ; Clear AVAIL
    mov    @2(r5),r1       ; Get unit number
    bic    #^c<Idunit-1>,r1 ; Force it to be valid
    asl    r1              ; Unit*2 is offset in LD.FLG table
    mov    r1,r2
    asl    r2
    asl    r2              ; Unit*8. is offset in LD.NAM table
    mov    Id.flg(r1),r0
    bpl  7$               ; If bit-15 =0, LD unit not allocated
    bit    #Id.rdo,r0      ; Is it read-only
    beq  5$
    dec    @10(r5)         ; Yes, set WRLOCK flag

5$: bic    #^c<Id.unt>,r0  ; Isolate physical unit number
    swab   r0              ; and put it in low byte
    mov    Id.siz(r1),@6(r5) ; Copy size to SIZE
    mov    4(r5),r3        ; Point to FILBLK
    add    #Id.nam,r2      ; Point to name
    mov    r2,r1           ; Save it for .DSTAT
```

```
;+
;************************************************************************
; This Code is subject to change if ldunit is ever > 8.
;
        mov        (r2)+,(r3)              ; Copy device name
        add        #^R  0,r0               ; Make unit RAD50
        add        r0,(r3)+                ; Add unit number to device name
;************************************************************************
;-
        mov        (r2)+,(r3)+             ; Copy file name
        mov        (r2)+,(r3)+
        mov        (r2)+,(r3)+
        inc        @12(r5)                 ; Set AVAIL to +1
        .serr                              ; Disable EMT error abort
        .dstat     #area,r1                ; See if device exists
        bcs        7$
        tst        area+4                  ; Yes, is handler loaded?
        beq        7$
        clr        @12(r5)                 ; Yes, zero AVAIL
        .lookup    #area,r4,4(r5)          ; and look for file
        bcc        6$
        dec        @12(r5)                 ; It's not there. AVAIL = -1
6$:     .purge     r4                      ; We're done with the channel

7$:     .herr                             ; Restore EMT error abort
        mov        (pc)+,r0                ; Return function value in R0
funval:.word      0
        return

area:      .blkw    6
dblk:      .word    ^RLD ,0,0,0

ldtbl:
ld.id:     .blkw    1            ; Filles with ^RLD
ld.num:    .blkb    1            ; Number of LD units (8. in V5.4)
           .blkb    1            ; (reserved)
ld.flg:    .blkw    ldunit
ld.ofs:    .blkw    ldunit
ld.siz:    .blkw    ldunit
ld.nam:    .blkw    4*ldunit

        .end
```

NEWSLETTER OF THE VAX SYSTEMS SIG

Pageswapper

Our Mascot

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VAX

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System Security and Student Operators DO Mix

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and
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Abstract

We present techniques through which all VMS user and system disk backups can be performed by operators whose only extra user authorization entries are for the "OPER" and "GRPNAM" privileges and an identifier such as "STUDENT_OPERATOR". We place Access Control Lists on the tape and removable-media disk drives that deny access to all users (including the operators) except those who have "BYPASS" privilege or a specific identifier. These methods have two primary advantages: all user disk backups are performed by command procedures, which reduces to minimal levels the chance of a catastrophic mistake, and the operators can legitimately be advertised to have no special access to the files they are backing up.

I. Introduction

It is difficult to resolve the conflicting goals of system security; file system invulnerability to hardware, software, or human failures; system availability to users (measured in both connect time and CPU cycles), especially during normal working hours; and the effective use of professional staff time. At Kalamazoo College we have developed a method of meeting the file backup goal that has minimal impact on our ability to meet the other goals. Although there are some refinements that require recent VMS updates, variations of these techniques should be usable on any VMS Version 4 system. The approach described here should be of particular interest for small educational installations, but many other sites cannot afford to use skilled programmers as operators either.

This paper is organized into four sections, as follows:

The heart of our approach is to perform all backups and system shutdowns from batch jobs that are submitted, /AFTER= a date in the far future, by user SYSTEM (or by someone else with "BYPASS" privilege). The student operator is granted access to the batch jobs' log files by an ACL entry that is automatically propagated to succeeding versions. The student operator can manipulate the queue to release or suspend a job, having OPER privilege. However, the student operator cannot read other people's private files directly, having neither BYPASS nor READALL privileges, and also cannot read them indirectly from the removable media (disk or tape) backup copies, because of Access Control List entries on the drives.

The hard parts are first, getting the identifiers, ACLs, and privileges done correctly (examples are included below) and second, creating a batch job to shut the system down, since the queue manager and all batch jobs vanish like the Cheshire Cat fairly early in the shutdown process! The solution to the second problem is to have the batch job (which is released by the student operator) include a RUN/DETACHED command to create a process that will shut the system down. This process is outside the purview of the job controller, hence survives the early shutdown of all queues.

II. Preparation

A. Maintaining Operator Accounts

Our student operators use two accounts. The first is their personal student account, which has no special privileges or identifiers at all. The second is one of several long term accounts (usernames of the form OPERATORn, for n = 1, 2, ...) whose password is changed every academic term and whose OWNER field in SYSUAF.DAT is also changed to indicate the student presently authorized to use it. It is the OPERATORn accounts that have the STUDENT_OPERATOR identifier and the OPER and GRPNAM privileges.

There are three steps involved in maintaining the student operator accounts: original creation, modification to operator functionality, and modification upon staff turnover. The original creation is by standard techniques, such as the ADDUSER.COM file presented in example 5-4 of the "Guide to VAX/VMS System Management and Daily Operations." Take pains to use a UIC code that gives all of the OPERATORn accounts the same group number, with no other users having that group number. The AUTHORIZE utility is used once interactively to create the STUDENT_OPERATOR identifier and later through a command procedure to grant it to the individual operator accounts.

Using the OPERATORn accounts also helps for dealing with turnover in student workers. When a student leaves, only the OPERATORn account he or she used need be modified. This keeps management of the OPERATORn accounts (and hence, who has access to the OPER and GRPNAM privileges) to a minimal level.

B. Boot-time Measures

ACLs for Devices

Since the tape and removable media disk drives are being used by the operator, the protection of those devices is especially important. There are often extended periods of time when previously used tapes or disk packs are physically mounted. This could constitute a terrible security hole, since the operators or other users might allocate the drive, mount the volume, and read the contents. The backup command procedure does indeed allocate the device, so that no interference will occur while it is in use, but that happens only when it is

actually time to write the new backup copies of the files. We escape from this nightmare, as shown in Fig. 1, by the simple expedient of placing Access Control Lists (ACLs) on the drives.

```
===================================================================
                        |  Figure 1  |
                        ==============

$!
$!
$!          Set protection so that users with the identifier
$!          EDCOMPSTAFF can access tape and disk drives.
$!
$           EDCOMP  :==      SET DEVICE/ACL=(-
                (IDENTIFIER=EDCOMPSTAFF,-
                ACCESS=READ+WRITE+EXECUTE+DELETE+CONTROL), -
                (IDENTIFIER=[*,*], ACCESS=NONE))
$!
$           EDCOMP MSA0:
$           IF ("'’f$trnlnm("sys$sysdevice")’" .NES. "DJA0:")   -
                THEN EDCOMP DJA0:
$!

===================================================================
```

Figure 1: Creating Device ACL's in SYSTARTUP.COM.

The ACLs achieve several useful functions: the professional staff (who have need, or who know the SYSTEM passwords, and hence could get to it anyway) are granted full access to the drives; any job, typically with [SYSTEM] UIC, that has BYPASS privilege (such as the BACKUP jobs) gets access anyway; all other processes are denied access, including ordinary users and the student operators. The ACL is applied to the RA-60 only if it is not the system disk, since users MUST have access to many files on the system disk!

Group Logical Names

The student operators use their group logical name table to communicate to the backup batch job in the event that a fatal error or other catastrophe requires that the BACKUP command itself be re-issued. As discussed in part III, our backup command procedure includes code that must be executed only once, so that re-trying the BACKUP command must be possible. Besides, what system manager likes to be awakened by a phone call at at 6:20 AM from the student operator asking to have the backup job re-submitted! In order for the group logical name table to exist, at least one name must continue to be defined in it. Figures 2 and 3 show how this is done; the input command procedure specified in Fig. 2 is presented in Fig. 3. The technique of running LOGINOUT to process a DCL input file was documented in the Release Notes for VMS V4.1, page 4-2 (thanks go to the Colorado Customer Support Center staff for digging up this reference).

```
================================================================
                        |  Figure 2  |
                        ==============

$!
$!          Run the job that creates the operator group [50,*]
$!          logical name table, for use by BATCH_SUBSETBACK.
$!
$           RUN/DETACH/UIC=[OPERATOR1]-
                /INPUT=SYS$MANAGER:OPERATOR_LNMTBL.COM-
                /OUTPUT=SYS$MANAGER:OPERATOR_LNMTBL.LOG-
                /PROCESS_NAME=OPERATOR_LNMTBL-
                SYS$SYSTEM:LOGINOUT
$!

================================================================
```

Figure 2: Creating Group Logical Names in SYSTARTUP.COM.
          (Input file is presented in Fig. 3.)

```
===============================================================
                        |  Figure 3  |
                        ==============

$       DEFINE/GROUP STUDENT_OPERATOR_GROUP  -
                "DO_NOT_DELETE_THIS_LOGICAL_NAME"
$!
$       EXIT
$!
$!          ++++++++++++++++++++++++++++++++++++++++++
$!
$!          SYS$MANAGER:OPERATOR_LNMTBL.COM
$!
$!      Executed by a RUN/DETACH/UIC=[OPERATOR] command in
$!      SYSTARTUP so that the [50,*] group logical name table
$!      will exist for reference by BATCH_SUBSETBACK.COM.
$!
$!          ++++++++++++++++++++++++++++++++++++++++++


===============================================================
```

Figure 3:   Input file for creating the OPERATORn
            group logical name table (see Fig. 2).

PRIVBATCH

The backup and system shutdown batch jobs are submitted to a
privileged (or private) batch queue, PRIVBATCH, so that they
cannot be shut out by user jobs. That queue is created as shown
in Fig. 4. The memory management values proved essential for
efficient analysis of accounting data, they are extravagant for
backups. (Before we learned how large to set WSEXTENT, one
quarterly accounting summary provoked 6 million page faults!)

```
===============================================================
                        |  Figure 4  |
                        ==============

$!
$       INITIALIZE/QUEUE/BATCH/START/JOB_LIMIT=5-
                /WSDEFAULT=1024/WSQUOTA=3500/WSEXTENT=3500-
                /BASE_PRIORITY=4/PROTECTION=(S:RWED,O,G,W) -
                PRIVBATCH
$!


===============================================================
```

Figure 4:   Creating PRIVBATCH in SYSTARTUP.COM.

C.   File Access Control Lists

In order to allow a student operator to monitor the command
procedures for errors, including BACKUP's soft tape write errors
(which we track as an indicator of wear on re-cycled tapes), the
student is granted the STUDENT_OPERATOR identifier. By giving
the log files the correct ACLs, the student operators can access
these files while leaving the rest of SYSTEM's log files secure
from browsing. This reduces temptation the student operators
might experience when it comes to looking into areas where they
should not be allowed.

Figure 5 shows the protection of a typical backup log file. Two
methods can be used to create ACLs for the log files. One
method is to set the ACL for the file with the VMS "SET ACL"
command, the other method is to EDIT/ACL the file. An example
of the former method is as follows:

```
    $ SET ACL/ACL=(IDENTIFIER=STUDENT_OPERATOR,  -
            ACCESS=READ)   EX.LOG
```

Note that if this file had an existing ACL associated with it,
this new ACL entry would be put at the top of the ACL list. The
new entry could instead be added to the end of the ACL list with
the "/AFTER" option.

```
=======================================================================
                              |  Figure 5  |
                              ==============
$ DIRECTORY/SECURITY SYS$MANAGER:BATCHBACK.LOG

Directory SYS$SYSROOT:[SYSMGR]

BATCHBACK.LOG;24   [SYSTEM]   (RWED,RWED,RE,)
        (IDENTIFIER=STUDENT_OPERATOR,ACCESS=READ)


=======================================================================
```

Figure 5: Log file ACL.

Another way to create or modify an ACL is to invoke the ACL
editor. By using the ACL editor, a file with the correct ACL
can be created and then other files can be given the same ACL
using the command

```
     $ SET ACL/LIKE=OBJECT_NAME=filename_with_ACL  -
             filename_needing_ACL
```

This command was not correctly described in early VMS Version 4
documentation.

III. Daily Operations

A. Professional Staff

BACKUP Jobs

The student operators can control the start of the backup
because the submission command specifies execution at a later
date that is hundreds of years in the future, so that the job
will not run until an operator intervenes. Because of the
complexity of the submission command, the system manager uses an
interactive command procedure to perform the submission. We
have such procedures for submitting the jobs that will perform
overnight backups of new files, that will shut the system down
for stand-alone backup of the system disk, that will perform

full backups of specific user file directory trees, etc..

Figure 6 shows the critical portion of the command procedure
that submits the procedure BATCH_RA60BACKUP.COM, which we use to
write tape copies of RA-60 packs, typically the oldest existing
disk pack copy of the system disk. The procedure prompts for
the saveset name if the name was not supplied. Once a saveset
name is supplied, the backup procedure is submitted to the batch
queue named PRIVBATCH, for execution after the 18th of September
in the year 3500. Of course that wait will never be fulfilled;
the job is held until an operator intervenes, as discussed in
part B of this section.

By having the queue manager hold the job, there is virtually no
CPU or memory used until it is actually time to execute the
backup. In these respects it is superior to our original
inspiration. That involved submission, by the backup or
shutdown job, of another job that consisted of an infinite loop
of 23 hour WAIT commands. Then, in the backup or shutdown job,
that submission was followed by a SYNCHRONIZE command. When the
time came to proceed, the student operator would delete the

```
=================================================================
                         |  Figure 6  |
                         ==============
$ BEGIN:
$!
$    IF P1 .NES. "" THEN GOTO START
$    INQUIRE/NOPUNCTUATION P1 -
     "SUPPLY SAVE SET NAME (e.g., SYSTEMC.BCK): "
$    GOTO BEGIN
$!
$ START:
$!
$    SUBMIT/QUEUE=PRIVBATCH/NOTIFY/PARAMETERS=("''P1'") -
        /NOPRINTER SYS$MANAGER:RA60BACKUP.COM -
        /NAME=BATCH_RA60BACKUP/AFTER=18-SEP-3500
$!
$    EXIT


=================================================================
```

Figure 6: A Simplified Submission Procedure.

WAITing job, which would satisfy the SYNCHRONIZE and release the backup or shutdown job. This was clumsy, but it did work. It required a separate queue ("SYNCQUEUE"), consumed memory for both jobs, as well as a little CPU for the WAIT loop, and consumed active job slots in the PRIVBATCH queue.

On our system we have located all user files in a directory tree whose root is DUA1:[USERFILES]. The files are split into three groups, in subdirectories MONDAY, WEDNESDAY, and FRIDAY, and the pseudodevices MON:, WED:, FRI:, and USER: are defined at boot time by the logical name assignments in Fig. 7. (USER: is a search list for the other three, for use when you don't know which group a given user's files are in.) We backup all files in each subtree once a week, on the obvious day.

```
=====================================================================
                          | Figure 7 |
                          ============
$      ASSIGN/EXEC/SYSTEM/TRANSLATION=(CONCEALED,TERMINAL) -
                 DUA1:[USERFILES.FRIDAY.] FRI:
$      ASSIGN/EXEC/SYSTEM/TRANSLATION=(CONCEALED,TERMINAL) -
                 DUA1:[USERFILES.WEDNESDAY.] WED:
$      ASSIGN/EXEC/SYSTEM/TRANSLATION=(CONCEALED,TERMINAL) -
                 DUA1:[USERFILES.MONDAY.] MON:
$!
$      ASSIGN/EXEC/SYSTEM FRI:,WED:,MON: USER:
$!

=====================================================================
```

Figure 7: Creating pseudodevices in SYSTARTUP.COM.

The procedure we actually use also performs several tasks at the beginning and end on specific days. Some of these we do not want repeated, so provision must be made to loop back over the BACKUP command itself in case something should be wrong (fatal tape drive error, etc.). That is done through a group logical name for the student operators' UIC group (50 in our case).

An alternative method to achieve the batch mode equivalent of the interactive INQUIRE command would be to write a program (in MACRO, FORTRAN, or PASCAL) that uses the SNDOPR (or SYS$SNDOPR) system service, which is documented on pages SYS-429 through SYS-442 of the VAX/VMS System Services Reference Manual. Once the program has captured the text of the operator's reply, that

text can be passed on to DCL through the LIB$SET_SYMBOL routine.

We chose to implement the group logical name approach, rather than the SNDOPR approach, because the code is simpler and we could implement it with confidence more rapidly. Even if information more complex than a YES or NO type choice must be communicated, the group logical name approach should be considered. It will not work, of course, unless the batch process and the operator have either the same UIC group number, an identifier that matches an ACL on the group logical name table, or BYPASS privilege. (See the PAGESWAPPER for April, 1986, pages VAX-2 and VAX-3 for techniques of placing ACL's on logical name tables.)

SHUTDOWN for S/A BACKUP

Figures 8 and 9 provide the means for the student operator to shut the system down. Figure 8 is the batch job, submitted /AFTER=18-SEP-3500 by SYSTEM, and Fig. 9 is the input command file for the process that it creates after the operator releases it. There is no EXIT at the end of Fig. 9, because by then the system is shut down! This is essentially a variation on the technique used to create the group logical name table: run LOGINOUT so that DCL is available, and specify a command procedure as the input. Here, the input command procedure invokes SYS$SYSTEM:SHUTDOWN, with parameters specified so that no interactive session takes place. Presumably we are vulnerable here to changes in the parameter definitions of SHUTDOWN that DIGITAL might choose to make in future versions of VMS (are you listening, developers?).

```
==============================================================================
                            |  Figure 8  |
                            ==============

$          SET NOON
$          ON ERROR THEN EXIT
$          SET LOGINS/INTERACTIVE=0
$          REPLY/USER/BELL/BELL -
     "THE SYSTEM IS SHUTTING DOWN FOR BACKUPS.  PLEASE LOGOUT!"
$          WAIT 0:2:0
$!
$!   Start detached process to shutdown the system
$!
$          RUN/DETACH/UIC=[SYSTEM]-
              /INPUT=SYS$MANAGER:CALL_SHUTDOWN.COM-
              /OUTPUT=SYS$MANAGER:SHUTDOWN.LOG-
              /PROCESS_NAME=CALL_SHUTDOWN  -
           SYS$SYSTEM:LOGINOUT
$!
$          EXIT
$!
$!
$!           +++++++++++++++++++++++++++++++++++++
$!
$!               SYS$MANAGER:BATCH_SHUTDOWN.COM
$!
$!   Allows an operator to bring the system down.
$!
$!
$!           +++++++++++++++++++++++++++++++++++++

=============================================================================
```

Figure 8: SHUTDOWN Procedure Batch job.

```
=============================================================================
                            |  Figure 9  |
                            ==============

$          ASSIGN OPA0: SYS$OUTPUT
$          DEL*ETE :== DELETE/NOCONFIRM
$          SET NOVERIFY
$          @SYS$SYSTEM:SHUTDOWN 0 "Stand-alone backup" "N" "Y"  -
              "BY 8 AM" "N" "REBOOT_CHECK"
$!
$!
$!           +++++++++++++++++++++++++++++++++++++
$!
$!               SYS$MANAGER:CALL_SHUTDOWN.COM
$!
$!   SHUTDOWN.COM parameters have the following meanings:
$!
$!           P1 = Minutes until shutdown
$!           P2 = Reason for shutdown
$!           P3 = Spin down disk volumes
$!           P4 = Invoke site-specific shutdown procedure
$!           P5 = When will the system be rebooted?
$!           P6 = Perform automatic reboot?
$!           P7 = Shutdown option
$!
$!           +++++++++++++++++++++++++++++++++++++

=============================================================================
```

Figure 9: SHUTDOWN Procedure Detached job input.

B.   Student Operators

BACKUP Jobs

The OPERATORn accounts have a LOGIN.COM that includes
REPLY/ENABLE and then REPLY/STATUS to find out whether any
outstanding requests need to be satisfied (such as mounting a
second tape volume for the overnight backup). If such is the
case, then the operator mounts the next tape and issues a
command of the form

$ REPLY/TO=request-number

using the request number indicated by the REPLY/STATUS output. The operator checks the overnight incremental backup log file (with an EDIT/TPU/READ_ONLY command) to verify that all went well.

Once the incremental backup is completed, the operator finds and mounts the first tape for that day's backup. Then the backup job needs to be released. There are two steps: first, find the entry number; second, SET that entry of the QUEUE to /NOAFTER as follows:

    $ SHOW QUEUE/BATCH/ALL   PRIVBATCH
    .
    .
    .
    $ SET QUEUE/ENTRY=entry-number/NOAFTER   PRIVBATCH

After the above command is entered, the command procedure is immediately queued up for execution. The operator replies to mount requests and problems that may arise during the backup. The first request is usually that the operator mount a tape. The syntax of the reply is as discussed above. When each reel is finished, the operator receives another request to mount the next volume, loads the next tape, and replies to the request.

If the procedure makes a request to "REPLY TO CONTINUE, USE DELETE/ENTRY= etc. TO ABORT JOB", then the procedure has encountered an error. Before responding, the operator logs in on a screen terminal and edits the log file with the command:

    $ EDIT/TPU/READ   SYS$MANAGER:BATCH_SUBSETBACK.LOG

If the only errors are "file access" errors that occurred while backing-up the files or "file not found" errors that occurred during the verify or the recording pass, or verification errors for blocks in MAIL or directory files, then all is normal for backups performed on an active system and the operator continues the procedure by replying to the request. If there is a FATAL type error message during the backup, we want to have it re-do just the tape writing part of the procedure. That will happen if, before replying, the following line is executed by OPERATORn:

$ ASSIGN/GROUP   "SHUCKS"   BACKUP_ABORTED

Then the operator replies to the request so that the procedure continues. Immediately following the BACKUP (but not executed until after the REPLY, if BACKUP exits with warning or worse status) is a check of the logical name BACKUP_ABORTED in the group table for the [OPERATORn] UIC.

If such a catastrophe has happened, and the above recovery started, then the request "Reply when FIRST tape is ready again." will appear. The operator waits for the tape on the drive to rewind and then mounts the first volume of the tape set, again, and replies to the request. As soon as the backup is underway successfully, the following command must be issued by the operator, before the backup completes:

    $ DEASSIGN/GROUP   BACKUP_ABORTED

In summary, the logic in BATCH_SUBSETBACK.COM is to test, immediately following completion of the tape-writing, whether the logical name BACKUP_ABORTED has any translation; if it does, then the procedure loops back to the BACKUP command itself.

If one reel has a problem, the operator may get a message like "Request 8, Continue, Retry, or Abort". In that case the usual correct response is

    $ REPLY/TO=8 "RETRY"

When the subset backup has completed, the operator types the log file on the operator's console, with the command:

    $ TYPE SYS$MANAGER:BATCH_SUBSETBACK.LOG.0

This maintains a hardcopy record of these operations.

SHUTDOWN and S/A BACKUP

We instruct our student operators to use the REPLY/USER command to inform current users that a shutdown is impending. If time is not too pressing, the operator waits until all users have logged off before releasing the batch job to shut the system down (see Fig. 8). That job itself sets interactive logins to zero, announces the impending shutdown, and waits another two minutes. This extra time is invested as a matter of policy, to be sure that even if the student operator neglects to announce

the shutdown, our users will have had fair warning.

Stand-alone BACKUP of the system disk is perhaps the most delicate of the procedures that we entrust to student operators. If they type the BACKUP command with the device names in the reversed order, then the system disk will be wiped out! We do reduce our vulnerability by not pre-initializing the disk pack that they are supposed to be writing onto (but in this disaster scenario would copy from). Thus an older copy of the system disk would be "restored" and only software updates, batch jobs pending, and user authorization file changes, made during the intervening period (three weeks as we do these things), would be lost. All but the last week's worth would be recoverable from other packs. After the system has rebooted, the operator logs in and uses REPLY/ALL to notify waiting users that the system is up for the day.

IV. Conclusion

Performing backups from batch jobs liberates the operator, whether professional or student, from having to loiter in the machine room. Instead, we can perform useful work while the backups are in progress, knowing that OPCOM will alert us to the need to change volumes. In addition, the techniques described here permit less-skilled operators to relieve the more skilled staff both of the need to arrive in the wee hours to initiate backup jobs, and also of the time consuming tasks of supervising command procedures and changing tape volumes.

We would like to thank several people who have contributed to the development of the techniques reported here. Amy Courter and Mary Haug developed the command procedures used for daily operation of our system. Forrest Piehl created the initial versions of the techniques reported here (using the SYNCHRONIZE command, as discussed above in section III, part A), including the code shown in Figs. 8 and 9 that permits student operators to shut the system down for stand-alone backup of the system disk. Finally, we thank the student operators who had to learn and deal with the various modifications and changes as we debugged each new inspiration: Kelly Baldrica, Daryl Dickhudt, Kenneth Dietz, In Bum Eom, Ernest Johnson, and Greg Lewis.

VMS User's Network Working Group

Jamie Hanrahan
Working Group Chair

This is a summary of the results of the meetings of the "Usenet for VMS Working Group" at the Spring '87 DECUS Symposium.

Background

(Those already familiar with the working group and its goals may skip this section.)

Unix(TM) sites have for many years enjoyed the benefits of "Usenet",* a worldwide network of (mostly) Unix systems connected (mostly) via 1200 bps autodialed phone lines. The services provided by this network are electronic mail and "Netnews", an elaborate on-line conferencing system.

The Usenet has been of incalculable value to the Unix community. The network encompasses over 10,000 systems, crossing both corporate and geopolitical boundaries; the body of knowledge that is available from the participants is not inconsiderable. Questions posted to Netnews on almost any topic are generally answered within a few days. Bug reports and fixes, patches to Unix system code, and public-domain software are all distributed through Usenet; many sites justify the telephone expenses (which, for sites with many connections, are not small) on this basis alone. Further, Usenet is effectively part of the Internet, which includes Arpanet, CSNET, and BITNET...#not to mention Easynet, DEC's internal DECnet network.

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* I am aware that, according to some authorities, the term "Usenet" only applies to Netnews, and the mail service should be referred to as "uucp mail" (a reference to the principal transport mechanism). But it is awkward to keep saying "Netnews and uucp mail". You know what I mean.

VMS users who are aware of Usenet have for many years wished for a way to connect to it -- not only so we could talk to all those other folks, but also (or especially) so we could talk to each other. There has never been anything technically impossible about this, but the necessary software and information has not been cheaply available in the correct combinations. A few years ago some of us got together at a DECUS Symposium, started calling ourselves a Working Group of the VAX SIG, and set out to do something about the problem.

To talk to the existing Unix systems in the network requires, first of all, a transport mechanism. The systems on Usenet mostly use uucp (Unix-to-Unix Copy), a facility that has been part of Unix since the early days. We considered writing uucp for VMS and rejected the notion, partly because AT&T regards the algorithms expressed in the Unix sources as trade secrets, partly because uucp isn't particularly efficient, and partly because we thought we hoped to find something else off the (low-cost) shelf.

Our next candidate for the transport mechanism was Kermit. Kermit, like uucp, is a file transfer protocol, not a general protocol for task-to-task communications; but that is fine for our purposes, since all news and mail traffic on Usenet is shipped from one system to another as files. Good implementations of Kermit already exist for both VMS and Unix. The Unix version is written in C and can autodial, negotiate login sequences, and generally do everything that uucp can do. There is a VMS version of C-Kermit which needs a little bit of polishing but can also perform all of the required functions. (The standard VMS Kermit -- the one written in Bliss -- cannot. Polishing C-Kermit/VMS will be a far easier job than adding the autodialing, login script, etc., features to Bliss Kermit.) As for efficiency, standard Kermit does not do very well, but if "sliding window" support is added* it can approach 90% line utilization.

Accordingly, I contacted Frank da Cruz about the possibility of my working on C-Kermit/VMS, and acquired the job. I got as far as getting automated, batch-mode file transfers to work between VMS systems, and my Unix-speaking acquaintances assured me that the scheme I was working on could be easily supported from the Unix side. This is where things stood before the Spring '87

----

*See Kermit -- a File Transfer Protocol by Frank da Cruz (Digital Press, 1987).

Symposium in Nashville.

Recent Developments

Todd Aven appeared at the working group meeting and said (approximately), "Why don't you use PMDF?" Further discussion during the meeting, after the meeting, and at another meeting held later in the week established that:

o PMDF (Pascal Memo Distribution Facility) is available at low cost. (Details are in a later section.)

o PMDF can do everything we need in the way of a transport mechanism between VMS systems.

o PMDF can speak to MMDF (Multi-channel Memo Distribution Facility), which is distributed with Berkeley 4.3 Unix systems, thus allowing connections with the Unix world (and thence with Internet).

o PMDF includes an interface to VMS Mail, thus, part of the application layer is done. (The other part is a news system, about which more later.)

o In addition to autodialed phone links, PMDF can use other channels, including DECnet, JNET*, and TCP/IP (Wollongong or Tektronix implementations). There are provisions for user-written support of additional channels.

(A few people at the meeting expressed some dismay at the thought of throwing away what's been done so far on C-Kermit/VMS, but I didn't; very little of what I've done is specific to the use of Kermit as a network transport mechanism. I'm still working on the C-Kermit/VMS code and expect to ship some files to Columbia University within a few weeks [famous last words].)

There are other nice things about PMDF. Since it can

----

* JNET is a VMS-to-IBM_RSCS product, and is a product of Joiner Associates, Inc.

conveniently use DECnet channels, and can delay use of such channels until a prescribed time of day or night, we may well be able to build a high-speed "backbone" for our network by using long-distance DECnet leased lines during off hours. (Many companies have such lines between facilities in widely-scattered locations, and nearly all such lines are idle at least twelve hours per day.)

What's Being Done Now

So, now that the software is available, we can start making connections, right? Well, almost.

PMDF or UUCP?

A public-domain uucp, "uuslave", is being developed. It does not at present do everything required (no autodial, no login script negotiation, etc.), but it does speak the uucp protocol and it has been certified by AT&T as not having been derived from Unix sources. If this can be turned into a relatively complete uucp emulator for VMS, it would be preferable to PMDF. Not all Unix systems can talk to PMDF; if we could use uucp we'd have a vastly larger number of potential gateways to the existing Unix network. It would also simplify the node addressing issues (see the next few sections).

Ad-Hoc Networks in the Internet Age

If we let our network "just grow", we will fall prey to many of the problems currently faced by Usenet sites. We could just start making connections, but the network will be far more beneficial to all of us if we do a bit of homework first. To make it as easy as possible to talk among ourselves and to the rest of the world, we should go to the trouble of becoming an officially recognized part of the Internet.*

I am currently making inquiries as to how we might best connect with the existing Internet; until we have at least some information here, it would be wise not to proceed hastily. (But see "What You Should Do Now", below.) For some sites this will not be a problem: They will simply connect to a system that's already on the Internet and which is willing to perform domain server functions for them, and that will be that. But the rest of us will need, collectively, to become a zone, a domain, or a subdomain of our own, or else find a way to join an existing one. (Which is most suitable depends on what sort of resources we can scrounge up. It is not unreasonable to suppose that DECUS, or some part of DECUS, might provide the "responsible organization" to act as the administering authority of a new Internet domain [perhaps decus.org], but this remains to be seen.)

Joining the UUCP Zone

One option is to register new domains through Stargate Technologies, a not-for-profit, volunteer organization that is providing name registration services for the .uucp zone of Internet. To do this you need to find a nearby Unix system which has the MMDF software and whose administrators are willing to give you a connection. As long as your site is reachable by what appears to be uucp (i.e. via "bang style" addressing), it doesn't matter that the actual transport mechanism is something other than uucp.

Registration for your organization through Stargate costs $150 per year; sign up and the rest of the Internet will recognize your organization as a domain and will properly handle mail to and from you. If you are the ABC company, your domain might be called abc.com . You can then add other systems to the routing tables on your "gateway" machine; the rest of the net doesn't need to know about those (since all traffic to and from the rest of the net will funnel through the gateway). Thus you can have

----

* Please do not call or write to tell me that "only DoD-approved sites can connect to Internet". This was true when Arpanet and Internet were synonymous. Today, Arpanet is the ".arpa" zone of the larger Internet. Other zones include .bitnet, .csnet, and .uucp .

eng.abc.com, sales.abc.com, etc., each subdomain representing a department. Stick a user name and an "@" on the beginning (i.e. yourname@eng.abc.com) and you have a complete Internet address for yourself, such as smith@eng.abc.com .

News System Issues

PMDF provides the transport mechanism and the mail application. Everyone involved in this project agrees that Netnews, or something like it, is also essential to the growth and health of this sort of network. A news system provides an effective replacement for network-wide "mailing lists", which can be expensive and difficult to maintain. Besides, with mail you can only exchange messages with already-known people; news lets you find people you might like to send mail to.

The existing netnews software cannot, as far as I can determine, be compiled under the VAX-11 C compiler. (I've tried; if someone else has had better luck, please let me know.) It can be compiled and run under Eunice (Wollongong's Unix-on-top-of-VMS product), but it is not reasonable for us to require sites to buy Eunice just to participate in the network.

Therefore, I am working on a VMS-specific news implementation. It is composed of four major components: Database server, import and export programs, and user interface. The components communicate with each other using a slightly modified version of Brian Kantor and Phil Lapsley's Network News Transfer Protocol (NNTP); the biggest change (and it's a minor one) is that the communication paths are VMS mailboxes or DECnet logical links, rather than character-oriented channels like TCP/IP (which is what NNTP expects).

This design will permit users on different VAXes on a LAN to access a common news database on a single machine; it will not be necessary to maintain the news on every machine where it might be read. It will also be easy to build alternate user interfaces without having to deal with the complexities of the news database. The database itself stores the articles in individual text files, with RMS indexed files acting as indices to the articles.

More information on the news software will appear in the next Working Group report, which I hope will be ready for next month's PAGESWAPPER. The job still looks relatively simple at this stage; I think I can comfortably promise that I'll have the news software ready before we get the addressing/domain questions resolved.

Too Much of Anything, Even News, is Not Necessarily a Good
Thing

In the meantime, you might consider the following issue: Usenet is currently laboring under a proliferation of news text. With 10,000 sites and untold legions of users producing ten megabytes or so of news a week, the network backbone links are saturated or nearly so, and nobody has time to read it all.

Fortunately you don't have to read it all; it's easy to ignore the topics ("newsgroups") you're not interested in, just as you avoid subscribing to every magazine that's available. But the backbone sites must still ship all of it everywhere. (Perhaps nobody at your site reads the newsgroup on Celtic cooking, but someone at one of the sites you feed might do so.) As a result of the proliferation of newsgroups and contributions thereto, both the phone line time and the disk space are becoming prohibitively expensive for many Usenet participants. Many sites (other than those that make up the backbone) have ceased forwarding what they consider to be "nonessential" newsgroups.

We will face this issue sooner or later. Should we decide at the outset that only technically-oriented newsgroups will be established? Or that there will be "mandatory" and "optional" newsgroups, and sites on our network will only be required to store and forward the "mandatory" ones? (Through the primary links, anyway. Sites would of course be free to establish additional links, over which they might receive and send news that they wouldn't get from the backbone. I believe that some of this is already happening on Usenet.)

With any sort of restrictive policy, we face the questions of "who will make the decisions" and "how will they arrive at their decisions", and whatever policies are adopted, it seems certain that some people will be unhappy. (Should this working group, or some other agency of DECUS, set the policies? If so, will we

be unable to use the network to exchange information (like product pricing) that conflicts with DECUS's canons of conduct?) But the Usenet experience indicates that without such a policy, the network will soon become untenable; presumably, this will make nearly everybody unhappy.

Minor Issues: The Name Game

Those of you who have been following this effort for some time will have noticed that the title of the article says "VMS User's Network Working Group" instead of "Usenet for VMS Working Group" -- the latter being our original name. This name change was made at Larry Kilgallen's suggestion that the idea of a "VMS User's Network" would have a broader appeal than the idea of "Usenet Access for VMS" -- since, after all, most VMS users would like a convenient way to talk to each other, while only a small fraction of the VMS community may be aware of Usenet and the desirability of connecting to it.

I'm not entirely happy with the name "VMS User's Network" (which will probably be shortened to VUnet, which sounds too catchy not to have been used before, or even [God help us] Vusenet), but it seems to describe what we're trying to do. If you have a better idea for a name, I'd be happy to hear it. On the other hand, I'm not inclined to spend much energy worrying about this.

What You Should Do Now

Acquire and Install PMDF

At this writing it is likely that PMDF will play an important role in the network, so if you want to join quickly, you would be wise to acquire it. PMDF is available for the cost of distribution.

Ned Freed
The PMDF Project
Computing Services
Harvey Mudd College
Claremont, CA 91711
(714) 621-8006

It will come on nine-track tape (VMS BACKUP format) with about a hundred pages of documentation. (If your organization makes it difficult to buy software without prior approval, tell them that it's a book that happens to come with a tape instead of the other way around. Or just tell them it's a book.) Read the documentation, install PMDF on your system(s), and become as familiar with it as you can.

(Even if you don't care about joining our network, you can use PMDF if you're using VMS Mail over DECnet. Have you ever been frustrated when trying to send mail to someone who lives on a node that's temporarily unreachable? PMDF will automatically spool the mail for transmission when the link is up. You'll have to give a "To:" address that specifies routing through PMDF, but that can be handled via logical names.)

Learn About Internet

Find someone in your organization, DECUS LUG, or other nearby tribe who knows something about Internet. This should not be difficult; most large universities and many small and large corporations are on the Internet, and there should be someone around who can either explain things to you or point you to someone else who can. They can in turn provide you with the various documents (called RFCs, for Request For Comment) which describe Internet addressing, standards for the exchange of Internet mail and network news, etc.

(You can also obtain these by buying them from the Network Information Center at SRI International in Palo Alto, CA, but I do not have a complete list of the applicable documents yet, and you do not want to buy [let alone read] all of the available RFCs. Next month's article will have a list of the RFCs to order, along with complete ordering information.)

If you can't find a local Internet guru, don't despair: One of the things our Working Group is going to do is collect all of the necessary information and boil it down into easily-digested form. There's no need for more than the first few sites to dig it out ourselves! But if you want to be one of the first few sites, you'll need to know this material. (Then I can ask you questions.)

Acquire Hardware

You'll need, at minimum, a 1200 or 2400 bps autodialing modem, attached to your VAX in such a way that software in the VAX can place outgoing calls, and incoming callers can be connected to your VAX. For traditional terminal multiplexers this means connecting the modem to a port that supports modem control (e.g. not ports 2 through 7 of a DMF32). I don't know what it means for ports on Ethernet terminal servers, since we don't have any here and I don't know how they work for outgoing calls. (I do know that PMDF can negotiate the terminal server connection sequence for an incoming call; this would also work for modems attached to port selectors and the like.)

Oh, yes -- order a phone line, preferably one that does not go through your company's PBX or Centrex or equivalent, and certainly not one that requires an operator to connect it to the VAX. Use it for a while with the modem and have the phone company correct any line noise problems before it's time to connect to the network.

If you already have a suitable modem on your VAX, perhaps to support logins-from-home by employees or students at home, you can use that for PMDF links. Don't worry about interference with dialup terminal users: PMDF can be told to only place calls during hours when no one else will likely want the line, and if it finds the line in use (either when attempting to place an outgoing call or when calling into another system), it will just try again later.

Talk To Your Management

Obviously you're going to be spending some money for phone lines, line charges, disk space, etc. You will also be making known, to people at another site, a telephone number and username/password which can be used to access your VMS system. Granted the username will be a captive account, good only for sending and receiving mail via PMDF (the news traffic will be sent as "mail"); granted that there are thousands of Unix sites all around the country doing the same thing with uucp-captive accounts; you may still find it difficult to convince management that this is a good idea. (I don't know if dialback schemes will be usable with PMDF.)

But convince them you must, if you want to join the network. Things will become easier after the network actually exists and has a few hundred sites on it; there will be a snowball effect once "everyone is doing it". But for the first hundred or so, things will be tough. Better start working on the problem now. (If all else fails, go to work for a more reasonable outfit.)

Find Potential Network Partners

Find other sites in your area to hook up to. In addition to VMS sites, you want to find a Unix site that is running Berkeley 4.3; they should have the MMDF software, and can therefore provide a gateway for you to the existing Unix-based network. (Whether they'll be willing to do so is another issue.)

(Of course, if you have a Usenet-connected machine running 4.3 in your computer room, that problem is solved, but you should still look for other potential VMS sites in your area; if we're at all successful, they'll be wanting to connect to you.)

Write To Me

To build a reasonable network in as short a time as possible, we

must hear from as many interested sites as possible. We need the following information:

o Name, address, phone, etc. If you have any sort of electronic addresses (whether on networks or on dial-in machines like Compuserve), include those.

o Do you think your site will be able to place and/or receive local and/or long distance telephone calls, in order to exchange mail and/or news with other sites? What do you think the cutoff point might be in terms of dollars per month?

o Are any systems at your site connected to any part of Internet? (In the United States, Internet includes Arpanet, Milnet [but we can't use that], Bitnet, CSNET, and UUCP.)

o Are you willing to be a pioneer, or would you prefer not to hook up to us until we have everything working reliably?

o Does your company operate any long-distance VMS-to-VMS DECnet leased lines, whose excess (e.g. late-night) capacity might be used for mail and/or news?

o ...anything else you think might be useful for us to know.

NOTE: If you want to join the network, we want to hear from you, whether or not you can place outgoing calls, provide DECnet link capacity, etc.

Conclusion

The light is (finally) visible at the end of the tunnel, and we are fairly certain that it's not a freight train. Right now it looks as though we might easily be up and running by the Fall Symposium in Anaheim. If you can help in any way, please let us know.

Jamie Hanrahan

Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619-565-1865


```
     uucp:  {akgua,hplabs!hp-sdd,sdcsvax,nosc}!crash!pnet01!jeh
     arpa:  crash!pnet01!jeh@nosc.mil
 internet:  jeh@pnet01.CTS.COM
       or:  pnet01!jeh@crash.CTS.COM
US194066 on the Pageswapper system (see page VAX-2)
DECUServe:  HANRAHAN
```

INPUT/OUTPUT

A SIG Information Interchange

A form for INPUT/OUTPUT submissions is available at the back of the issue.

To register for on-line submission to the Pageswapper dial:

(617) 262-6830

(in the United States) using a 1200 baud modem and log in with the username PAGESWAPPER.

```
==================================================================
Note 567.10          BACKUP Hints and Questions          10 of 13
"Kevin Angley"                      19 lines  27-MAY-1987 14:45
                   -< To CRC or not to CRC >-
------------------------------------------------------------------
```

The /CRC or /NOCRC question has taken pseudo-religious airs. At Nashville, top people in DEC's storage group said that /CRC was a waste of time with new technology drives. However, the VMS Backup developer stressed the importance of reliability that a software CRC gives you. It comes down to the question of how far do you go in establishing a high confidence level. After all, you could do "paranoid" backups (small blocks, redundancy groups, /CRC, etc.) and THEN do fifty BACKUP/COMPARE's if you wanted to be EXTRA sure. But there's a point of diminishing returns, isn't there?

Key to this discussion is the number of times "block recovered by redundancy group" is actually due to a software CRC error, or by a hardware reported error. The VMS developer said that 9 times out of 10 that you see that message, /CRC has saved you (seems unlikely to me). But the same message is reported for hardware detected errors, so you cannot build any kind of historical feeling for this. Perhaps if backup gave you a clue as to whether the hardware was the reason for tossing a block, or if the software CRC helped out, then we could judge this issue better.

Kevin Angley

3301 Terminal Drive
Raleigh, NC 27604
(919) 890-1416

```
==================================================================
Note 567.11          BACKUP Hints and Questions          11 of 13
"Linwood Ferguson"                  24 lines  29-MAY-1987 21:08
                   -< /CRC gets you $25,000+ TK50 >-
------------------------------------------------------------------
```

/CRC and /NOCRC never seemed worth it, even for marginal gains on slow (i.e. 750 machines). Now it seems that it might be worth the risk: we tried our first MicroVax II with a TU81+.

First experience, with our standard backups (/CRC by default) caused the language to singe the cabinet: it was as slow as a TK50; worse since you could see it sitting there and barely moving. Then I tried /NOCRC and no other changes (65534 blocks, /buff=5) and the tape streams at 75 ips with no stops (well, almost none depending on what it's copying). It is visibly the same speed as a 8500 we use (/CRC there). Actual timing put elapsed time "cost" of /CRC at 518% and CPU time cost at 1600%. CPU and elapsed were almost identical (does this make it a "reel time" backup?).

So, for the moment, rather than tell the people paying the bill that they paid $25,000+ for a TK50, we're going with /NOCRC and crossing our fingers, and /VERIFY'ng more often.

Question: can someone enlighten us as to whether there is such a thing as redundancy groups if you use /NOCRC, or what effect /GROUP has if you use /NOCRC? The manual seems to disconnect these somewhat. Is there any way to put redundancy into the backup without /CRC?

Linwood Ferguson
MJ Systems, Inc.
P.O. Box 5223
2564 Ivy Road (22901)
Charlottesville, Va. 22905-0223
804/977-2732

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==================================================================
Note 567.13              BACKUP Hints and Questions        13 of 13
"Frank J. Nagy"                     12 lines    1-JUN-1987 08:48
            -< /GROUP and /CRC are indeed different >-
------------------------------------------------------------------
```

The redundancy group (/GROUP) and cyclic redundancy (/CRC) are indeed separate. The redundancy group, according to the documentation, is a complete XOR block written every N blocks. That is, it seems to be the XOR of the previous N blocks. The redundancy group allows BACKUP to recover a block from the group if it disappears or is unreadable by using the other N-1 blocks of the group with the XOR block. Or, at least that seems to be the theory.

Personally, I think that /NOCRC is probably OK on 6250 bpi tapes. We plan to proceed in this fashion once we get a TU81+ for our LAVC.

Frank J. Nagy
Fermilab
PO Box 500 MS/220
Batavia, IL 60510
(312)840-4935

```
==================================================================
Note 577.18           Questions/Comments on TPU           18 of 18
"Offline Submission"               72 lines   29-JUN-1987 22:06
                -< Customization in Germany >-
------------------------------------------------------------------
```

I am the leader of a software development group and we used a number of editors in the past. Getting our first VAX with EDT in 1983, it was our first full screen editor and all our people loved to work with it.

But then came EVE. It should be the best you ever got, but nobody on our team could/would use it, because the man/machine interface was quite different from our well known EDT.

But there was a small example in the TPU manual to make EVE like EDT. With this example and some additional changes I tailored the keypad interface of EVE to an EDT-like keypad. My people now loved EVE and - with some experience - had the advantages of EVE too.

One of the best features of TPU is that you can extend the functionality of the programs stepwise without changing the previous characteristics. So later I extended EVE by adding several functions:

- First I added typewriter-like tabulator functions, which insert a number of spaces instead of tabs (to get a readable output on a standard printer), working in overstrike and insert mode.

- The next step was to implement functions for the replacement of rectangular text blocks, also working in overstrike/insert mode.

- Then I included paragraph formating tools with semi-automatic hyphenation and right margin justification.

- Then I added tools for pagination.

- And last but not least I added tools for setting up tables of contents and indices.

Finally we got a very powerful online text processing system. For our standard technical paper it fits our requirements on a WYSIWYG editor and nobody in our group will use the old-fashioned Runoff anymore. More and more of our marketing and management people will use this powerful and easy to use tool.

But against all its advantages, TPU has sometimes mysterious and strange behaviour. In particular the pattern and search functions deliver sometimes unexpected results. We discovered a number of faults, and if you write a letter to the source you will get an answer like:

"Thank you for bringing this to our attention. You are right... We plan to fix this problem in a future release of TPU."

Some of the problems we encountered could have been prevented by better documentation, particularly in the case of side effects of the predeclared functions which are not explained (with some exceptions).

If there is any interest in our text processing package we can
hand it out. Unfortunately the program and the documentation is
written in German (procedure names and messages) and probably
someone would have to translate it.

Rudolf Reusch
AEG Aktiengesellschaft
A46 V42
Hafenstr. 32
D 2000 Wedel/Germany

Telephone: (0)40-700-565

Date: May 22, 1987

===
Note 585.8   Anyone use defrag programs?   8 of 10
"Kevin Angley"   15 lines   27-MAY-1987 14:56
                    -< Defrag alternatives >-

For sites that do not have much utilization during the wee
hours, I suggest compressing as part of a nightly backup. We do
an image backup of one of the user disks each night to a scratch
disk. Then, if NO errors occur during that image backup (and be
careful - backup's $SEVERITY is not to be trusted), we dismount
the subject disk, and do a physical backup back to it. Then, we
write the scratch disk off to tape.

Now if RA's had programmable unit plugs, you wouldn't even have
to do that.

As far as third party defraggers go, I prefer to hold off for a
year or two. I heard at Nashville that defrag tools are on
DEC's possible do list for some possible unannounced release
AFTER the next major unannounced not to be mentioned release.

Kevin Angley
3301 Terminal Drive
Raleigh, NC 27604
(919) 890-1416

===
Note 585.9   Anyone use defrag programs?   9 of 10
"Ken A L Coar"   12 lines   28-MAY-1987 11:47
                    -< Ah'm agin 'em >-

My personal opinion is that I don't want to TOUCH a third-party
defragmentation program until the people who DESIGNED the file
system have come up with one. This item has been high on the
SIR list for a long time, as I recall, and if Digital hasn't
done it, I surely don't want to trust my file systems to someone
else's original code..! Particularly since the license would
almost certainly read 'no liability is assumed for loss or
damage to ANYthing - data, files, business revenues, your
hairline or hair colour - stemming from your use of this
product.' If something goes dreadfully wrong, I want someone I
can jump upon with hobnailed boots! :-)}

#k

Ken A L Coar
General Dynamics
Office Systems
12101 Woodcrest Executive Drive
Creve Coeur, MO 63141
(314) 851.4003 (CST)

===
Note 585.10   Anyone use defrag programs?   10 of 10
"Brian Tillman, Lear Siegler, Inc."   4 lines 24-JUN-1987 10:43
                    -< I'd love a defragger, but... >-

The problem I've encountered is that, try as I might, I can't
justify the cost to management, because I can't get a handle on
how much money I'm losing because of decreased throughput.
Inefficiency due to fragmentation is extremely intangible.

Brian Tillman
Lear Siegler, Inc.
4141 Eastern Ave. MS121
Grand Rapids, MI 49518-8727
(616)241-8425

```
==================================================================
Note 590.5              VAX 11/750 Word Processor           5 of 7
"Bob Ainsley"                   12 lines      4-JUN-1987 14:32
                    -< MASS-11 Experience >-
------------------------------------------------------------------
```

We are using MASS-11 on 2 clusters with CPUs ranging from 750 to
8600. MASS-11 is a memory hog. It can be a CPU hog if
something like a table of contents is requested. 15 to 20 users
can bring a 780 to its knees. SPM and VPA seem to confirm that
memory is more critical than CPU. We usually see 85-90% of 16
megs memory used on a dedicated 780 while CPU will be around
50%. Adding more memory (8 megs) seems to help.

There is one bug that we can't seem to isolate. MASS-11 will
sometimes go off into the weeds and get stuck in an infinite
loop, consuming as much CPU that is available. The only
recovery is stopping the offending process.

Bob Ainsley
DSC COMMUNICATIONS
1000 COIT RD
PLANO TX 75075
2145193952

```
==================================================================
Note 590.6              VAX 11/750 Word Processor           6 of 7
"Barry L. Wallis"               13 lines      4-JUN-1987 19:04
                  -< More MASS-11 experience. >-
------------------------------------------------------------------
```

We also use MASS-11. We use it on a VAX-8600 with 20 megs of
memory. I concur that memory seems to be the critical element
(most processes seem to ring in between 1900 and 2000 pages
[2000 pages is our WSQUOTA is 2000]).

The only complaint I have is when one of my users does a large
match/merge operation (to produce 5000 "personalized" form
letters). At that point page faults so badly that I need to
suspend until non-prime time so my other users can get useful
work done!

But all told, I would pick MASS-11 (over WPS and other word
processors) again.

Barry L. Wallis
Fleetwood Enterprises, Inc.
3125 Myers Street
Riverside, CA 92523
(714)351-3682

```
==================================================================
Note 590.7              VAX 11/750 Word Processor           7 of 7
"John Osudar"                   12 lines      4-JUN-1987 20:21
                   -< Another MASS-11 site >-
------------------------------------------------------------------
```

We use MASS-11 on a 785 with 32 megs, and a lot of other
(interactive and batch) activity. I wonder if you've got the
image installed shareable? The current version (6C), when
installed, shows up as global sections totalling 715 pages.
MASS-11 MAIL (if you use it) installs at another 616 pages.
That 715 figure is for the "large" (monolithic) image. I agree
that MASS-11 can be a memory hog, and especially a CPU hog,
particularly when doing formatting for printing. The "infinite
loop" problem that someone mentioned is a bug that we also saw,
though I believe it was in a version before the current one. If
you can feed MASS-11 the memory and cycles, though, it's a good
product -- both our secretarial personnel and scientific staff
use it.

John Osudar
Argonne National Laboratory
9700 S. Cass Ave.
Bldg. 205 A-051
Argonne, IL 60439-4837
(312) 972-7505

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===================================================================
```
Note 599.7   Any PSI users out there?   7 of 9
"Ralph Sierra"   9 lines   7-JUN-1987 17:32
                -< Should I be using PSI? >-

This may be a naive question but here goes (just charge me 5
negative points): What is PSI?

Reply .6 said they were using PSI in a 'classic' application,
for communicating via TYMNET. I have a user that calls various
information services, in some cases, via TYMNET. This user is
currently dialing out using VAXNET. How would this differ from
using PSI?

Ralph Sierra
NKF ENGINEERING INC
12200 SUNRISE VALLEY DRIVE
RESTON VA 22091
703/620-0900

```
===================================================================
```
Note 599.8   Any PSI users out there?   8 of 9
"Jamie Hanrahan"   118 lines   8-JUN-1987 15:33
             -< PSI explained in a (large) nutshell >-

> What is PSI?

PSI (technically, "VAX-11 PSI") is a layered product from DEC
that allows VMS to access packet-switched data networks (PSDNs).

If you're familiar with PSDNs, skip ahead to the section
labelled "WHAT PSI DOES". (Difficult to do with NOTES, I
know...)

ABOUT PSDNs

Without going into the details of packet switching, suffice it
to say that, for the most part, a packet-switched data network
is a privately-owned nationwide data communications network.
The best- known examples in the US are Telenet and Tymnet. (In
most other countries there is just one PSDN, and like the phone
systems, they are run by each country's telephone and postal
authority. Also, there are such things as private PSDNs,

operated by and for a single company.) A PSDN allows you to
connect multiple systems at various sites around the country or
the world. Depending on the amount of traffic and the number of
connections you need, there can be a large cost savings over
leased lines.

Suppose you have systems in Boston, Los Angeles, Seattle, and
Houston, and you want each connected to all the others. You
would need six long-distance leased lines. Or, you could sign
up with a PSDN. A leased line runs from each system to one of
the PSDN's nearby switches (four lines total). Each of your
systems is assigned an "address" by the PSDN, quite analogous to
a phone number. When one system wants to talk to one of the
others, software in the first tells the PSDN to place a "call"
over the PSDN to the target system's address. When the target
system answers ("confirms the call"), the two systems can
communicate just as if there was a leased line between them.
Naturally you can set things up so that your system will only
accept calls from certain other addresses (presumably the
addresses of your other sites).

Multiple calls can be multiplexed over a single connection to
the PSDN, so all systems can be simultaneously connected to all
others (within reason; there are some large limits on the number
of simultaneous calls) with just one local leased line per
system.

Charges: You pay for the local leased lines, plus a monthly
service fee, plus a charge for the amount of data (actually, the
number of packets) you send. None of the charges are related to
the distances between systems. The rate structures are such
that if you have several sites to be connected, and you wouldn't
use a leased line to more than, say, 10% capacity (remember this
includes evening and weekends, during which time many leased
lines are idle), you may well save money by using a PSDN. If
you have just two systems to connect you may find that the cost
of the single long-distance leased line is less than the cost of
the two local leased lines plus the PSDN's monthly fees. (That
was our experience.)

Another use for a PSDN is to support people calling into your
system with async terminals from around the country. You can
set up a bunch of modems and let them make long-distance calls;
or, you can hook up to a PSDN. Instead of calling your system
directly they call a (usually) local number for the PSDN's
nearby "X.29 PAD" (Packet Assembler/Disassembler). They then
tell the PAD (via their terminal keyboard) the PSDN address of

your machine. The PAD places a PSDN "call" to your machine, and software in your machine creates a virtual terminal, much like a DECnet remote terminal, in response to this call. You (not the caller) pay for line time on the PAD, plus (I believe) a charge for the amount of data. This is much cheaper than the equivalent long-distance phone line time would be, for almost any distance, and line errors are confined to the hop from the caller's modem to her local PAD (everything else is checksummed and corrected if errors are noted). The downside is that the round-trip time is considerably longer than for a regular dialup connection; use of things like screen editors, which require fast response to individual keystrokes, is severely hampered.

WHAT PSI DOES

VAX-11 PSI provides the software to place and accept calls and otherwise speak the proper protocol (X.25 over HDLC) to the PSDN. PSI provides four interfaces to users and programmers:

1. A $QIO interface for programmers, quite similar in function (though, of course, different in detail) to the $QIO interface for DECnet task-to-task communication. Processes on VAXes connected to the PSDN can communicate by using this feature of PSI. No other software (e.g. DECnet) is required.

2. X.29 (remote terminal) support. PSI can accept "calls" from PADs, allowing remote terminal users to connect to your system via the PSDN. A user logged into your system (usually locally, but not necessarily) can also place *outgoing* "remote terminal" calls to *other* systems on the PSDN (assuming that those systems have X.29 remote terminal support).

3. PSI MAIL. Users on machines connected to a PSDN can use VMS MAIL to send messages to each other, again without needing DECnet.

4. DECnet data link mapping (DLM). If you have DECnet and PSI on systems that are connected to a PSDN, DECnet can place PSDN "calls" between the systems. (The name "data link mapping" refers to the idea that the software "maps" a PSDN "call", or "virtual circuit" (a requested and confirmed call creates a virtual circuit), into a DECnet data link.) Then DECnet can use the data link for all the usual DECnet stuff: Task-to-task communications, file transfers, remote terminals, VMS MAIL, etc., etc.

Naturally, all of the above traffic can ride on the single leased line between your system and the PSDN's local switch.

Does that help?

(Experts: What have I missed or gotten wrong?)

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619-565-1865

===
Note 599.9   Any PSI users out there?   9 of 9
"Jamie Hanrahan"   29 lines   8-JUN-1987 15:53
                       -< PSI vs. VAXNET? >-

Oops, almost forgot your other question:

        I have a user that calls various information services,
        in some cases, via TYMNET. This user is currently
        dialing out using VAXNET. How would this differ from
        using PSI?

Right now your user is, presumably, using VAXNET* to dial out to TYMNET's nearby (I hope it's nearby) X.29 PAD. If you connect your VAX to TYMNET and install PSI (and there's no point in doing one without the other), your user could do this instead:

        $ SET HOST/X.29 other_system_name_or_psdn_address

Benefits would be immunity from line noise (since every serial link is now a checksummed-and-corrected link) and, possibly, greater effective line speed, as the local hops to the PSDN switches are generally 9600 bps or more. But the cost would be exorbitant if this was all you were doing with the PSDN connection.

------

* (Footnotes in NOTES? Oh, well) Someone is sure to ask about VAXNET. VAXNET is a package that has appeared on several DECUS VAX SIG tapes. It is a very, very fancy SET HOST utility that includes autodialing capability for various modems, file transfer support, and many other features. It is quite a bit

more efficient than the regular VMS SET HOST, according to reports.

Jamie Hanrahan
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619-565-1865

```
================================================================
Note 637.1              New Version of MRGATE              1 of 2
"Ken A L Coar"               13 lines   28-MAY-1987 10:42
              -< Not quite, for us at least >-
----------------------------------------------------------------
```

> Another neat thing to do with MRGATE is to have your VMSmail automatically sent to ALL-IN-1 !! You can do this by setting the VMSmail forwarding address to
>
>   A1_user::A1::MRGATE

That doesn't work for us, because our ALL-IN-1 usernames are of the form 'lname,xx' (mine, for example, is COAR,KA). In order to get this to work, we use

     MRGATE::"A1::alusername" e.g., MRGATE::"A1::COAR,KA"

#k

Ken A L Coar
General Dynamics
Office Systems
12101 Woodcrest Executive Drive
Creve Coeur, MO   63141
(314) 851.4003 (CST)

```
================================================================
Note 637.2              New Version of MRGATE              2 of 2
"Jack Patteeuw"             13 lines   1-JUN-1987 06:52
              -< MAILUAF.COM Warning ! >-
----------------------------------------------------------------
```

Ken is very much correct ! In fact we have a A1 node on our network that assigning ALL-IN-1 user names in the format "Lname, Fname". Note the SPACE in between !

Just a warning for all you "System Manglers" out there. If you try and use MAILUAF.COM to set another users autoforward address be warned that the quotes used in .1 will screw up the database.

This has to do with the way the .COM file re-builds the record to be written out to MAILUAF.DAT. Best protection is to double check the entry with a SHOW command. If it is screwed up, you will have to log into that account and fix via MAIL or fix the .COM file to properly handle the quotes (which I have not had time to do yet).

Jack Patteeuw
Ford Motor Co.
Electrical and Electronics Division
31630 Wyoming
Livonia, MI   48150
313-323-8643

```
================================================================
Note 642.5            print&batch complaints             5 of 10
"Brian Tillman"             12 lines   24-JUN-1987 09:33
              -< On the whole, they seem to work >-
----------------------------------------------------------------
```

RE: < Note 642.0 by NODE::US133673 "John Osudar" >

> As long as we're complaining about the queue manager/job controller/symbionts (e.g. note 630)...

We find the Separation modules and the Setup modules generally work well. However, I do have to disagree with the form-level setup module. It comes out in front of every file in a job, not just when the form is changed, which seems to me to be all that's necessary. Notes 619 et. al. also address this issue for non-DEC lasers, which fits us as well.

Brian Tillman
Lear Siegler, Inc.
4141 Eastern Ave. MS121
Grand Rapids, MI 49518-8727
(616)241-8425

```
=================================================================
Note 642.6              print&batch complaints           6 of 10
"Tony Carter"                        4 lines  25-JUN-1987 07:39
                 -< Form-level setup modules useful >-
-----------------------------------------------------------------
```

We use form-level setup modules with our LN03's. The setup
module resets the laser printer to a known state. We had users
changing all sorts of printer parameters and not resetting after
they were done. This way it is transparent to the users.

Tony Carter
P.O. Box 846
Middleton, MA 01949
(617) 245-6600

```
=================================================================
Note 642.7              print&batch complaints           7 of 10
"John Osudar"                        6 lines  25-JUN-1987 15:57
                         -< re: 642.6 >-
-----------------------------------------------------------------
```

That's what "job reset modules" are for -- to reset your printer
to a known state after a job finishes. The form-level stuff in
intended to set up new characteristics specific to the form
being used. While you can obviously put things anywhere you
want, it's a lot easier to put reset stuff in the job reset
modules, setup stuff in the setup modules, etc.

John Osudar
Argonne National Laboratory
9700 S. Cass Ave.
Bldg. 205 A-051
Argonne, IL 60439-4837
(312) 972-7505

```
=================================================================
Note 642.8              print&batch complaints           8 of 10
"Tony Carter"                        6 lines  26-JUN-1987 08:02
                         -< Re: 642.7 >-
-----------------------------------------------------------------
```

Using "job reset modules" is fine if you know that all files in
one job are to be printed with the same characteristics. But if
one file is to be printed in 132 columns and another in 80
columns then it is not good enough. Though your point is well
taken. It may be worth putting up with that problem to put
things where they really belong. I'll check it out.

Tony Carter
P.O. Box 846
Middleton, MA 01949
(617) 245-6600

```
=================================================================
Note 642.9              print&batch complaints           9 of 10
"Tony Carter"                        4 lines  28-JUN-1987 12:38
                -< Form-level modules vs Job reset modules >-
-----------------------------------------------------------------
```

Using the LN03 reset escape sequence in the job reset module
causes an extra page to be ejected. Using it in the form-level
module works fine. There may be a work around for this, but I
haven't figured it out yet.

Tony Carter
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Middleton, MA 01949
(617) 245-6600

```
====================================================================
Note 642.10            print&batch complaints            10 of 10
"Chris Erskine"                   7 lines   29-JUN-1987 12:17
          -< Repeat of how to eliminate the extra pages >-
--------------------------------------------------------------------
```

A repeat of replies from myself and others. By putting a <FF>
on the first line of the RESET module with escape sequences also
on the first line appears to fix the problem. I have run this
on an LN03 without problem but have not been back to my other
site to test on an LN01 but I think the extra page is from the
spooler so the type of printer should not matter.

Chris Erskine
6001 Adams Rd.
Bloomfield Hills, MI   48013
(313) 258-4049

```
====================================================================
Note 644.15          Wanted: MAIL improvements          15 of 18
"John Osudar"                    20 lines    4-JUN-1987 20:37
               -< another wish list item >-
--------------------------------------------------------------------
```

Just to add to my previous list of desired improvements: VMS
MAIL lets you SET FORWARD your mail -- and this is great, since
I have accounts on four or five different VAXes located in
different   places.   However, automatic forwarding could be
better: first of all, it ought to be trivial for MAIL to
continue to broadcast a message telling me (if I'm logged in, of
course) that someone just sent me mail on node ABC, even though
that mail was forwarded to node XYZ as I directed. (In fact, it
should be easy to remind me at the same time that the forwarding
actually happened!) This would be a low-cost feature that would
help users get more timely notification of their messages, and
can be disabled by any user that doesn't want it. The other
thing I don't like about forwarding probably can't be fixed
without store-and-forward, which I don't think belongs in the
basic VMS MAIL (although I wouldn't complain if someone gave it
to me!) -- and that is the problem that, if the node to which
your mail is forwarded can't be reached, the message is lost.
This can be really confusing for someone who thinks they're
sending a local mail message and is told that the node is
unreachable.   However, as I said before, I don't expect an easy
fix for this one...

John Osudar
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(312) 972-7505

```
====================================================================
Note 644.16          Wanted: MAIL improvements          16 of 18
"Jamie Hanrahan"                 15 lines    8-JUN-1987 14:37
              -< PMDF can do store-and-forward >-
--------------------------------------------------------------------
```

You can get store-and-forward for VMS mail at low cost by using
PMDF (Pascal Memo Distribution Facility).   PMDF is also the
transport mechanism we've selected for the "VMS User's Network"
(formerly Usenet-for-VMS; see note 511), so if you're interested
in that you need PMDF anyway. To get PMDF, send $50 to:

            Ned Freed
            The PMDF Project
            Computing Services
            Harvey Mudd College
            Claremont, CA 91711

It comes on a magtape with all sources, doc. as .RNO and .MEM
files, and hardcopy documentation as well. Highly recommended.

Jamie Hanrahan
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619-565-1865

===
Note 660.0   Applications software standards   26 replies
"Kevin Angley"   70 lines 27-MAY-1987 15:05

We are in the process of putting together an "applications
software" standard which we will at least try to get third party
software suppliers to adhere to. I am putting it in this forum
to generate some discussion: Are these reasonable/practical?
Can you think of other standards? Here is the condensed first
draft:

Most writers of application software develop their application
and installation procedures with the naive notion that their
package is the only package to run on the system. They make
assumptions about the practicality of "system" level
modifications, logical names, and privilege. Because we must
maintain multiple applications, often for similar purposes, and
because many applications are actually used by a small
percentage of the user population, it is mandatory for us to
provide support/changes to a user's process for a particular
application only if that user is going to use that application.
This means that all logicals, verb definitions, symbols, etc.
will be done on a per process basis, upon the user's request.
We have implemented a "SUPPORT" command procedure which does the
necessary setup for each application.

The application software standards follow. In some cases, minor
exceptions can be made as long as the vendor is willing to
cooperate in providing the software support necessary to comply
with the intent, if not the letter of the standards. VMS and
layered products from Digital are exempt.

    o Command verbs will be added on a per process basis via
       SET COMMAND's rather than modification of the
       network-wide DCLTABLES.

    o Symbol definitions will not be made in the cluster-wide
       SYLOGIN.COM. Rather, symbol definitions can be made in
       the application setup command procedure or in command
       procedure(s) nested in the application setup command
       procedure.

    o Logical names may be entered only in the process
       tables. Group and system logical name tables, or
       user-created logical name tables which require
       privileges to create cannot be used.

    o The application software must reside in directories of
       its own, and may not place any files in "system
       directories", including SYS$SYSTEM, SYS$HELP,
       SYS$LIBRARY, SYS$MANAGER, etc.

    o Applications may not depend on users having privileges
       beyond TMPMBX and NETMBX.

    o Applications may not require that images be installed
       with any privileges. Exceptions may be made for images
       that require privilege to interact with dedicated
       hardware (e.g. a device driver for a graphics
       station). In these exception cases, source code must
       be provided, and the image built from this source at
       our site.

    o Logical names must be of the form "xxx_name" where xxx
       is a unique vendor designation, the underscore must be
       present, and name is any acceptable name not containing
       "$".

    o Magnetic tape written in VMS "backup" format (either
       6250 or 1600 BPI) is the preferred distribution media.
       Files-11 formatted tapes, TK50 tape cartridges, or RX50
       diskettes may also be acceptable. Distribution media
       are kept onsite as long as they are current level, and
       will thereafter be destroyed if requested by the
       vendor. We do not return media to the vendor under any
       circumstances.

Kevin Angley
3301 Terminal Drive
Raleigh, NC 27604
(919) 890-1416

To be continued in next issue . . .

DECUS PROGRAM LIBRARY

DECUS NO: V-SP-62 **Title:** PC SIG Tape Copy **Version:** May 1987

Author: Various

Submitted by: Fritz Howard **Operating System:** MS/DOS V2.11 **Source Language:** C, TURBO PASCAL **Memory Required:** 256KW **Software Required:** KERMIT **Keywords:** Utilities - MS/DOS

Abstract: With these programs you can use your computer to create the ultimate desktop. All of the programs have been tested and work on the machine noted. Where an author requests certain restrictions be observed, DECUS nor I take any responsibility. It is your responsibility to follow the authors' instructions.

To use: Transfer to your PC using KERMIT or some other file transfer protocol. DO NOT use VAX/VMS Services or DECnet DOS as these files were uploaded to a VAX using Kermit. Unarchive using ARC520.COM, and have fun.

Some of the programs included are:

CALRB.ARC	Calendar manager (appointments, etc) uses windows.
HMS.ARC	Home Management System for the Rainbow.
MACPIX.ARC	Make your Rainbow look like a Mac. Fool your friends.
MLRB.ARC	Mailing List program. Maintain a mail list. V2.3.
RBE.ARC	Rainbow Emulator for the IBM. Run Rainbow programs.
RX50.ARC	Read/write Rainbow RX50 diskettes on a PC/AT.
TIMER.ARC	Constant clock in the corner of your screen.

Notes: Operating system MS/DOS V2.11 or higher required.

Complete sources not included.

Media (Service Charge Code): 600' Magnetic Tape (MA) **Format:** VMS/BACKUP

DECUS NO: V-SP-63 **Title:** Miscellaneous PC Tool Collection #1 **Version:** V1, May 1987

Submitted by: Glenn Everhart, Ph.D. **Operating System:** MS/DOS, OTHER, VAX/VMS **Source Language:** C, FORTRAN 77, FORTRAN IV, PASCAL **Keywords:** Editors, Spreadsheet

Abstract: This tape contains a variety of tools mostly for the MS-DOS environment, plus a few for VMS and for Amiga. These represent tools obtained from public domain sources other than the PC-SIG, and hence do not properly belong in the "PC-8088 Collections". Many of these programs originate in the PC-Blue Library and include a huge grab bag of MS-DOS utilities. Also present is Micro GNU Emacs Version 1b complete, including VMS, MS-DOS, AmigaDos, and other versions.

The Amiga utilities are a "core functionality" set permitting an Amiga to become an inexpensive 3D CAD/graphics workstation in a mixed environment, offering multitasking, VT100, TEK 4010, and other terminal frontends, and 704 by 470 pixel graphics resolution with up to 4096 colors at a time.

AAAFILES.TXT files in the major directories give further information on particular files.

Complete sources not included.

Media (Service Charge Code): 2400' Magnetic Tape (PA) **Format:** VMS/BACKUP

DECUS NO: VAX-255 **Title:** JMU Utility Programs **Version:** V1.0, April 1987

Submitted by: Mike O'Neill, James Madison University, Harrisonburg, VA **Operating System:** VAX/VMS V4.4 **Source Language:** VAX-11 FORTRAN **Software Required:** FMS **Hardware Required:** VT100 or emulator **Keywords:** Bulletin Board, Calculators, Mail, Utilities - VMS

Abstract: This submission consists of three utility programs in use at James Madison University. They consist of an FMS based Bulletin Board System, an FMS based calculator program that uses the VT keypad, and a checkmail utility that allows you to check to see if someone has read a mail message that you sent to them. We are currently running these programs on a cluster consisting of an 8650, 11/785, and 11/780 with common sysuaf, netuaf, and vmsmail files.

The bulletin board system is a graphics based menu driven bulletin board that utilizes the cursor keys and return key for command selection. It features online help, multiple categories, tracking of unread notices, internal access to mail and the edt editor, automatic identification of notice owners, and automatic notice expiration.

The calculator program utilizes the VT keypad to provide a four function calculator with memory. It requires FMS to operate.

The mailcheck program allows a user to check to see if someone has read a mail message that they had sent. It lists notice dates and subjects for all unread notices sent

from the person running the program to the person being inquired about. This version also supports a cluster environment with common sysuaf and vmsmail files.

Notes: Operating system VMS 4.0 or later required.

Media (Service Charge Code): 600' Magnetic Tape (MA) **Format:** VMS/BACKUP

DECUS NO: VAX-257 **Title:** Performance Monitoring Tools **Version:** V1.0, May 1987

Submitted by: John F. Priebe, Edison State College, Piqua, OH **Operating System:** VAX/VMS V4.4 **Source Language:** DCL, VAX FORTRAN **Keywords:** Accounting

Abstract: This submission contains performance monitoring tools used for tuning VAX systems and extensive notes on how to use the tools for tuning. Included are DCL command files to automatically run the MONITOR utility every day, produce reports from the ACCOUNTING utility, and a program written in both DCL and FORTRAN which lists the images being run by all users of the system.

Media (Service Charge Code): 600' Magnetic Tape (MA) **Format:** VMS/BACKUP

DECUS NO: VAX-258 **Title:** KILL **Version:** April 1987

Submitted by: Connie R. Minnick, James Madison University, Harrisonburg, VA **Operating System:** VAX/VMS V4.4 **Source Language:** VAX-11 FORTRAN **Software Required:** VAX/FMS - Forms Management System **Keywords:** Utilities - VMS

Abstract: This is a program designed to enable an operator or privileged user to affect another process on the system without having to look up and use the process PID. The only requirement to execute this program is that VAX FMS must be installed.

FMS is used to set up a screen where the current processes will be displayed. The operator may then use the arrow keys to

"scroll" through the processes and perform certain functions on the selected process.

The process data information includes:

USERNAME	TERMINAL
PROCESS NAME	ACCUMULATED CPU TIME
PROCESS STATE	PROCESS AGE or CONNECT TIME
PROCESS TYPE	

The functions currently implemented are:

ABORT ==}	Aborts the selected process
MONITOR ==}	Monitors the selected process with SHOW PROC/CONTINUOUS
TOPCPU ==}	Displays the TOPCPU processes on the system

Other functions such as SUSPEND, RESUME and CHANGE PRIORITY can easily be built into this program as well.

By default, all critical system processes will be filtered out and not displayed. This will avoid potentially aborting such processes. There are two arrays used for this purpose that should be modified for each application. One array lists the critical processes to be filtered and the other lists usernames for which you want to override the filtering procedure (i.e., users with SYSPRIV).

Media (Service Charge Code): 600' Magnetic Tape (MA) **Format:** VMS/BACKUP

DECUS NO: VAX-259 **Title:** MsgInc **Version:** V1.0

Author: Donald R. Gummow, Monsanto Co, St. Louis, MO

Operating System: VAX/VMS V4.4 **Source Language:** VAX FORTRAN **Keywords:** Utilities - VMS

Abstract: MsgInc is used to create include files from the object files produced by the VMS Message Utility. It supports C, FORTRAN and PASCAL, but you could always write a new output routine if you want to support a new language.

Some of the modules included on the tape are:

MsgInc.for	The source code for the program.
MsgInc.Table.cld	The CLD file that defines the command syntax.
MsgInc.KeyTable.mar	The MACRO that sets up the parse tables.
MsgInc.Messages.msg	Message Utility source.
LibForeign.mar	Utility to parse foreign DCL commands.
LibParse.mar	Utility to do F$Parse stuff.
StrLength.mar	Utility to get effective length of strings.

Restrictions: Noted in documentation.

Media (Service Charge Code): 600' Magnetic Tape (MA) **Format:** VMS/BACKUP

DECUS NO: VAX-261 **Title:** IdxTeX & GloTeX **Version:** V2.0, April 1987

Author: Richard L. Aurbach, Monsanto Company, St Louis, MO

Operating System: VAX/VMS V4.4 **Source Language:** C **Software Required:** LaTeX V2.09

Abstract: The GloTeX program is used to automate the generation of a glossary in a LaTeX document. It uses the .glo file generated by the makeglossary command and one or more Glossary Definition Database Files to create a file which is input in the document to generate the glossary.

The IdxTeX program is used to automate the generation of an index in a LaTeX document. It uses the .IDX file generated by the makeindex command to create a file which is input in the document to generate the index.

Version 2.0 improves the visual appearance of the index and adds support for page ranges, index cross references, and the genera tion of a master index.

Media (Service Charge Code): User's Manual (EA), 600' Magnetic Tape (MA) **Format:** VMS/BACKUP

DECUS NO: VAX-264 **Title:** FEDT **Version:** May 1987

Submitted by: Jack Schwartz **Operating System:** VAX/VMS V4.2 **Source Language:** MACRO-32 **Software Required:** EDT **Keywords:** Editors

Abstract: This program offers EDT under controlled higher process priority. Original priority is restored upon image termination. Much of the code deals with making sure original priority is restored when the image dies with an error condition. The program must either be installed with ALTPRI privilege or run from a process which has it.

The program takes advantage of calling EDT by allowing users to spawn a subprocess to execute another command without leaving the editor; the spawned process is at the original priority. The interface allows for both execution of single spawned commands and for spawning a new DCL shell from which several commands may be issued. The full EDT commandline is accepted by this program. LIB$TPARSE is used to parse the commandline input. A complete, unambiguous set of error messages is included in the program.

The program also maintains the screen, clearing it when returning from spawned subprocesses and at image exit. It has separate scrolling reset capabilities for VT100 and VT200 series terminals.

Restrictions: Must be installed with ALTPRI privilege or run from an account which has ALTPRI privilege. Program requires VMS Version 4.X or above for use of calling EDT.

Documentation not available.

Media (Service Charge Code): 600' Magnetic Tape (MA) **Format:** VMS/BACKUP

DECUS NO: VAX-265 **Title:** A Generic User Interface **Version:** 1A, May 1987

Submitted by: Barry L. Wallis, Fleetwood Enterprises, Inc., Riverside, CA **Operating System:** VAX/VMS V4.1 to V4.4 **Source Language:** VAX COBOL **Memory Required:** Will run in a minimum configuration **Software Required:** SCOPE (can be changed to use other screen management systems). **Keywords:** Interface Routines, Utilities - VMS

Abstract: The Generic User Interface (UIF) is a menu oriented user interface with the following features:

. DCL procedures can be run interactively or in batch with any batch qualifiers.
. Automatic parameter substitution and validation (for batch or interactive procedures).
. Security by VAX USERNAME.
. Tree structured menu system with multiple trees.
. Non-menu shortcut method of executing procedures.
. Can be run in captive mode.
. Any DCL procedure (including any third party packages or user written application) can be run.
. A single VMS subprocess is reused for every active user (i.e., two process slots are required for each user).

These routines were described in the DECUS Symposium Session, "A Generic User Interface", given at the Spring 1986, Fall 1986, and Spring 1987 DECUS Symposia.

Media (Service Charge Code): 600' Magnetic Tape (MA) **Format:** VMS/BACKUP

DECUS NO: VAX-266 **Title:** NO__FRAGMENTS, SMART and XMODEM__AU **Version:** 1.0, April 1987

Submitted by: David Swanger, Auburn University, Auburn University, AL **Operating System:** VAX/VMS V4.3 - V4.5 **Source Language:** VAX FORTRAN

Abstract: NO__FRAGMENTS is a program that performs pseudo on-line disk compression for VAX systems operating under the VMS operating system. It will make each file in a particular directory tree contiguous if there is sufficient contiguous space available on the disk. If the chosen directory tree is the main 000000 directory, then all of the files on the disk will be restructured.

SMART is a semi-intelligent program that displays all of the interactive processes on a VAX next to the Username for each process. SMART reads all of the users on the system into an array using a series of LIB & GETJPI calls, the array is sorted alphabetically by username and printed to the terminal.

XMODEM__AU is a revised version of Jim Belonis' XMODEM 5.60. The user interface to the program has been rewritten. XMODEM is a VAX to VAX file transfer program.

Notes: XMODEM__AU is a revision of the program XMODEM by Jim Belonis.

Media (Service Charge Code): 600' Magnetic Tape (MA) **Format:** VAX/ANSI

NEW LIBRARY PROGRAMS AVAILABLE FOR THE PROFESSIONAL-300 SERIES OF COMPUTERS

DECUS NO: PRO-169 **Title:** PRO 2780/3870 Communications Applications **Version:** 1.2, May 1987

Submitted by: Digital Equipment Corporation **Operating System:** P/OS **Hardware Required:** RCD5X Hard Disk **Keywords:** Utilities - P/OS

Abstract: PRO-2780/3780 is an application for the Professional 300 series of personal computers that provides communications to systems with capabilities similar to IBM 2780 and 3780 remote batch terminals. The product runs under the P/OS Hard Disk Operating System.

PRO-2780/3780 operates using a single, point-to-point communications line. This line can be half- or full- duplex, and transmission speeds of up to 9600 bits per second can be achieved on an otherwise idle system.

The user interacts with the product by means of a hierarchy of menus and forms. The product also supplies the user with help information that provides a brief description of the product and its menus.

The communications discipline implemented by PRO-2780/3780 is a subset of IBM's Binary Synchronous Communications (BSC) protocol that uses EBCDIC transmission code. Horizontal format control records can be received and processed. A subset of vertical format control escape sequences is supported, specifically single, double and triple space, form feed and space suppress. Any block addressable storage device supported by P/OS can be used as a source of transmission files. Both fixed length (80 character card image) and variable length files can be transmitted as EBCDIC (automatically translated from ASCII) or binary data (no translation). BSC control characters are automatical ly added to the data before transmission and stripped on reception. Any block addressable storage device supported by P/OS can be used to receive files. Optionally, received print files can be sent to a printer, if one is attached to the Professional System.

The following 2780/3780 remote batch terminal features are supported:

. 2780 multiple record transmission option
. Transparent mode
. 3780 space compression
. Variable vertical and horizontal forms control

Notes: Sources not available.

Documentation available in hardcopy only. Sources not included.

Media (Service Charge Code): User's Manual (EC), One RX50 Diskette (JA) **Format:** FILES-11

NEW LIBRARY PROGRAMS AVAILABLE FOR THE PDP-11 COMPUTER FAMILY

DECUS NO: 11-870 **Title:** ECR: Enhanced Console Routine **Version:** V1, April 1987

Submitted by: Frank R. Borger, Michael Reese Hospital, Chicago, IL **Operating System:** IAS V3.1 **Source Language:** MACRO-11 **Keywords:** Utilities - IAS

Abstract: ECR is an intelligent monitor console routine. It is an enhancement to the AUX program as originally written by Robin Miller for operation on RSX-11. It provides the following enhancements.

. The last twenty command lines can be recalled and edited.
. Often used commands are defined by numeric keypad keys.
. Up to 48 command line mungers can be defined. Typical uses for these would be to define a command that expands:

KEF NAME   to KED NAME.FOR
FOR NAME   to F77 NAME,NAME/-SP/CR=NAME
LINK NAME   to TKB @NAME.CMD

. A default file name option lets ECR remember the last name used and use it again if no name is given in the command. This would further reduce the commands required to edit, compile and link a fortran program to the following:

KEF NAME
FOR
LINK

As an added goodie, we have included the program QUOTE. This is a cookie/dammit program that provides notable quotations.

Notes:Operating system IAS V3.1 or higher is required.

Media (Service Charge Code): 600' Magnetic Tape (MA) **Format:** BRU

DECUS NO: 11-871 **Title:** IAS KERMIT **Version:** April 1987

Submitted by: Frank R. Borger, Michael Reese Hospital, Chicago, IL **Operating System:** IAS V3.1, V3.2 **Source Language:** MACRO-11 **Keywords:** KERMIT

Abstract: IAS kermit is Brian Nelson's RSX-11 KERMIT. There are three notable changes made to bring this version up under IAS.

. Bruce C. Wright made the necessary changes to use version 1.8 RMS11 file I/O. As such, it can not do xxx*.* type wildcards but it can do *.*. This will be the case until IAS supports version 2 of RMS.

. Due to the lack of a get size of readahead qio request under IAS, the E P A connect code did one qio per character reads. This produced an intolerable burden on the system, and limited operation to 300 baud. Changes to the connect code done at Michael Reese used reads with subsequent mark times followed by a kill io, (which returned the partial read.) This allowed operation nicely at 1200 baud, (but has not been tested above that speed.)

. The current IAS version is a couple of tapes behind Brian's RSX-11 version. We will make every attempt to prepare a version that is only 1 tape behind Brian's work for subsequent DECUS tapes.

Notes: Operating system IAS V3.1 or higher is required.

Restrictions: TTY Handler may have to be rebuilt.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: BRU

DECUS NO: 11-873 Title: FORTRAN Aids and Tools Version: V1, April 1987

Submitted by: Richard Neitzel Operating System: RSX-11M V4.2 Source Language: FORTRAN 77, MACRO-11 Keywords: FORTRAN, File Management, MACRO, Tools - Applications Development, Utilities -RSX-11

Abstract: There are five major categories of items included in this package.

. Routines to access and manipulate the file structure.

. Some SST handlers.
. A software fix for a DL device hardware bug.
. An undeletion utility.
. A miscellaneous grab bag.

Some of the programs in the grab bag are as follows:

WIND.FTN	This program takes input values for temperature and wind speed and returns the wind-chill temperature.
SEARCH.FTN	The user enters in a wildcard file specification, with optional switches that prompt him for a string to locate and the number of lines from the file to print on the terminal, and the program then displays the matching files on the terminal (up to 99 lines).
COMPS.FTN	This program is very useful for verifying that the executable version of a file is identical to the master for software quality assurance purposes.
MACLIB.ULB	This is a collection of assorted MACRO routines that all are callable from FORTRAN. They per-

form various functions that are either impossible from FORTRAN, such as performing bit reversals or push/popping items onto the stack, or are easier and faster in MACRO, such as converting lower case to upper case or changing an odd into an even integer.

Media (Service Charge Code): One RX02 Diskette (LA) Format: FILES-11, 600' Magnetic Tape (MA) Format: FILES-11

DECUS NO: 11-874 Title: DECUS "C" Compiler Changes Version: 1.0 April 1987

Author: James Conroy, Unisys Corp, St. Paul, MN55164

Operating System: RSX-11M-PLUS V2.1 Source Language: C, MACRO-11 Software Required: DECUS NO's 11-SP-18, 11-SP-90, and 11-SP-92.

Abstract: The new "C" compiler, assembler and runtime libraries support I and D space. It was built from the DECUS Fall'85 RSX SIG tape (11-SP-90). Added to it were the Australian submissions for split I and D space from the Spring '86 (11-SP-92). The Australian changes can be found in UICs [272,34], [272,35], and [272,37] on that tape. Only the changes for I and D space were used. The double-precision arithmetic changes were not included. The merging of these two tapes has resulted in the use of these UICs:

. [5,4]	compiler and assembler modules.
. [5,15] and [5,16]	C.OLB library routines.
. [5,24]	CX.OLB library routines.

The resultant compiling system did not work well and we were forced to modify several programs. Specific changes to each program are listed in the edit history at the beginning of the program.

Notes: Modifications to use split I & D space.

Documentation may or may not be on magnetic media.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: BRU

DECUS NO: 11-875 Title: RSTS/E 2780 Version: 3.0, May 1987

Submitted by: Digital Equipment Corporation Operating System: RSTS/E V6B or later Memory Required: 16K Bytes Hardware Required: DUP-11, KG11 for UNIBUS, DUV-11 for QBUSS Keywords: Emulators

Abstract: The RSTS/E-2780 software emulates the communications protocol of an IBM 2780 device, while running as a user job on a suitably configured RSTS/E system.

The RSTS/E-2780 transmits files stored on any medium supported by the RSTS/E Operating System. It stores files on any output medium supported by RSTS/E except DECtape. Magnetic tape operation can cause timeout errors, unless the tape is positioned at the start of the file when transmission or reception is about to begin. Files can be printed directly on any line printer supported by the host operating system.

RSTS/E supports a spooling feature that allows users running with the RSTS/E-2780 to queue one or more files for subsequent transmission.

The processing requirements of the 2780 protocol can perceptibly degrade RSTS/E response time during transmission or reception.

Notes: Will run on PDP 11-23 or Micro PDP-11 by answering system generated question 2780 with a YES/Q. Program also works on Version 9.0 of RSTS/E.

Assoc. Documentation: The RSTS/E 2780 RMT CMP System Installation Notes (AA-1151A-TC) and RSTS/E 2780 RCS User Guide (AA-2675B-TC) are available through Digital Equipment Corporation not through DECUS. They may be obtained by contacting your local Digital Sales Representative. Documentation not available. Sources not included.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: DOS-11

DECUS NO: 11-876 Title: RSTS/E 3271 Protocol Emulator Version: 2.1, May 1987

Submitted by: Digital Equipment Corporation Operating System: RSTS/E Version 8.0 Memory Required: 4K Bytes Hardware Required: DUP11-DA, KMC11-A Keywords: Emulators

Abstract: The RSTS/E 3271 Protocol Emulator permits application programs written in BASIC-PLUS, BASIC-PLUS 2, COBOL, or DIBOL running under the RSTS/E Operating System to communicate interactively with user jobs running on an IBM 370 or 303x host system. The IBM application program can run with IMS/VS, CICS/VS, or TSO. The package makes it possible to implement applications performing remote, on-line access to IBM Data Bases for data entry, retrieval, and update, or file transfer.

The RSTS/E 3271 Protocol Emulator is a communications product only. It does not perform IBM 3277 video display emulation nor does it respond to the SENSE, COPY, and READ BUFFER commands.

The communications discipline used by the RSTS/E 3271 Protocol Emulator is the 3271 subset of IBM's Binary Synchronous Communications (BSC) protocol that uses EBCDIC code. Specifically, this subset of BSC supports operation of full- and half-duplex leased lines, in either point-to-point or multipoint configurations, at transmission speeds up to 9600 bits per second. The RSTS/E

3271 Protocol Emulator does not support switched facilities, contention line control, or transparent BSC capability. It can share a multipoint line with control units functioning in nontransparent mode only.

Assoc. Documentation: The RSTS/E 3271 PE Users Guide (AA-D365B-TC) and RSTS/E 3271 TE Release Notes (H474C-TC) are available through Digital Equipment Corporation not through DECUS. They may be obtained by contacting your local Digital Sales Representative.

Restrictions: Will not run on PDP-11/23 or Micro PDP-11. Requires RSTS/E Version 8 or later.

Documentation not available. Sources not included.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: DOS-11

DECUS NO: 11-877 Title: RSTS/E HPE 2780/3780 Version: V1.1 MAY 1987

Submitted by: Digital Equipment Corporation Operating System: RSTS/E Version 8.0 or later Memory Required: 4K Bytes Hardware Required: UNIBUS based RSTS/E configuration with RMS support with DUP11-DA and KMC11-A Keywords: Emulators Abstract: The RSTS/E High Performance 2780/3780 Emulator runs as a user job on a suitably configured RSTS/E Operating System while emulating the communications protocol of an IBM 2780/3780 device. The RSTS/E High Performance 2780/3780 Emulator uses a KMC-11 Microproces sor to handle modem and line control, as well as BSC protocol. By using a microprocessor to perform these functions, the CPU load required to do protocol emulation is reduced.

The RSTS/E High Performance 2780/3780 Emulator appears as an IBM 2780 or 3780 data transmission terminal, in EBCDIC mode, on a point-to -point switched or nonswitched synchronous data link operating with standard 2780/3780 protocol. Received data blocks can be up to the maximum buffer size, which is 400 characters for 2780 and 512 characters for 3780.

The RSTS/E High Performance 2780/3780 Emulator can transmit and receive data and/or job control files with an IBM System/370 (including 303x processor systems) running Power/VS, HASP, ASP, JES1, JES2, OR JES3. The RSTS/E High Performance 2780/3780 Emulator operates at transmission speeds up to 9600 bits per second. Switched, leased, or private circuits using Bell System 201, 208, 209, or 212 modems or equivalents are supported.

Assoc. Documentation: The RSTS/E 2780/3780 Users Manual (AA-J177A-TC) and RSTS/E HPE Version 1.1 Release Notes (AA-J458B-TC) are available through Digital Equipment Corporation not through DECUS. They may be obtained by contacting your local Digital Sales Representative.

Restrictions: Will not run on PDP-11/23 or Micro PDP-11. Requires RSTS/E Version 8.0 or later.

Documentation not available. Sources not included.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: DOS-11

DECUS NO: 11-878 Title: RT-11 2780/3780 Protocol Emulator Version: 4.1, May 1987

Submitted by: Digital Equipment Corporation Operating System: RT-11 Memory Required: 32K Bytes Software Required: RT-11 with FB or XM Monitor. Hardware Required: One of the following - DU11 or DUP11 for PDP-11, DUV11 or DPV11 for LSI, SCIfor PDT-11/130 or PDT-11/150 Keywords: Data Communications, Emulators

Abstract: The RT-11 2780/3780 Protocol Emulator (PE) provides communications capabilities similar to IBM 2780 and 3780 remote batch terminals.

The emulator runs under the RT-11 Foreground/Background (FB) or Extended Memory (XM) monitor as either a foreground or background job. The emulator accepts commands interactively or from indirect command files. Commands are provided for operation in unattended environments. The emulator supports operation of a single full- or half-duplex synchronous point-to-point line at transmission speeds up to 9600 bits per second on an otherwise idle system (maximum line speed on PDT-11 is 4800 bits per second). Support for automatic answer to incoming calls is also available for use with those modems that provide this capability.

The communications discipline implemented by the RT-11 2780/3780 PE is a subset of IBM's Binary Synchronous Communications (BSC) protocol that uses the EBCDIC transmission code. Horizontal format control records can be received and processed. A subset of vertical format control escape sequences is supported, specifically single, double, and triple space, form feed, and space suppress. Any block addressable storage device supported by RT-11 can be used as a source of transmission files. Both fixed length (80 character card image) and variable length transmitted as either EBCDIC (automatically translated from ASCII) or binary data (no translation). BSC control characters are automatically added to the data before transmission and stripped upon reception. Any block addressable storage device or line printer supported by RT-11 can be used to receive files.

The following 2780/3780 remote batch terminal features are supported:

. 2780 multiple record transmission option
. Transparent mode
. 3780 space compression
. Variable horizontal forms control
. Print and punch component selection on receive

Assoc. Documentation: The RT-11 2780/3780 PE User and Installation Guide (AA-J089A-TC) and RT-11 2780/3780 PE Update Notice (AD-J089A-T1) may be available through Digital Equipment Corporation not through

DECUS. They may be obtained by contacting your local Digital Sales Representative.

Documentation not available. Sources not included.

Media (Service Charge Code): Two RX01 Diskettes (KB) Format: RT-11, 600' Magnetic Tape (MA) Format: RT-11

REVISIONS TO LIBRARY PROGRAMS

DECUS NO: V-SP-53 Title: KERMIT Distribution Version: April 1987

Author: Various

Submitted by: Frank Da Cruz and Glenn Everhart, Operating System: IAS, OS/78, OS/8, RSTS/E, RSX-11D, RSX-11M, RSX-11M-PLUS, RSX-11S, RT-11, TOPS-10, TOPS-20, VMS Source Language: BASIC, BLISS-16, BLISS-32, BLISS-36, C, FORTRAN 77, FORTRAN IV, FORTRAN, VAX-11, MACRO-10, MACRO-11, MACRO-32, PASCAL & MANY OTHERS Keywords: Data Communications, KERMIT

Abstract: This tape contains a VMS Backup distribution made from a KERMIT distribution from Columbia University dated April 22, 1987. It contains all KERMITS known to Columbia as of that date plus a large amount of documentation.

To make the distribution fit on one reel of tape, some of the less frequently used KERMITS were compressed. The decompression routines and instructions on their use are included. No KERMITS were dropped, however, and all may be extracted. KERMITS needed for Digital Equipment Corporation equipment were generally not compressed, and the MS/DOS, CP/M, and C/UN*X/MAC/AMIGA KERMITS, and documentation, were generally not compressed.

Changes and Improvements: Newer versions of essentially all KERMITS.

Restrictions: See individual *.BWR Files.

Media (Service Charge Code): 2400' Magnetic Tape (PC) Format: VMS/BACKUP

DECUS NO: VAX-6 Title: SPICE 3A7 Version: 3A7. May 1987

Submitted by: Digital Equipment Corporation Operating System: VAX/VMS V4.3 or later Source Language: C Memory Required: 3 MB Software Required: C Compiler Keywords: Circuit Simulation

Abstract: SPICE3 is a general-purpose circuit simulation program for nonlinear dc, nonlinear transient, and linear ac analyses. Circuits may contain resistors, capacitors, inductors, mutual inductors, independent voltage and current sources, four types of dependent sources, trans-

mission lines, and the four most common semiconductor devices: diodes, BJTS, JFETS, and MOSFETS.

The SPICE3 version is based directly on SPICE 2G.6. While SPICE3 is being developed to include new features, it will continue to support those capabilities and models which remain in extensive use in the SPICE2 program.

The ordering information for the manuals are as follows:

. Order VAX-6 (EB) for Programmer's Manual
. Order VAX-6 (EC) for User's Manual and User's Guide

Notes: Full user's guide, programming manual and user's manual included with this submission.

Restrictions: U.S. Government export regulations prohibit the distribution of this program outside of the United States without the appropriate export licenses.

Documentation available in hardcopy only.

Media (Service Charge Code): User's Manual (EB), User's Manual (EC), 2400' Magnetic Tape (PA) Format: VAX/ANSI, or order VAX-LIB-1

DECUS NO: VAX-154 Title: Screen Management System Subroutines Version: April 1987

Submitted by: Kenneth Messer, Allied Electronics Operating System: VAX/VMS V4.5 Source Language: VAX BASIC Keywords: BASIC, Tools - Applications Development

Abstract: This submission consists of a group of subroutines, written in VAX BASIC V2.3, comprising a system allowing the relatively simple use of Digital Equipment Corporation's screen management facility. Object code compiled under VAX BASIC V3.0 is included. Documentation is provided, both Runoff and TeX versions. A small program, which uses a number of the routines, is also included.

Notes: Operating system VMS V4.5 required as VAX BASIC 3.0 is used.

Changes and Improvements: New routines, bug fixes, enhancements

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: VMS/BACKUP, or order VAX-LIB-4

DECUS NO: VAX-255 Title: JMU Utilities Version: V1.4, May 1987

Submitted by: Michael O'Neill, James Madison University, Harrisonburg, VA Operating System: VAX/VMS V4.4 Source Language: VAX-11 FORTRAN Software Required: FMS Keywords: Bulletin Board, Calculators, Mail, Utilities - VMS

Abstract: This submission consists of three utility programs in use at James Madison University. They consist of an FMS based Bulletin Board System, an FMS based

calculator program that uses the VT keypad, and a checkmail utility that allows you to check to see if someone has read a mail message that you sent to them. We are currently running these programs on a cluster consisting of an 8650, 11/785, and 11/780 with common sysuaf, netuaf, and VMSmail files.

The bulletin board system is a graphics based menu driven bulletin board that utilizes the cursor keys and return key for command selection. It features online help, multiple categories, tracking of unread notices, internal access to mail and the EDT editor, automatic identification of notice owners, and automatic notice expiration.

The calculator program utilizes the VT keypad to provide a four function calculator with memory. It requires FMS to operate.

The mailcheck program allows a user to check to see if someone has read a mail message that they had sent. It lists notice dates and subjects for all unread notices sent from the person running the program to the person being inquired about. This version also supports a cluster environment with common sysuaf and VMSmail files.

Notes: Operating system VMS Version 4.0 or later required.

Changes and Improvements: Several bug fixes and removal of some site specific code.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: VMS/BACKUP

DECUS NO: VAX-183 Title: JUICER ODS-2 Disk and File Compression Utilities Version: 2.03, May 1987

Submitted by: Michael N. LeVine, Naval Weapons Center, China Lake, CA Operating System: VAX/VMS V4.5 Source Language: MACRO-32, VAX FORTRAN Memory Required: 3 megabyte Software Required: RUNOFF Keywords: Utilities - Disk - VMS

Abstract: The JUICER package of programs and command files is provided to the system manager to allow him to monitor VAX/VMS ODS-2 disks for disk and file fragmentation and to do such compression as might be needed. The package is made up of eight parts:

. JUICER__1 to do stand alone line disk compression.
. JUICER__2 to do online disk and file defragmentation while disk is in use by other users.
. FRAG to monitor disk fragmentation.
. FILE to monitor and optionally compress fragmented files.
. DIR to make a map of disk directory structure and its file/block usage.
. DISK to show by user and account the number of disk blocks in use, authorized and overdraft.
. DISKMON to run as a detached process to provide a constant monitor of all disk(s) free space.
. BAD to scan a selected disk for bad blocks and on user authorization, try to repair them.

JUICER_1 is an inplace disk compression utility for VAX/VMS ODS-2 disks suffering from excessive fragmentation. This program, within limitations, attempts to move portions of files from the high end of the disk to any unused areas (fragments) at the low end.

JUICER_2 defragments the most defragmented files it can find that will fit in the largest contiguous free areas on disk, and moves other files as far down toward the low end of the disk as it can.

FRAG is run on a disk to see how badly the target disk free space is fragmented, giving a histogram of fragmented areas by size, and a calculated measure of the disk free space fragmentation and, if wanted, a map of free fragments by starting LBN vs size.

FILE scans all the file headers on the target disk and outputs two list files, one containing a list of the 100 files having the most retrieval pointers in use, and the second being a matrix of file size versus number of pointers in use.

DIR scans a target disk and creates an output file DIRECTORY.MAP containing a graphical output showing the on disk directory structure, with a notation for each directory showing the number of files and blocks contained therein.

DISK.COM sets up data for the program DISK.EXE which produces a list by user and account (for each disk specified) of disk blocks in use, authorized and permitted overdrafts.

DISKMON is a detached process which constantly monitors all disks on the system and warns when free space falls below preset values.

Changes and Improvements: Additional utilities, updated online version of Juicer added.

Restrictions: Does not do volume setting. Operating system VMS V4.X or later. Will not run under V3.X because of change in ODS-2.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: VMS/BACKUP

DECUS NO: 11-750 Title: TEM: A Terminal EMulator for RSX-11 Version: V87.077, April, 1987

Submitted by: Thomas R. Wyant III, E. I. du Pont de Nemours, Richmond, VA Operating System: Micro/RSX V3.0, RSX-11M-PLUS V3.0, RSX-11S V4.1, VAX-11 RSX V2.0 Source Language: MACRO-11 Memory Required: 16KW Hardware Required: Communicating with another system or device requires a link to the system running TEM. Keywords: Data Communications, Emulators, Utilities - RSX-11

Abstract: TEM provides "dumb" terminal emulation over a full duplex TT: line. It allows the user to "become" a terminal on a remote system, and to do ASCII file

transfers between systems. TEM has been used to communicate with RSX-11, VMS, RSTS and TOPS-20 systems, as well as non-Digital Equipment Corporation equipment. It requires no software on the remote system (and therefore has no error checking).

In addition to the basic functionality, TEM can automatically issue canned commands to smart modems at the beginning and end of a session. The user can also select from the following features:

. Local Echo.
. Automatic line feed on carriage return.
. Translation of inbound control characters to ASCII abbreviations.
. Passthru of control/s, control/q, control/o and control/x to the remote system.
. User selectable attention and end-of-file characters.
. Inbound and outbound character mapping.
. Specifiable record delay and prompt character for file transfer.
. Parity generation and checking.
. Support for dialout modems as remote devices.

TEM requires at least RSX-11M-PLUS V2.0, VAX-11 RSX V2.0, RSX-11M V4.0 or RSX-11S V4.0. If running under RSX-11M or RSX-11S, it requires the full-duplex TT: driver, get/set multiple character istics, and unsolicited input AST's. Correct access of named directories and files numbered in decimal requires the FEAT$ directive. The GIN$ directive is used to prevent non-privileged users from using TEM to read files that are none of their business (e.g. LB:[0,0]RSX11.SYS). An attempt has been made to conditionalize TEM for RSX-11M V3.2, but it has not been checked. TEM can be initiated from and communicate with any reasonable serial device, but there may be restrictions if not being used on a TT:type device.

Notes: Requires full-duplex TT: driver, get/set multiple characteristics.

Changes and Improvements: Fixed batch support, added username to log file, added remote echo.

Media (Service Charge Code): Two RX01 Diskette (KB) Format: RT-11, 600' Magnetic Tape (MA) Format: DOS-11

DECUS NO: 11-833 Title: Management Tools Version: V8.705, May 1987

Submitted by: M. D. Smith, WAAY-TV (Smith Broadcasting, Inc.), Huntsville, AL Operating System: RSTS/E V9.3 Source Language: BASIC-PLUS Memory Required: 16K Bytes Software Required: BASIC-PLUS Keywords: Business Applications, Utilities - RSTS/E

Abstract: Management Tools is a series of ten programs written by a manager with twenty-three years experience as a manager, including ten years teaching management seminars. There are documentation files for each of the following:

. EVALUE.BAS Employee evaluation
. COMMUN.BAS Communication effectiveness
. TIMEFI.BAS Time management improvement
. DECISI.BAS Decision making help
. DELEGA.BAS Be a better delegator
. MOTIVA.BAS Motivation of people and self
. MANAGE.BAS Better overall manager of people
. MYBOSS.BAS Boss evaluation program
. PLANS.BAS Planning improvement
. GETDUN.BAS Getting more done in a day
. INTERV.QES Interviewing prospective employees

The more times a manager uses these programs, the more benefits he/she will gain. There are options for hardcopy printouts of various portions of the programs as they run or they can be stored in files.

These programs were originally written on my MS/DOS PC at home and were further modified to run on a C-64 and an APPLE computer. The basic code used is highly transportable for this reason and will run, with only minor modifications, on any computer that runs BASIC.

Non-management personnel will also find benefits in these programs for business and private lives.

Changes and Improvements: Includes ten programs and DOC files, a text file, and a READ.ME overall documentation file. Media (Service Charge Code): 600' Magnetic Tape (MA) Format: FORTRANUM Version: V1.1, March 1987 Title:

DECUS NO: PRO-156

Submitted by: Jorg Buchner, D-5064 Rosrath, West Germany Operating System: P/OS V2.0 Source Language: FORTRAN 77, MACRO-11 Memory Required: 365KB Keywords: FORTRAN, Tools - Applications Development

Abstract: FORTRANUM renumbers statement-numbers (labels) in the source code of FORTRAN programs. It is designed for programmers who in the process of building a program want to alter or reorganize part or all of the program's statement-numbers. The complete DEC-FORTRAN 77 statement - (command-) set can be processed. The old program version is saved.

The user denotes a program section by specifying:

. the first statement-number which shall be changed (and its new value).
. the last statement-number which shall be changed.

Within this program section, all statement-numbers are changed in ascending order. The increment between two consecutive statement -numbers is also variable.

Although the author has no experience with the program RENUM by E. Morton, (DECUS Library No. PRO-112), FORTRANUM's new features seem to be only its operating system (P/OS) and the FORTRAN 77 capability.

Changes and Improvements: Bugs removed.

Restrictions: Mentioned in the documentation.

Media (Service Charge Code): One RX50 Diskette (JA) Format: FILES-11

DECUS NO: PRO-155 Title: RT Programs for PRO Version: April 1987

Submitted by: C. E. Chew Operating System: RT-11 V5.02 Source Language: MACRO-11, NBS PASCAL Software Required: NBS PASCAL required to recompile some programs if customization is needed. Keywords: Device Handlers, Spell, Text Formatting, Utilities -RT-11

Abstract: This is a potpourri of programs written for RT-11 V5.1 or later (except where noted) on a PRO. The following have been provided:

PL	A pipeline handler which functions ir much the same way as MQ: except tha no special .LOOKUP requests are needed.
CI	A console interface which allows one job to 'type' input to another.
MENU	A suite of rather crude menu control subroutines.
TYPO	A typographical error checker written in NBS PASCAL.
MORE	A file perusal utility written in NBS PASCAL.
OTHER	A program which determines which drive (0 or 1) RT is booted from and assigns logical names to it (SYS) and the other drive (DK and DSK).
WP	A program utilizing all the above to allow the creation of a cheap but effective text formatting system using KEX and RUN-OFF (you have to provide your own KEX and RUNOFF).
DZCOPY	Program to make a sector by sector image of a foreign disk by using the DZ controller hardware. Has been used to read IBM format 5.25 inch disks.
XHANDL	An alternative overlay handler which can force large root segments and large overlay tables into extended memory. Moved code to allow for .module code.
PRTSCR	A screen dump utility. It can be customized for non Digital Equipment Corporation printers, requires less low memory than the SPOOL utility, and can dump in text or graphics mode, but requires V5.02.

Note that some programs may require a little experience with RT and MACRO to customize, but should be fairly easy to put together.

Changes and Improvements: Bug fix to XHANDL.

Media (Service Charge Code): One RX50 Diskette (JA) Format: RT-11

SUBMITTING ARTICLES TO THE HMS SIG NEWSLETTER

The purpose of the HMS SIG newsletter is to serve as a forum to share information related to DEC hardware with the members of the SIG. As such, the existence of the newsletter is entirely dependent on your contributions. If you have an HHK item, a better or safer way to do something, product news, a tutorial article of general interest, etc., we are interested in publishing it in the newsletter. It is intended that the HMS newsletter be published at least four times a year.

You can submit material to either the editor, Bill Walker, or the assistant editor, Carmen Wiseman. We can accept submissions in a wide variety of formats:

   o   Items can be sent to the assistant editor on VMS
       format RX50s or IBM PC format 5 1/4" floppies.

   o   The editor can handle just about any reasonable
       media, but prefers RT-11 format diskettes.

   o   Hard copy, like cash, is always acceptable. If it
       is camera-ready it will save us a lot of typing,
       but we don't insist on it. You can also use the
       "Hardware Submission Form," which you will find in
       the "Questionnaire" section of the combined
       newsletters.

   o   Those of you that have access to DCS can send
       things to WALKER or WISEMAN. DCS is usually
       checked on a daily basis.

   o   You can reach the editor on CompuServe as
       "Bill Walker 71066,24" or via EasyLink mailbox
       62752448. You can reach the assistant editor via
       EasyLink mailbox 62960090 (be sure to say ATTN: or
       TO: Carmen Wiseman somewhere in the message).

In any event, if you have anything to submit, send it! If it is a mess, but we can read it, we will get it in the newsletter somehow. Finally, if you have any question about submitting material, call one of us. The telephone numbers are listed below.

Contributions can be sent to:

William K. Walker		Carmen D. Wiseman
Monsanto Research Corp.	OR	Digital Review
P.O. Box 32 A-152	==	Prudential Tower, Suite 1390
Miamisburg, OH 45342		800 Boylston Street
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(513) 426-7094/0344 (home)		(617) 375-4361

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│ How to Submit to the RSTS Newsletter │
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The RSTS SIG newsletter solicits contributions of items of interest including, but not limited to, articles, DCL magic, copies of SPR's, and war stories.

You may electronically submit material by calling the SIG newsletter system at (201) 435-2546 at either 300 or 1200 baud. Press a few RETURN's until you get the RSTS banner, then sign on with account 2,1. No password is required. KERMIT is available for uploading material. Then you can use MAIL to compose a cover letter for your material and send it to NEWS.

You may also submit material on RX50's (in RSTS or RT11 format), on 800, 1600, 3200, or 6250 BPI 9-track tape (in DOS, ANSI, BRU, RSTS BACKUP or VMS BACKUP format), or on PC-DOS floppies (5¼ or 3½ inch format). If you are really desperate, I can also accept RSTS or RT11 format RL02 and RK07 disks. You may also submit hardcopy documents, but these will take longer to get into print.

If you are sending media you want returned, please insure it.

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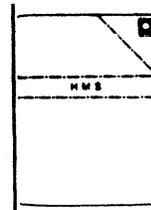
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ihnp4!decwrl!dgeiger

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(619) 294-2678
(ihnp4 decvax akgua dcdwest ucbvax)
!sdcsvax!mplvax!cdl

USENET LIAISON
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711 Powell Avenue, SW
Renton, WA 98055
allegra!fluke!joe

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ihnp4!nsc!voder!jeff

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600 Mountain Avenue
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(decvax ihnp4)!research!norman

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decvax!maclean

VAX SYSTEMS SIG

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Austin, TX 78712

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Arlington, TX 76094-0557

MicroVAX WORKING GROUP
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Pivotal, Inc.
6892 East Dorado Court
Tucson, AZ 85715-3264
(602) 886-5563

SYSTEM IMPROVEMENT REQUEST (CORE)
Mark D. Oakley
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Room 11-6-008
505 King Avenue
Columbus, OH 43201-2669

MULTIPROCESSOR WORKING GROUP
Eugene Pal
U.S. Army
CAORA (ATORCATC)
Fort Leavenworth, KA

PRE-SYMPOSIUM SEMINAR COORD. HISTORIAN
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JCC
P.O. Box 381
Granville, OH 43023

PRE-SYMPOSIUM COORD. (ACTING)
June Baker
Computer Sciences Corp.
6565 Arlington Blvd.
Falls Church, VA 22046

REAL TIME/PROCESS CONTROL WORKING GP
Larry Robertson
Bear Computer Systems Inc.
56512 Case Avenue
North Hollywood, CA

FIELD SERVICE WORKING GROUP
Dave Slater
Computer Sciences Corp.
6565 Arlington Falls Church, VA 22046

LARGE SYSTEMS INTEGRATION WORKING GP
Leslie Maltz
Stevens Institute of Tech.
Computer Center
Hoboken, NJ 07030

VOLUNTEER COORDINATOR
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222 CEB
Tennessee Valley Authority
Muscle Shoals, AL 35661

COMMERCIAL WORKING GROUP
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GE Microelectronics Center
P.O. Box 13409, MS7T3-01
Research Triangle Park, NC 27709-3049

SECURITY
C. Douglas Brown
Sandia National Labs
Division 2644
P.O. Box 5800
Albuquerque, NM 87185-5800

MIGRATION AND HOST DEVELOPMENT
VAXintosh WORKING GROUP
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P.O. Box 156D
Ann Arbor, MI 48106

REAL TIME/PROCESS CONTROL WORKING GP
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McDonnell Douglas
5301 Bolsa Avenue
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INTERNALS WORKING GROUP
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65 William Street, 9th Floor
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NSTL Station, MS 39529-6000

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McLean, VA 22102

Al Siegel
Battelle Memorial Institute
505 King Avenue
Columbus, OH 43201-2693

Ask the WOMBAT WIZARD
Submission Form

To submit a problem to the WIZARD, please fill out the form below and send it to:

> WW Editor, Philip A. Naecker
> Consulting Software Engineer
> 3011 North Mount Curve Avenue
> Altadena, CA 91001
> USA

Name:_____ DECUS Membership No. _____

Affiliation:_____

Address:_____

_____

_____

Telephone Number:_____

Statement of Problem:_____

_____

_____

_____

_____

_____

Please following the following guidelines when submitting support material:

1. If you are trying to demonstrate a method or a concept, please simplify the procedures, records, and other information to the shortest form possible.

2. Annotate your attachments. Simple comments or hand-written notes ("Everything worked until I added this statement.") go a long way toward identifying the problem.

3. Keep an exact copy of what you send. And number the pages on both copies. But send everything that is related to your question, even remotely.

4. If you would like a direct response or would like your materials returned, please don't forget to include a stamped, self-addressed envelope large enough to hold the materials you send.

DATATRIEVE/4GL SIG
Product Improvement Request Submission Form

Submittor: DECUS Membership Number:
Address: Firm:

Phone: Product or Products:
_____

How to write a PIR

A PIR should be directed at a specific product or group of
products. Be sure to give the full name of the product(s) and
version numbers if applicable. Describe the functionality you
would like to see in as complete terms as possible. Don't assume
that the PIR editors or software developers know how it is done
in some other software product - state specifically how you want
the software to function. Provide justification of your request
and give an example of its use. If you can, suggest a possible
implementation of your request.
_____
Abstract: (Please limit to one or two short sentences.)

_____
Description and Examples: (Use additional pages as necessary.)

[Put my name and address on reverse side, thus:]

            PIR Editor, Philip A. Naecker
            Consulting Software Engineer
            3011 North Mount Curve Avenue
            Altadena, CA 91001
            USA

DTR/4GL SIG Spring 1987 PIR Ballot

DECUS Membership Number: __ __ __ __ __ __

CPU Types (Check all that apply):
VAXes___   PDP-11's___   DECsystems___   Other (Specify)_____

Application Types at your site (Check all that apply):

____ Business EDP/MIS   ____ Software Development
____ Education   ____ Engineering/Scientific
____ Office Automation   ____ Service Bureau
____ Other (Specify)_____

Number of years using computers:____   **Number of years using 4GL's:**   ____

Products Used (Check all that apply):

____ DTR-11   ____ VAX-DTR   ____ CDD   ____ TDMS   ____ DBMS(any)
____ FMS   ____ RS1   ____ Oracle   ____ Ingress   ____ Rdb
____ Others (Specify)_____

_____

_____

PIR Number	Points		PIR Number	Points
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____
_____	_____		_____	_____

Be sure to return your ballot by July 1, 1987

Return to:

Philip A. Naecker
3011 N. Mount Curve Ave.
Altadena, CA 91001

QU-5

H M S   S I G

HARDWARE SUBMISSION FORM -- A SIG INFORMATION INTERCHANGE

Message _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Contact
Name _____

Address _____

_____

_____

Telephone _____

Type of equipment _____

SUBMIT ANY TYPE OF HARDWARE PROBLEMS AND/OR FIXES.

SEND TO:

William K. Walker   Carmen D. Wiseman
Monsanto Research Corp.   OR   Digital Review
P.O. Box 32 A-152   ==   Prudential Tower, Suite 1390
Miamisburg, OH   45342   800 Boylston Street
                                     Boston, MA   02199

WHAT: (Describe your WHIM) (Please print or type)

WHY: (Describe the reason for the WHIM)

HOW: (Make any suggestions for a possible implementation

Name: _____

Company: _____

_____

Address: _____

_____

_____

Phone: _____

Please mail to:

Kathleen M. Anderson
EATON Information Management
Systems Division
2017 Cunningham Drive
Suite 208
Hampton, Virginia 23666

Phone: (804) 326-1941

IAS SIG MEMBERSHIP SURVEY

Name: _____

Address: _____

_____

_____

_____

Telephone: _____

Current Hardware: (Include number and type of processors, mass
storage devices, communication devices, etc.)

IAS Release: (Indicate release of IAS under which these systems
are running)

Software: (Indicate software running on these systems, i.e.,
DECNET, Decus C, etc.)

Application: (Indicate the type of application running on the
system.)

Contacts: Would you be willing to be placed on a list of contacts?
If so, what areas?

Features: Do you have any features which you would like IAS to include?

Any further comments?

fold

Frank R. Borger
Michael Reese Medical Center
Dept of Radiation Therapy
Lake Shore Drive at 31st Street
Chicago Il 60616

Languages & Tools SIG

MASTERS APPLICATION

Name: _____ Title _____

Company: _____

Address: _____

_____

_____ Phone: (   ) _____

Network Address: _____ Date: _____

The Languages & Tools SIG has established the designation "LANGUAGES AND TOOLS MASTER", to be applied to selected, qualified people willing to share their expertise in various subjects with others. Masters are people who are knowledgeable enough in one or more languages or tools to be comfortable answering questions about them. The qualifications of an L&T Master are: expertise in a specific area, a willingness to have his/her name published as a Master, and a willingness to volunteer services in different ways. Each product may have several Masters, and there is an overall Masters Coordinator who is a member of the L&T Steering Committee.

Masters are asked to serve other users (and, under some circumstances, DEC), as a resource on products within their competence. In addition to being listed in the L&T Masters Directory (published in the newsletter) as available for occasional telephone consultation, Masters may act as 'Doctors' at Symposium Clinics, present Symposium sessions on the products of interest to them, field test products, interact with DEC product managers when appropriate, or act as a reference for a product for Digital salespeople. Especially on mature products, the SIG is anxious for knowledgeable users to offer product tutorial sessions at Symposia, and Masters can be of great help here. At Symposia, Masters will wear an identifying button bearing the legend "Ask Me About....." and the name of the language or tool in which he/she specializes.

If you'd like to serve as an L&T Master, please mark the products on which you are willing to answer questions with an "M" (for Master). Please mark any other products running at your site with an "A" (for "also running") to provide users with a broader picture of your facilities. (Although not an L&T product, Mumps is included here at the request of the Mumps SIG as a service to Mumps users). You may request removal of your name from the Masters Directory at any time, although you may continue to be listed for a month or two, because of publication lead times.

I am qualified to act as an L&T Master for the following products: ☐ Mumps

☐ Debug	☐ Bliss	☐ CMS	☐ TPU	☐ C	☐ Test Manager
☐ Pascal	☐ Basic	☐ MMS	☐ EVE	☐ Ada[1]	☐ Runoff & DSR
☐ Fortran	☐ Cobol	☐ LSE	☐ EDT	☐ APL	☐ TeX & LaTeX
☐ Document	☐ Dibol	☐ SCA	☐ TECO	☐ RPG	☐ Cobol Generator
☐ VAX Notes	☐ Emacs	☐ PCA	☐ PL/I	☐ Scan	☐ Software Project Mgr

Briefly describe your experience with those you checked. _____

_____

_____

_____

How long have you held your present position? _____

Are you able to attend at least one symposium each year? _____

Users are encouraged to seek assistance with products by calling appropriate Masters listed in the Directory. As a Master, your name and telephone number will be published in the Masters Directory, and users will call on you for limited help from time to time. Please check, below, any additional activities you might do:

☐ Field-test new versions of your product at your work site.

☐ Provide feedback on the product when needed by its DEC product manager.

☐ Act as a reference for the product at the request of Digital Sales or Marketing people.

Mail to: **Dena Shelton, L&T SIG Masters Coordinator, Cullinet Software, Inc., 2860 Zanker Road, Suite 206, San Jose, CA 95134.**

---

[1]Ada is a trademark of the DoD

Languages & Tools SIG

WISHLIST QUESTIONNAIRE

Name: _____ Title _____

Company: _____

Address: _____

_____

_____ Phone: (___) _____

Network Address: _____ Date: _____

The Languages & Tools SIG is principally concerned with the DEC and public domain software products listed below. If your request directly involves one of these products, please check which one (if you have more than one request, please use a separate form for each):

☐ Debug	☐ Bliss	☐ CMS	☐ TPU	☐ C	☐ Test Manager
☐ Pascal	☐ Basic	☐ MMS	☐ EVE	☐ Ada[1]	☐ Runoff & DSR
☐ Fortran	☐ Cobol	☐ LSE	☐ EDT	☐ APL	☐ TEX & LaTEX
☐ Document	☐ Dibol	☐ SCA	☐ TECO	☐ RPG	☐ Cobol Generator
☐ VAX Notes	☐ Emacs	☐ PCA	☐ PL/I	☐ Scan	☐ Software Project Mgr

If your request or suggestion doesn't relate to one of the products listed above, check which one of the following Language & Tools SIG topics it concerns:

☐ Newsletter	☐ Symposium Sessions	☐ Pre-Symposium Seminars
☐ Masters Program	☐ Working Group Activities	☐ Session Notes
☐ Information Folder	☐ SIG Tape	☐ DECUS Store Item
☐ Other L&T SIG topic: _____		

Wish List Request—brief description: _____

_____

_____

Complete description—please explain your request thoroughly; don't assume we know details of other products or services; give examples. _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Mail to: **Shava Nerad, L&T Wishlist Coordinator, MIT, 77 Mass Ave. W91-219A, Cambridge, MA 02139; (617)253-7438**

_____
[1] Ada is a trademark of the DoD

DATAGRAM

DATAGRAMs are short messages, comments, requests, or answers that are published in NETwords. Please fill in the sections below and send the DATAGRAM to:

Vickie Hess
NETWords Editor
2510 Limestone Ln.
Garland, Tx. 75040

Title: _____

Message: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Your Name: _____
Address: _____

_____

Telephone: _____

If this is a reply to a previous DATAGRAM, what #? __

Signature: _____ Date: ____

Vickie Hess
NETWords Editor
2510 Limestone Ln.
Garland, Tx. 75040

Fold Here

OFFICE AUTOMATION SIG

SYSTEM IMPROVEMENT REQUEST SUBMISSION FORM

Name _____   Address _____

Firm _____   _____

Telephone _____   _____

INSTRUCTIONS: System Improvement Requests (SIR) can be either hardware of software; please check the category addressed by this SIR. Under ABSTRACT, give a brief definition of the capability you would like. In the DESCRIPTION section, give a detailed description and examples of what you want. Be specific; don't assume that we know how other products function. Justify the usefulness of the capability and give an example of its use.

HARDWARE IMPROVEMENT   **SOFTWARE IMPROVEMENT**

DECmate _____   ALL-IN-1 _____   WPS _____

PRO-Series _____   CP/M (DECmate) _____   P/OS _____

Rainbow _____   CP/M (Rainbow) _____   MS-DOS _____

Other _____   Other _____

ABSTRACT _____

_____

_____

DESCRIPTION _____

_____

_____

_____

_____

_____

_____

_____

_____

E. Catherine Ditamore
ARA Services
Corp MIS
The ARA Tower
1101 Market Street
Philadelphia, Pa. 19107

DECmate Wish List Ballot

Use this ballot to show which items on the DECmate Wish List are most important to you. Put the number of the most important item on the list in space 1, the next most in space 2, etc.

1._____	10._____	19._____	28._____	37._____
2._____	11._____	20._____	29._____	38._____
3._____	12._____	21._____	30._____	39._____
4._____	13._____	22._____	31._____	40._____
5._____	14._____	23._____	32._____	41._____
6._____	15._____	24._____	33._____	42._____
7._____	16._____	25._____	34._____	43._____
8._____	17._____	26._____	35._____	44._____
9._____	18._____	27._____	36._____	45._____

Please add the following to the wish list:

_____

_____

_____

_____

Comments:

Name:_____

Company:_____

Address:_____

_____

_____

Work Phone:_____

Home Phone:_____

Return Ballot to:

Cheryl Johnson
DECUS DECmate Working Group
Grinnell College
P.O. Box 805
Grinnell, IA 50112-0810

Professional Wish List Ballot

Use this ballot to show which items on the Professional Wish List are most important to you. Put the number of the most important item on the list in space 1, the next most in space 2, etc.

1._____	10._____	19._____	28._____	37._____
2._____	11._____	20._____	29._____	38._____
3._____	12._____	21._____	30._____	39._____
4._____	13._____	22._____	31._____	40._____
5._____	14._____	23._____	32._____	41._____
6._____	15._____	24._____	33._____	42._____
7._____	16._____	25._____	34._____	43._____
8._____	17._____	26._____	35._____	44._____
9._____	18._____	27._____	36._____	45._____

Please add the following to the wish list:

_____

_____

_____

_____

Comments:

Name:_____

Company:_____

Address:_____

_____

Work Phone:_____

Home Phone:_____

Return Ballot to:

Thomas Hintz
DECUS Professional Working Group
University of Florida
IFAS Computer Network
1022 McCarty Hall
Gainesville, FL 32611

Rainbow Wish List Ballot

Use this ballot to show which items on the Rainbow Wish List are most important to you. Put the number of the most important item on the list in space 1, the next most in space 2, etc.

1._____	10._____	19._____	28._____	37._____
2._____	11._____	20._____	29._____	38._____
3._____	12._____	21._____	30._____	39._____
4._____	13._____	22._____	31._____	40._____
5._____	14._____	23._____	32._____	41._____
6._____	15._____	24._____	33._____	42._____
7._____	16._____	25._____	34._____	43._____
8._____	17._____	26._____	35._____	44._____
9._____	18._____	27._____	36._____	45._____

Please add the following to the wish list:

_____

_____

_____

_____

Comments:

Name:_____

Company:_____

Address:_____

_____

Work Phone:_____

Home Phone:_____

Return Ballot to:

   Lynn Jarrett
   DECUS PC Sig Rainbow Working Group Chairman
   Union Tribune Publishing
   P.O. Box 191
   San Diego, CA 92108

PC POSTSCRIPT

PC Postscripts are short requests, comments and responses to be published in the *Postscript Section* of the PC SIG Newsletter. Please respond to the following:

__ Y/N This is a reply to a previous Postscript. __ __ Issue Mo. _____ No.

Title:_____

Message:_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Name: _____

Address: _____

_____

Phone: (_____) _____-_____

Signature: _____ Date_____

DECUS PERSONAL COMPUTER SIG QUESTIONNAIRE

General:
I would like information on _____
I would like to see an article
      in the newsletter on _____
I would like to see a symposium
      session on _____

I am willing to write an article(s) on: _____
I am willing to be contacted by PC SIG members by telephone to give
assistance/advice on: _____
Phone number to call: Area Code (____) # _____ Times _____

I attend DECUS Symposiums :   ____always ____Sometimes ____never
I expect to attend these symposiums ____Fall 85 ____Spring 86 ____Fall 86

I use/own: ___Rainbow(s) ___PRO(s) ___DECmate(s) ___Robin ___Other_____
I use the machine(s) checked above: ___at work ___at home ___both
If a work, total number of DEC PC's at your site: _____
I also use: ___VAX ___IBM or other mainframe ___IBM/other PC
Type of use: ___business ___educational ___government ___other_____
Primary Operating System: ___MS-DOS ___CP/M ___both equally
      ___P/OS ___UNIX ___other_____

I belong to a local DEC PC Group: ___yes ___no
There is a user group in my geographic area: ___yes ___no
I would like information on starting a user group: ___yes
I use a modem: ___often ___reluctantly ___never
          ___for work ___for pleasure ___both

Here is information on he DEC PC User Group I belong to or know of:

   Name of Group _____
   Name of Contact Person _____
   Address _____
   _____
   Telephone (____)_____
   Supports ___Rainbow ___PRO ___DECmate ___Robin ___LUG ___Gold Key

Here is a DEC oriented bulletin board not on your list, or new information on a
listed board:

   Name of Board _____
   Full name of Sysop _____
   Address if known _____
   City and State _____
   Telephone Number _____
   Other Info: _____
   Supports ___Rainbow ___PRO ___DECmate ___Robin

The subjects of greatest ineres to me are:
___word processing   ___project management
___spreadsheets   ___specialized vertical software
___database   ___(type)_____
___graphics   ___Other:_____
___communications   ___Rainbow
___programming   ___PRO
___software reviews   ___DECmate
___technical articles   ___Robin

___DEC Gossip and News   ___Other:_____

If I had it to do over again, I:
___would buy another DEC Rainbow/PRO/DECmate (circle one
___might buy another Rainbow/PRO/DECmate if it was a bargain (circle one_
___would not buy another Rainbow/PRO/DECmate (circle one)

Will you continue to subscribe at the new price of $35/year?   ___yes ___no
Feel free to enclose another page(s) with comments!
Do you feel that leaving the prices out of the newsletter:
___is appropriate
___is very annoying
___makes the articles less useful

Do you feel that Decus should revise its (anti)commercialism policy?
___yes
___no

Name_____   Return to:
Company_____   Barbara Maaskant
Address_____   Computing Resources
City/ST/ZIP_____   The University of Texas Health
Work Phone (___)_____   Science Center at San Antonio
Home Phone (___)_____   7703 Floyd Curl Drive
                                    San Antonio, Texas 78284

fold here, flap under---
                                                    stamp

                        Barbara Maaskant
                        Computing Resources
                        The University of Texas Health
                          Science Center at San Antonio
                        7703 Floyd Curl Drive
                        San Antonio, Texas 78284

Information Resource Sign Up Sheet
Personal Computing Special Interest Group - PC SIG

Are you willing to be an information resource for other PC SIG members? Placing your name on the *Contact List* means you are willing to answer questions within the span of a brief telephone conversation. A Contact is not expected to be a consultant. *Please Register below.* Your name and phone number (including restrictions) will be posted in the PC SIG Newsletter.

First Name:_____ Last Name:_____

Address:_____

_____

City:_____ State:_____ ZIP:_____

Phone:(_____) _____-_____

Areas of Expertise:_____

_____

_____

_____

_____

Suggestions for Additional Services the SIG can Provide:

_____

_____

_____

Barbara A. Maaskant
UTHSCSA Computing Resources
7703 Floyd Curl Drive
San Antonio, Texas   78216

PERSONAL COMPUTING SPECIAL INTEREST GROUP
VOLUNTEER FORM

Name_____

Company_____

Address_____

City_____State_____Zip Code_____

Telephone_____

What special talents do you have?_____

When do you attend symposia?

- ☐ Always
- ☐ East Coast Only
- ☐ West Coast Only

- ☐ Occasional Attendance
- ☐ Other (please specify)
  _____
  _____

Please check if you are interested in helping with any of the following activities:

Symposia Related Activities:

- ☐ Session Chairs _____
- ☐ Campground Volunteer_____
- ☐ Suite Volunteer_____
- ☐ DECUS Store _____
- ☐ Software Clinic_____
- ☐ Panels_____ (indicate topics)_____
- ☐ Technical Sessions_____ (indicate topics)_____

- ☐ Articles for Update.Daily
- ☐ Write letters of appreciation
- ☐ Equipment Setup

Ongoing SIG Activities:

- ☐ Working Groups_____ (indicate which groups)_____
- ☐ Newsletter_____
- ☐ Public Domain Software Project _____
- ☐ Write Software for Special SIG Needs_____

Other SIG Activities: (please specify) _____

Do you wish to see the PCSIG undertake any activities which it is not currently doing? Please specify.

_____

Would you be willing to coordinate the activity you have listed above?   ☐ Yes   ☐ No

Thank you

RSTS Newsletter Reader Survey

In order to serve you better, the newsletter editor solicits the following information:

I would to see a newsletter article on _____

I am interested in a Symposium session on _____

I am willing to write an article on _____

I/my company have _____ machines running RSTS version _____

I attend the DECUS Symposia: __ Always __ Sometimes __ Never

Do you/your company use DECmail-11? _____

    What other operating systems do you use MAIL with? _____

Do you/your company use DECNET/E? _____

    What other operating systems do you use DECNET with? _____

What other layered products do you use? _____

_____

_____

Would you be willing to serve as an 'expert' on one of the above products? _____ If so, which one(s)? _____

If so, please give contact information:

Name: _____

Address: _____

        _____

        _____

        _____

Phone: (_____) _____-_____ Ext. _____

Other comments: _____

_____

_____

_____

fold here

Terence M. Kennedy
St. Peter's College
Dep't. of Computer Science
2641 Kennedy Blvd.
Jersey City, N.J. 07306

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fold here

RT-11 WISH LIST SURVEY

Name (optional)   _____

Address (optional)   _____

                                    _____

                                    _____

DECUS Number (optional) --

1.1	___	3.1	___	3.7u	___	3.13a ___	5.1b	___
1.2	___	3.2a	___	3.7v	___	3.13b ___	5.2a	___
1.3	___	3.2b	___	3.7w	___	3.13c ___	5.2b	___
1.4	___	3.2c	___	3.7x	___	3.13d ___	6.1	___
1.5	___	3.2d	___	3.7y	___	3.14 ___	6.2a	___
1.6	___	3.2e	___	3.7z	___	3.15 ___	6.2b	___
1.7a	___	3.3a	___	3.7aa	___	3.16 ___	6.2c	___
1.7b	___	3.3b	___	3.7bb	___	3.17a ___	6.2d	___
1.8	___	3.3c	___	3.7cc	___	3.17b ___	6.3	___
1.9a	___	3.3d	___	3.7dd	___	3.17c ___	6.4a	___
1.9b	___	3.4a	___	3.7ee	___	3.17d ___	6.4b	___
1.9c	___	3.4b	___	3.8a	___	3.17e ___	6.4c	___
1.9d	___	3.4c	___	3.8b	___	3.17f ___	6.4d	___
1.10	___	3.5a	___	3.8c	___	3.18 ___	6.5	___
1.11	___	3.5b	___	3.9a	___	3.19a ___	6.6a	___
1.12	___	3.6a	___	3.9b	___	3.19b ___	6.6b	___
1.13	___	3.6b	___	3.9c	___	3.19c ___	6.6c	___
1.14	___	3.6c	___	3.9d	___	4.1 ___	6.6d	___
2.1	___	3.6d	___	3.9e	___	4.2a ___	6.7	___
2.2	___	3.6e	___	3.9f	___	4.2b ___	6.8a	___
2.3	___	3.6f	___	3.9g	___	4.3 ___	6.8b	___
2.4	___	3.6g	___	3.9h	___	4.4a ___	6.8c	___
2.5	___	3.7a	___	3.9i	___	4.4b ___	6.8d	___
2.6	___	3.7b	___	3.9j	___	4.5a ___	6.8e	___
2.7	___	3.7c	___	3.9k	___	4.5b ___	7.	___
2.8	___	3.7d	___	3.10a ___	4.6 ___	8.	___
2.9	___	3.7e	___	3.10b ___	4.7a ___	9.1	___
2.10	___	3.7f	___	3.10c ___	4.7b ___	9.2a	___
2.11	___	3.7g	___	3.10d ___	4.7c ___	9.2b	___
2.12	___	3.7h	___	3.10e ___	4.7d ___	9.3a	___
2.13	___	3.7i	___	3.10f ___	4.7e ___	9.3b	___
2.14	___	3.7j	___	3.10g ___	4.7f ___	10.1	___
2.15	___	3.7k	___	3.10h ___	4.7g ___	10.2	___
2.16	___	3.7l	___	3.10i ___	4.7h ___	10.3	___
2.17	___	3.7m	___	3.10j ___	4.7i ___		
2.18	___	3.7n	___	3.10k ___	4.7j ___		
2.19	___	3.7o	___	3.10l ___	4.7k ___		
2.20	___	3.7p	___	3.10m ___	4.7l ___		
2.21	___	3.7q	___	3.10n ___	4.7m ___		
2.22	___	3.7r	___	3.11a ___	4.7n ___		
2.23	___	3.7s	___	3.11b ___	4.7o ___		
2.24	___	3.7t	___	3.12 ___	5.1a ___		

Send Responses to: RT-11 Wish List Survey
                    Multiware, Inc.
                    2121-B Second St. Suite 107
                    Davis, CA 95616

INPUT/OUTPUT Submission Form

A SIG Information Interchange

Please reprint in the next issue of the Pageswapper

If this is a reply to a previous I/O, which number? _____

Caption: _____

Message: · _____

_____

_____

_____

_____

_____

Contact:

Name _____

Address _____

_____

_____

_____

Telephone _____

Signature _____ Date _____

Mail this form to: Larry Kilgallen, PAGESWAPPER Editor
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Larry Kilgallen, PAGESWAPPER Editor
Box 81, MIT Station
Cambridge, MA 02139-0901
USA

System Improvement Request Submission Form

Page 1 of _____

Submittor: Firm:

Address: Phone:

How to write an SIR:
Describe the capability you would like to see available on VAX
systems. Be as specific as possible. Please don't assume we
know how it's done on the XYZ system. Justify why the capability
would be useful and give an example of its use. If you wish,
suggest a possible implementation of your request.

Abstract (Please limit to four lines):

Description and examples (use additional pages if required)

Tear out or photocopy reverse to submit an SIR

Mark D. Oakley
Battelle Columbus Division
Room 11-6-008
505 King Avenue
Columbus, Ohio 43201-2369
USA

VAX Systems SIG Fall 1987 SIR Ballot

DECUS membership number _____ (six digits)

Our site uses the following VAX cpus (check all that apply)

8700/8800 ____   8600/8650 ____   8500/8550 ____   8300/8200 ____
11/780,11/782,11/785 ____   11/750 ____   11/730,11/725 ____
MicroVAX I,II ____   MicroVAX 2000, VAXstation 2000 ____

We use VAXes in the following applications(Check all that apply)

Business EDP ____   Software Development ____
Education ____   Computer Science Research ____
Data Acquisition/Control____   CAD/CAM ____
Service Bureau ____   Hardware Development ____
Scientific/Engineering ____   Office Automation ____
Telecommunications ____   Other _____

I support the following as the most important System Improvement
Requests. (List from zero to fifteen SIR's):

--------   --------   --------   --------   --------

--------   --------   --------   --------   --------

--------   --------   --------   --------   --------

I oppose the following SIR's as detrimental. (List from zero to
five SIR's):

--------   --------   --------   --------   --------

Mail to:

Mark D. Oakley
Battelle Columbus Division
Room 11-6008
505 King Avenue
Columbus, OH 43201-2693
USA

To be counted, your ballot must be received by October 30.

Tear out or photocopy reverse to vote on SIRs

Mark D. Oakley
Battelle Columbus Division
Room 11-6008
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Columbus, Ohio 43201-2693
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