

PRENTICE COMPUTER CENTRE

UNIVERSITY OF QUEENSLAND, ST. LUCIA, QUEENSLAND, AUSTRALIA. 4067.



NEWSLETTER

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6-September-82

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1.0 CHARGE RATES

Terminal use on Sunday and at other unattended times is charged at quarter rates.

Batch Processing, however, is charged according to the priority stated on the submit command. The default PRIORITY for batch is 10, which results in a job being processed at the normal rate.

When batch processing is required to be run at quarter rates, users must ensure that a PRIORITY of 1 or 2 is used on the SUBMIT command.

Sandra Campbell
extension 3471

2.0 CONNECTIONS TO HOSTS ON CSIRONET

CSIRO have advised that James Cook University's KL-10 is now accessible via CSIRONET. To access JCU's computer the following commands should be typed:

```
WELCOME TO 'UQNET' MICOM CIRCUIT SWITCH  
SELECT HOST 1 <cr>  
GO  
<cr>  
Connecting to UQKL10  
Prentice KL 70T #20 09:23:24 TTY 40 System 1189  
Connected to Node DN87SA(10) Line #70  
Please LOGIN or ATTACH
```

```
.SET HOST CSIRO <cr>  
CSIRO GATEWAY V1.36  
Escape character is \
```

*TGU,project id/project password, user id/user password <cr>

```
JCU 1091 7.01 V31.1 hh:mm:ss
```

.

This style of command line will soon be required to access WARCC and UQ from CSIRONET. So a current CSIRO account will soon be required to access any host on CSIRONET.

The new connection mnemonics will be:

BGU (Brisbane Gateway University)
PGU (Perth " ")
TGU (Townsville " ")

The first two replacing UQX/QT and WAX/QT.

Users will be advised in SYS:NOTICE.TXT when WARCC and UQ actually change.

Bryan Claire
extension 2960

3.0 EUNICE - A SUBSTITUTE FOR UNIX?*

3.1 Introduction

EUNICE is a software package for transporting Version 7 UNIX software to VAX/VMS. It provides a UNIX system call emulation package, which maps UNIX calls to VMS requests. This document briefly considers the suitability of EUNICE as a replacement for UNIX, and notes areas of incompatibility.

3.2 What Does EUNICE Provide?

EUNICE provides the basic UNIX system call emulation package, subroutine libraries, compilers, and system utility programs. These correspond basically to the Berkeley 4BSD version of UNIX, which is a super-set of standard Version 7 UNIX. Users may operate in a UNIX environment using the UNIX shell, or access UNIX facilities from VMS, albeit with reduced functionality.

3.3 How Successful Is The Emulation?

The EUNICE system call emulation package provides most UNIX operating system functions in a relatively transparent and efficient manner. Using this package, many of the UNIX utilities have been ported to VMS with little or no modifications. Unfortunately, there are some UNIX facilities which can only be approximated, or not provided at all via VMS. Particular problem areas are the filesystem, protection mechanisms, and device handling. These incompatibilities may impact on the portability of programs, and a significant number of the UNIX utilities required non-trivial modifications to run under EUNICE.

*UNIX is a Trademark of Bell Laboratories.

3.4 Advantages Of EUNICE/VMS

Using EUNICE under VMS may offer some performance advantages for large programs. Access to VMS facilities is also possible eg. DECNET and VMS language processors. VMS system calls may be used in programs running under EUNICE to provide functions unavailable in UNIX, but this is obviously undesirable for reasons of portability.

3.5 Disadvantages Of EUNICE/VMS

The main disadvantage of EUNICE as a substitute for UNIX at the user level, is that the two systems are not exactly equivalent. Although EUNICE emulates most UNIX facilities quite closely, there are some significant differences. These differences give rise to portability problems (in both directions), and could be irritating and confusing to experienced UNIX users.

Some degree of VMS expertise is required of EUNICE users (eg. UNIX commands sometimes provoke error messages from the VMS system), and a detailed knowledge of VMS would be required to maintain EUNICE. EUNICE may not work with future versions of VMS; there is obviously no commitment for DEC to ensure that it does. Less support and expertise is available from other institutions. VMS and EUNICE licenses are required in addition to a UNIX license. Some UNIX programs could conceivably perform poorly under EUNICE/VMS due to optimisation for a UNIX environment. The UNIX environment is not ideally integrated with VMS e.g. it is possible to run VMS commands from UNIX, but not to use them in pipelines with UNIX commands.

3.6 Incompatibilities

I will now discuss briefly the major incompatibilities between the two systems and their ramifications.

3.6.1 Filesystem -

There are many differences between UNIX and VMS filesystems which make an exact mapping impossible. In particular:

1. UNIX file naming conventions are much more liberal. UNIX filenames are longer than VMS filenames, may include non-alphanumeric characters, and the case of alphabetic characters is significant.
2. VMS has no equivalent of UNIX links i.e. multiple directory entries for a single file.

3. Exact file size information is not readily available under VMS without opening and reading files.

The implications of these differences are wide ranging, for example, some standard UNIX filenames are not legal using EUNICE/VMS, and must be changed. Problems may arise when reading tapes from other UNIX installations. Some efficient mechanisms for manipulating files using links are precluded.

Other differences, such as the VMS file version numbering scheme may also cause problems.

3.6.2 Protection -

A particularly nice feature of UNIX is that it provides a simple and clean mechanism for creating programs with controlled access to protected resources. This is accomplished through the use of so called setUID and setGID programs. A setUID program, when invoked, is given the access privileges of its owner (or owners group for setGID programs). A setUID program may relinquish these privileges at any time, and simple mechanisms are available for checking whether the invoker would have access to a particular resource without the inherited capabilities. This is a general facility which is widely used by the UNIX system to provide privileged programs, and also by users who want to allow others controlled access to their files.

VMS lacks any facility comparable to setUID programs. UNIX programs which require special privileges must be installed with appropriate VMS privileges, and may require modification. There is no provision for mortal users who wish to allow controlled access to their files (this is an inherent deficiency in VMS).

3.6.3 Device Handling -

Since the device drivers accessible through EUNICE are VMS device drivers, and not UNIX drivers, this is a particularly awkward area. There are two problems:

1. VMS drivers may not behave in the same manner as UNIX drivers. Both the program interface for control functions, and outwardly visible behaviour may be different.
2. New or specialised UNIX drivers may not be installed without drastic modifications by VMS gurus.

Incompatibilities between EUNICE/VMS and UNIX device drivers are particularly obvious in the case of the terminal driver (some incompatibilities may be due to installation problems). Differences may also be expected for other devices, such as magnetic tape units.

An example of a UNIX device driver which is very useful, but would require a major effort to port to VMS is the multiplexed TTY driver (used for both inter-machine communication, and terminal multiplexing).

3.6.4 Miscellaneous -

There are numerous other small differences, eg. a number of emulated system calls have slightly different semantics or do not provide all the facilities of their UNIX counterparts. Although these are likely to affect mainly systems programs, sophisticated users, and others using library routines which interact with the system may also be affected.

Addition of new features such as share scheduling may be difficult, as these would require modifications to VMS.

3.7 Conclusion

EUNICE is a useful tool for making UNIX facilities available to VMS users, and also for providing an environment familiar to UNIX users on a machine running VMS. However, as a substitute for UNIX I believe that EUNICE/VMS is inadequate, due to some significant differences between the two systems, both in the user interface, and the programming interface.

As a pathological example of the difficulties which might be encountered porting UNIX software to VMS, the INGRES database system would suffer from most of the portability problems mentioned so far!

3.8 References

- [1] "A system for porting UNIX programs to VAX/VMS", David L. Kashtan, SRI.
- [2] "Installing EUNICE Version 2.0", David L. Kashtan, SRI.
- [3] "VAX/VMS Command Language User Guide", Digital Equipment Corporation.

APPENDIX

This is a brief summary of the incompatibilities I have noticed between UNIX and EUNICE/VMS. I doubt very much that it is exhaustive.

Filesystem:

- filenames
- no links
- limit on depth of directory hierarchies

Protection scheme - no setUID/setGID programs.

Differences in device drivers, particularly TTY driver.

Unimplemented UNIX system calls:

chown
chroot
fork
nice
setuid/setgid
utime

Lseek system call may be very inefficient under some circumstances.

System calls whose semantics may differ:

dup
getpid
sbrk
stat
stty

Some UNIX signals are not implemented.

EUNICE generated UID's may overflow short integer.

The directories '/' and '/dev' are not real directories.

Pipes may behave slightly differently.

Multiple file pointers treated differently (in particular when inherited).

Rick Stevenson
Computer Science Dept.

4.0 POSTSCRIPT ON EUNICE

Since Rick's evaluation, The Wollongong Group (of UNIX Edition VII fame) have announced that EUNICE for all VAX/VMS systems is to be provided and supported exclusively by them. According to TWG the latest version, which we hope to obtain later this year, is compatible with VMS versions 2.5 and 3.0 (we are currently running version 2.5). Hopefully, TWG will ensure that EUNICE works with future versions of VMS.

Although EUNICE does not provide a total UNIX environment, it may be advantageous in at least two ways.

1. VAX users or intending users who are familiar with UNIX but not with VMS (or any of the PDP-11 operating systems) should find EUNICE relatively easy to use.
2. Programs which require a large amount of instruction and/or data space may have to be overlaid to run on many UNIX systems. Because of the VAX/VMS virtual memory organization they should run under EUNICE thus saving the work involved in setting up overlays.

Allan Woodland
extension 2921

5.0 INTRODUCING GENSTAT VERSION 4.03 - A NEW LIBRARY PACKAGE

Genstat is a computing language for DATA manipulation and statistical analysis. Many standard procedures are provided so that routine analysis can be simply specified. At the same time, because Genstat is not just a collection of subroutines but an integrated language, the user is able to program more complex or unorthodox procedures. Additional features include structured data handling (SCALARS, VECTORS, MATRICES, TABLES, etc.), a very large and flexible command set and sophisticated backing store facilities with the ability to create libraries for user defined algorithms for inclusion in subsequent programs. If such procedures are frequently required they can be stored and subsequently retrieved for use by a few simple instructions. Thus, Genstat satisfies the needs both of statisticians for a sophisticated instrument under their control and of other related workers with little programming or statistical expertise.

Many similar programs can handle only one set of data at a time. Genstat can handle many sets of data in one run, a feature which can be used when one set of results are necessary to control the operation of a subsequent set.

Genstat is written in FORTRAN which uses numbered channels (not to be confused with Genstat's streams or unit numbers) for its input/output. The relationship between the GENSTAT I/O and FORTRAN I/O is explained fully in the manual, but will also be summarized in the documentation which will be implemented onto the system as soon as possible. The FORTRAN channel numbers must be assigned to the various system devices before running and relate to the relevant files to be used. The GENSTAT macro library is held online in a file called FOR60.DAT with all other aligned programs on a device called GEN:. Therefore, if the library is to be used, the relevant 'FILE' command in the program must refer to unit 60, e.g. 'FILE' GML=60, and channel 60 must be assigned to GEN:.

All GENSTAT 4.03 programs and files are located on a system ersatz device called GEN:, and are accessed by specifying that device name before the filename, as with all the ersatz devices generally.

e.g. .R GEN:GENST

GEN: contains the executable and overlay files as well as the MACRO library and general test and output data files. Because of the difficulty in setting up a new GEN: device, GEN: is at present only a logical device name, therefore, users must set the path to GEN:

e.g. .PATH GEN:/SEARCH=DSKB:[5,122]

The Program Librarian has a manual available for interested users, as well as a comprehensive list of available MACRO subroutine functions and may be easily bribed into lending them out. A reasonably comprehensive GENST.HLP file is available on HLP: and should explain what cannot be said here. Any enquiries regarding running of GENSTAT can be directed to me.

Wayne Buglar
extension 3943

6.0 INFORMATION CONCERNING COURSES

Below is listed the proposed schedule of courses for the remainder of 1982:

September

Introduction to PDP-10	: September 20-21 2 full days 9-12am + 1-4pm each day
SPSS	: September 22-24 3 full days 9-12am + 1-4pm each day

Plotting/Graphics : September 27-29
3 half days 9-12am each day

October

VAX Conversion Course : October 1
1 full day 9-12am + 1-4pm

Introduction to PDP-10 : October 4-5
2 full days 9-12am + 1-4pm each day

RUNOFF : October 6-8
3 full days 9-12am + 1-4pm each day

November

Introduction to PDP-10 : November 8-9
2 full days 9-12am + 1-4pm each day

VAX Conversion Course : November 10
1 full day 9-12am + 1-4pm

Introduction to PDP-10 : November 11-12
2 full days 9-12am + 1-4pm each day

RUNOFF : November 15-19
5 half days 9am-12.30pm each day

1022 : November 15-19
5 half days 1-4pm each day

SPSS : November 22-26
5 half days 9am-12.30pm each day

VG : November 22-26
5 half days 1-4pm each day

Elementary FORTRAN Programming : November 29 - December 3
5 full days 9-12am + 1-4pm each day

Introduction to PDP-10 : December 6-7
2 full days 9-12am + 1-4pm each day

Elementary BASIC Programming : December 8-10
3 full days 9-12am + 1-4pm each day.

General Notes

1. The course "Introduction to PDP-10" is intended for new users and those with no previous experience with the DEC-10 system. Users without this experience must attend this course before enrolling in any other course.

2. All courses are free of charge to staff and post-graduate students of both University of Queensland and Griffith University. All other users must pay the appropriate fee, viz:

VAX Conversion Course	: \$20.00
Plotting/Graphics	: \$30.00
Introduction to PDP-10	: \$40.00
1022, VG	: \$50.00
RUNOFF, BASIC, SPSS	: \$60.00
FORTTRAN	: \$100.00

3. All courses listed above will be held in the Client Room, Hawken Building, St Lucia.
4. To ensure sufficient practical experience is obtained, enrolments at all courses are limited. If enrolled for a course, which you are unable to attend, please advise us as soon as possible so that your place may be taken by someone on a waiting list. When insufficient enrolments are received for any course, that course may be cancelled by the Centre.
5. Enrolments for all courses may be made by phoning extension 3018.

Barry Maher
extension 3021

7.0 RL01 DISC PACK RACKS

We now have plastic coated wire RL01 Disc Pack Racks (10 pack capacity) for sale @ \$72 ea. Contact Alan Langdon (x2928) or Dal Anderson (x3166).

Dal Anderson
extension 3166

8.0 EXPIRED PPN'S

On 24 December each year all PPN's on the DEC-10's and UIC's on the VAX expire, unless the Centre has been notified in writing that a PPN/UIC is required for another year. The term "expire" means that all files are deleted, any balance of commitment is taken to 0 and PPN and charge code are deleted from the system.

As you can imagine then, it is very important that if you intend to keep using your account for the following year it is imperative to complete the "change of expiry date" form, prior to 24 December each year. Separate forms for KA/KL and VAX users are provided herewith and at the Accounts office.

We do this not to make life difficult for you, but merely to keep disk space clear and overheads down. Each year many people leave the University or go away on the Special Studies Programme, or finish post graduate research and omit to notify us that they have finished with their account. Expiring accounts is our way, then, of keeping the system operating efficiently for the user's continued benefit.

Carol Walker
extension 2188

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DEPT:

PPN's

SYSTEM (KL,KA)

[illegible]

Change Expiry Date to:

Signature:

CHANGE OF PROJECT PROGRAMMER NUMBER EXPIRY DATE

DEPT:

UIC's

SYSTEM (VAX)

This image shows a full page of primary-ruled paper. It features two vertical columns of horizontal dotted lines, designed for handwriting practice. Each column contains 18 rows of dots, providing a guide for letter height and placement. The paper is otherwise blank, with no margins or additional markings.

Change Expiry Date to:

Signature:

