UNIVERSITY OF MINNESOTA COMPUTER CENTER
Deadstart Systems Newsletter

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NOTICE OF CHANGES TO THE SYSTEM

Rod Fletcher contributed a new version of WRITEUP with unspecified changes.

Jeff Woolsey changed execute-only file security so that SSM= is not set during
execute-only loads. Additionally storage increases are cleared. Jeff also
changed the USERS/DSD E,A-display so that control point assignment is indicated.

Kevin Matthews contributed a change to CPM which allows normal user jobs
to use the FAMILY command. The following conditions must be present:
1) user number in effect must exist on both families.
2) user number must have the same user index.
3) user number must be open on the new family.

Andy Hastings supplied the following changes.

1) A correction to MODIFY so that *COMMENT directives are treated properly
   under several conditions.

2) A change to IAF which allows network terminals to use the HALF or FULL
   commands. These can now be specified transparently as ESC-H or ESC-F
   respectively. After receiving one of these commands, IAF sends a
   supervisory message to CCP causing the duplex to be set.

3) An annoying problem with IAF initialization wherein nonfatal loader errors occurred during IAF startup was corrected.
4) IAF was changed to not clear the B-display after an SRU or time limit.
5) Since converting to the PSR 543 version of IAF, help-line personnel have been beset with a problem which prohibits entering a password on the same line as the 7 *'s user number. This was caused by a problem in the way IAF cracked parameters. Andy fixed this problem.

Paul Thompson contributed the following changes.

1) A new error code was defined in QAC which specifies that QAC cannot alter a job or file.

2) QAC was modified so that jobs with certain priorities below MNPS can be purged. These priorities are those which identify low rate, no frills or Cray jobs. Previously, purging these jobs was disallowed because the multi mainframe mechanism used priorities below MNPS to signify that a file was "in transit" and operators had attempted to purge these files. The significance of this change is that users will now be able to use QUEUE to purge low rate and nofrills jobs.

3) Program QUEUE was changed to try several times when QAC returns the "unable to alter job" error code.

4) Paul fixed a problem in RELOAD which occasionally caused user indices to get bashed.

5) A problem in DSP where MID was sometimes forced to 72 was fixed.

6) Program QUEUE was taught about two new types of jobs: St. Paul IBM jobs and Health Sciences jobs.

Don Mears contributed the following changes.

1) X-OFF processing in IAF was changed so that X-OFF cannot be used to resume output after an X-OFF has been typed.

2) A small change designed to speedup 9600 baud output was installed.

3) 1CD, the printer driver, was corrected so that 580 PFC image memory is reloaded before each print file.

4) IAF was enhanced to display an approximate response time on the B-display.

5) A correction to RBF page accounting was installed.

6) Don contributed a new version of ODV with unspecified changes.

Steve Siirila fixed UNPAGE so that unpaging a deferred routed file does not cause the deferred routed status to be lost - a long standing error.

Brad Blasing corrected a sign-extension problem in several macros used in USERS/DSD.

Tom Kovarik added two new sites to SUPIO and changed the Morris site so that it would never time out.

PROPOSED CHANGES TO THE SYSTEM

A New Reformatting Directive for SUBMIT - by T. W. Lanzatella

Rich Franta informs me that several users have requested a /CHARGE directive for SUBMIT which performs analogously to the /USER directive. I propose that such a directive be installed.

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XFER - by G. R. Gonzalez

I propose installing program 'xfer' on Unix. 'Xfer' is a file transfer program which interfaces with microcomputers running the 'com' program. 'com' would start 'xfer' running with the commands:

% /user/local/xfer
UnixPathName

'UnixPathName' is the name of the file the user wishes to transfer to the micro. The name should be read from standard input, NOT from the command line for several reasons:

1) It makes 'xfer', which is a standard Pascal program, operating-system independent. It need not be modified to acquire the command line from Unix, VMS, ...

2) 'xfer' on VMS is installed as a RUN command. It seems impossible to specify extra parameters on the VMS 'RUN' command.

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VMS Line Printer Efficiency - by S. Levy

As currently written, the VMS line printer driver handles interrupts very inefficiently. During normal printing, about 10% of the VAX CPU's time is spent serving printer interrupts, while in plot mode that figure is nearly 50%. Response time increases dramatically when anyone is using the printer to plot an image.

Apparently the reason is that the driver is awaiting an interrupt as it puts each character into the print buffer (which takes a few microseconds), instead of waiting only during the time-consuming printing itself. My solution is to wait, up to approximately 10 microseconds, after feeding the printer each character. Only when it does not become ready in that time will the driver suspend itself awaiting an interrupt.

A test of this in plot mode reduced interrupt overhead to about 17% of real time and meanwhile doubled the plotting speed; in print mode the overhead fell to about 5% and printing seemed to run a bit faster.

The implementation was through a binary patch of approximately a dozen instructions.

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A Batch-able SCRIBE - by S. Levy

The version of Scribe (the text formatter) supplied by Unilogic was not very well adapted to VMS. Probably the most serious problem is the way it interactively requests an input file and associated parameters. Instead of using the standard files SYS$INPUT and SYS$OUTPUT, which work interactively, from a procedure file, or as a batch job, it uses the name TT for both input and output. This works only from an interactive terminal.

It would be nice if Scribe could run as a batch job, since it is a hog of both memory space and CPU time. The physical memory allotted to interactive jobs, 200 pages, is a good deal smaller than the batch limit of 700 pages, and Scribe page faults much less when given the extra room. Besides, it is irritating for interactive users to have to compete with a long-running Scribe job, and this would be eased if it ran at the lower priority associated with the batch queues.

I have a small program which calls Scribe as a subprogram, effectively re-connecting Scribe's interactive I/O to use the SYS$INPUT and SYS$OUTPUT files. As a bonus, it will accept Scribe input parameters on the command line, handling them just as if they were entered through SYS$INPUT. The implementation is completely transparent -- users calling Scribe with no command line find no change at all.

A new distribution of Scribe, with both of the above features, has been promised for a couple of months but has not yet appeared. I do not know whether its behavior will be different from the current version, requiring two changes of documentation (current => batchable => new) instead of one (current => new).

SYSTEM MAINTENANCE: People and Procedures

Systems Group Meeting of January 14 - by W. T. Sackett

The following proposals (the first five from DSN Vol. 7, No. 23, the rest from Vol. 8 No. 1) were discussed.

1) L. Liddiard's system ID proposal passed in the form it was presented. The new ID's will be made valid as soon as possible. The proposal did not meet all of the requirements of previous discussions (one and only one name per machine, a machine ID of greater than two characters, non-hardware specific names, expandable and easy to remember) but passed as being acceptable to the Executive Committee where previous proposals were not.

2) M. Midden's conversion routines for going from Cyber NORMAL mode to Cray ASCII were accepted as control cards A6TOA9 and A9TOA6 on the Cray. They were motivated by the occurrence of % symbols in library names.

3) D. Mears' FAMILY proposal was passed. The checking of password match on the destination family was not required because the user indices match. The destination family account will be checked to be sure it is open.

4) D. Mears NAMIAF proposal to add a NAMSIM terminal type to IAF passed.

5) D. Mears' X-ON/X-OFF proposal passed with the exception of the portion dealing with when to resume after X-OFF. If an industry standard exists it will be proposed. If not, any character except X-OFF will be used to resume output.

6) K. C. Matthews staff on MERITSS/ME proposal generated the following:

The effect of the extra memory and PPUs on the Cyber 730 will be monitored. If they diminish the saturation problems there, there will be no need for moving staff to the MERITSS machine. Should it be necessary to move staff to the MERITSS, more communications equipment would be necessary there for additional ports. The next hardware expansion likely to be necessary would be more PPU's. Plans are for a 50% CPU upgrade two years from now if we still have 275 or more users and are compute bound. An informal survey of the 30 or so present at the system's meeting showed at least 10 people who indicated that they would use MERITSS. A family prompt will come out on MERITSS unless a kludge is made to the system (not desirable). For this reason Family=STAFF will not be added until the end of spring quarter. Before spring quarter, pack SPL will be made into a three-way shared pack. It will have to be an 844 pack, and thus should only contain the CALLPRG and WRITEUP files. The rest of the file on the existing 885 pack named SPL will remain there, but that pack will be renamed to STF. A problem exists for files saved by users and staff on the new SPL pack, since those files will have a user index which matches some random user numbers on MERITSS.

Solution: MIRJE CALLPRG and WRITEUP user indices will be changed to the MERITSS special values. User indices on MERITSS will be changed to some higher values (for example, NEW INDEX = OLD INDEX + 200000B). The user index changes necessary for CALLPRG will be done in the next month or so as well as changing the name of SPL to STF (this will be the shared device between the systems. Jeff Woolsey agreed to do the permanent file reconstructions necessary on MERITSS and Bill Sackett agreed to insure that the MERITSS accounting would be changed if necessary to insure that it would run.

7) A. B. Hastings' scheduling proposal passed with the proviso that operator's be able to rollin jobs that exceed service limits.

8) A. B. Hastings' IPTEXT proposal passed with the following modifications: The 543 versions will be placed on the Library tapes so that there can be different versions for the Cyber 74 and 730 machine types. The other

texts related to install procedures should also be at level 543 (CPCTEXT, PSSTEXT, etc.) where they do not conflict with our systems' texts.

9) A. B. Hastings proposal to make the system version of UPDATE and ITEMIZE be at level 531 passed. A PAST version of UPDATE will be available.

10) C. Boylan's automation of TT library management proposal passed.

11) C. Boylan's proposed addition of the directory /usr/local to the default UNIX search path was approved.

12) A. B. Hastings' CALLPRG proposal generated much discussion and many comments which will be gathered and published in the DSN before the proposal will be accepted/modified/rejected.

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Callprg and Library Tape News - by M. Riviere

On February 23rd I included on the library tape of the Cyber 74, 172 and 730, the CDC texts most commonly used by the product set installation jobs. These texts are CPCTEXT, CPUTEXT, IPTEXT, SPPTEXT, SCPTEXT and PFMTEXT. All these texts belong to the release level 552. The Cyber 730 and 172 texts are created with the option of the CMU feature.

Also on February 23rd, I added FTN5, its associated libraries FTN5LIB and FT5IOL and the post mortum dump utility, PMDMP, on the Cyber 172 Library Tape.

On the same day Betty Hinkley changed the Callprg index entries for the future versions of the BMDP packages to make these packages available as disk files instead of tape resident.

Another modification made by Betty to the index is the change of the entry for the MATTER program which makes the package available through a DO type procedure. Also on February 23rd, Susan Steffen inserted a Callprg index entry to install a future version of GPSS.

The next set of Callprg and Library Tape modifications will be taking place on March 16th. Modifications for that date should be requested no later than March 4th, at noon.

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CDC Installation Tapes on the UCC Tape Library - by M. Riviere

I removed duplicate reels of CDC installation tapes for the levels 485, 501, 509, 518 and 531 from the UCC Tape Library. I updated the file TAPES (UN=LIBRARY,PN=UCC) with the list of the remaining reels. This list also included the level 552 release tapes. From now on I will place in the UCC Tape Library only one copy of each of the CDC installation tapes for each level.

The Project Oriented System Group - by T. W. Lanzatella

We continue this week with our description of current projects in the systems group. This week we cover the Operating Systems Group headed by Keven Matthews.

	KCM	PJT	JLW	CB	WTS	JLL	BEB
Tape Consulting and Library				50%			
UNIX Service and Support	25%			45%			10%
Cray Service and Support	20%		45%		65%	90%	
Deadstart Dump Analysis							5%
X.25 Front-end in C							65%
NOS Analysis and Maintenance		45%			2.5%		
Move Staff Time Sharing to Meritss	20%						
Cyber Permanent File Maintenance	15%						
Meritss Project					5%		10%
Management	15%						5%
Help Line	5%				2.5%		
Consulting		5%	5%	5%		10%	5%

Tape consulting and library refers to the task of fielding all help-line referrals related to tapes and to the task of maintaining all of the utility programs used to manipulate the tape library data base.

UNIX service and support means, at this time, preparation for UNIX service on the VAX and self education about UNIX.

Cray Service and support entails keeping the Cray operating system up to date and consulting with the user community.

Deadstart dump analysis is a maintenance procedure wherein all crashes on the Cyber system are analyzed and accounted for.

X.25 Front-end in C is a project using a special card designed by Tom Jacobson which plugs into a PDP-11. The card uses a chip which is a microprocessor that executes the bottom three layers of the X.25 protocol. This project may provide a replacement for the existing PDP-11 front-end used by IAF.

NOS analysis and maintenance refers to various day-to-day activities used for keeping the Cyber systems running. These include performance measurement and permanent file maintenance.

Move staff time-sharing from the C730 to the C172 is a current project which should yield a significant increase in capacity on the Cyber 730.

Cyber permanent file maintenance is a persistant maintenance procedure. The activity entails keeping track of disk reliability and determining the best distribution of permanent files.

The MERITSS project has evolved into a small number of special activities common to only the Meritss machine. These include accounting, some aspects of performance measurement and dealing with MECC.

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Miscellaneous Thoughts on UNIX at U of M, In no Particular Order: - by T. Gerber

By rights, I shouldn't give a damn since I'll be leaving here at the end of January. However, some perverse instinct inside me which wants to see the "truth" triumph over "evil" leads me to put the following in writing:

The overwhelming impression I've received at the UCC is that nothing innovative or ground-breaking is being done. Instead, people seem to be pre-occupied with keeping existing systems together, in one way or another. Considering the unworkable operating system in use (NOS), this is not really surprising. However, instead of doing something "interesting", various people seem to be pre-occupied with making trivial or piecemeal "improvements" to obscure "Features" of the operating system. This strikes me as a waste of time and effort.

The recent decision to go with NAM/CCP seems ludicrous. On the surface of it, any so-called "improvements" to the functional behavior of the system are bogged down beneath a bizarre labyrinth of CTRL and BREAK and ESC character sequences. If you want to drive users off the Cybers, NAM/CCP would seem to be the way to do it.

VAXs appear to be machines of limited power. Possessing a "modern" architecture, they should be and are more amenable to networking than older machines (no names being mentioned). Thus the decision to run 2 different operating systems on 2 identical machines could be fairly described as ludicrous. Not so much ludicrous, as pitiful, is the brouhaha which has sprung up surrounding the merits and demerits of the two operating systems.

The case for VMS:
    It is supported by the manufacturer.
    It is better than NOS.
    *It supports COBOL, BASIC, and other "commercial" software.
    It is "user-friendly" for novice users.

* Some people would consider these to be listed in the wrong "case".

The case against VMS:
  It cannot be modified locally in an effective manner.
  It is an "old-fashioned" operating system.
  The documentation is expensive, voluminous, of dubious quality.
  It is not available on other machines.

The case for UNIX: It can be modified locally in a highly effective manner.
  It is widely-used, available on other machines, and has a large "fan
  club" throughout the Computer Science community.
  The documentation is of high quality, cheap, and physically small.
  It is a "modern" operating system.
  It is a productive, social environment.
  It provides a vast array of software tools and the means for thier
  inter-connection.

The case against UNIX:
  It does not support COBOL, BASIC, and other "commercial" software.
  A lot of people think the command language is cryptic.
  It believes people should read the documentation, i.e. not so novice-
  friendly.

The term "user-friendly" is an enormous misnomer in the context of debates
on VMS vs. UNIX. Most arguments which purport to show that VMS is user-
friendly while UNIX is not really mean "novice-friendly". This revised argument
is true, in a limited way. It _is_ true that VMS provides more on-line help
to the novice user than UNIX. On the other hand, the entire manual is on-line
under UNIX as well*, so where does the difference lie? I would suggest that
UNIX's approach is more cost-effective. Rather than have the system dedicate
its time and energy to helping users who have not bothered to read the documen-
tation, and who may thereafter use the system's "friendliness" as a crutch,
UNIX expects the user to be intelligent and mildly knowledgeable. All the
documentation is still on-line, should it be needed. The concept of "user-
friendliness" is therefore "different" under UNIX. UNIX provides a user-
friendly environment as witnessed by the many claims to the effect that
UNIX is "productive" and acts as an aid to getting things done, rather than
a hindrance. This should be the true meaning of "user-friendly".

I would hesitate to suggest that the UCC adopt UNIX as its only operating
system. Since UNIX is in little need of change, this could put a lot of
people out of work. On the other hand, perhaps this very fact would free
up staff to work on something interesting, like a Cray-and-2-VAX's network...

UNIX does have its faults - what system of that size and complexity doesn't?
It is unfortunate that the "fault" most often seized upon is the issue which
usually goes something like: "I hate the commands. What does 'ls' mean?
What does 'cat' mean? What's wrong with 'lnh', or 'catlist'?" The first
response goes something like: "Well, if you don't like it, use an 'alias'
to change things to whatever you prefer". Beyond that point, the argument
degenerates into an emotional battle of wits.

The fact is that there is no accounting for taste, and if 150 people were
asked to nominate their desired aliases, one would undoubtedly receive at

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* And UNIX contains 'learn' which allows the user to tutor himself in UNIX.

least 150 different lists, given a sufficiently large set of commands to be aliased. It seems pointless to me, therefore, to expend time and energy on choosing 'aliases' which are to be used by other people. Such a list, chosen on the grounds that it would isolate users from "UNIX shock", and presumably chosen to mimic NOS's commands, would only generate extra documentation and confusion for users, and little else.

My own experience with novice users, and that of other sites, is that they have no trouble learning command names, however cryptic they may appear to experienced users of systems with longer command names, because the names are nevertheless "reasonable" mnemonic in almost all cases, and are short and easy to type. The names of the commands cannot in any way impact the effectiveness and operation of the system: if a system has been designed with a poorly-chosen set of primitives (e.g. NOS), no amount of aliasing is going to help users. They will still have to remember to 'get', 'attach', or 'a' files, 'rewind' them, 'return' them, 'gtr' them, and many other things, none of which are necessary under UNIX.

UNIX is, nevertheless, in need of help. Too many tools, or programs, on the system have slightly different conventions which could be unified. The UNIX documentation freely admits this. Much of the new C-shell added by UCB is adorned with cryptic syntax, the result of an overloading of concepts, I feel. It seems to me that UCC staff could best spend their efforts in these areas, not to mention the writing of software (in C) for turning the VAXs into a network with other local machines. A link with the CSci VAX strikes me as a highly desirable feature, which could go a long way to repairing the present "links" between the UCC and CSci.

UNIX does not reveal its charms over a short period. It requires the user to make not insubstantial effort to learn some "minimum" amount of the system before the user may reasonably expect to have his efforts rewarded. Beyond that threshold, however, UNIX rewards its users generously. A time vs reward function might be characterized thus:

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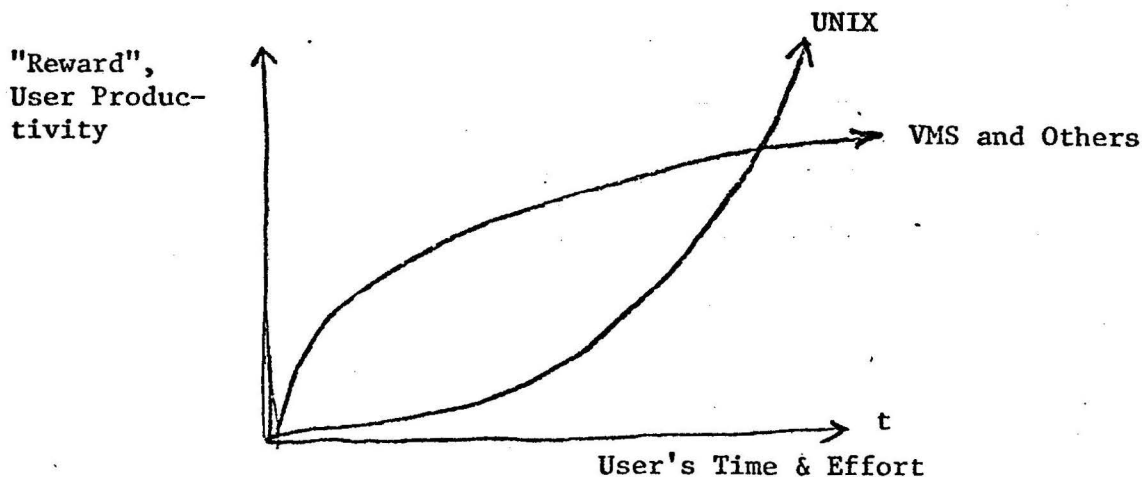
A criticism also heard from experienced programmers, is that UNIX is a "hacker's" system, a system for use by those programmers who enjoy the power of cryptic notation - an APL of operating systems. These is no point in denying this: Unix does allow a little notation to go a long way. However, it also supports a full range of constructs and primitives which support the disciplined (dare we say "structured") use of the system. You can make what you like of it, in effect. More importantly, it is difficult to accept the notion that this property of UNIX is reason enough to reject it in order to remain with the status quo. (Would you reject APL if only FORTRAN and COBOL were available instead? Not an accurate analogy perhaps, but it is in keeping with the spirit of things.)

It seems to me that if one is to improve on UNIX, experience with it is essential. In other words, UNIX is a more suitable base from which the state of the art may develop than NOS or VMS. Who was it that said he *saw further only because he stood on the shoulders of giants? Computer scientists have often been accused of standing on each other's toes. Rejection of UNIX in favor of a more primitive operating system surely belongs to the latter category.

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Cyber Deadstart Dump Analysis - 12/7/81-2/16-82 - by B. E. Blasing

Cyber 730 - CA
Wed., 12/9, 08:00

An error in the deadstart tape indicating which devices are shared prevented the 74 and the 730 from coming up on time.

Tue. 12/15, 13:40   Bad Dump
1AJ hung. Unfortunately I lost the dump output and someone overwrote the dump tape (systems group - Achtung!).

Sun. 12/27, 21:02   DD2004
Sun. 12/27, 23:00   DD2005
Sun. 12/27, 23:17
Sun. 12/27, 23:38
The memory controller broke. SECDED double bit errors showed up, CPUMTR moded out, and the scopes blanked several times during the night. This was fixed next morning.

Thur. 12/31, 15:50   No Dump
Disk controller on channel 25 broke. The CE's fixed it at 18:00.

Thur. 1/14, 11:24   DD2023
Word 7 (the central library directory) got overwritten by an unknown agent.

Sat. 1/16, 03:53   DD2001
LFM hung trying to drop an already dropped tape equipment. It is not known how the equipment first got dropped.

*Isaac Newton?

Mon. 2/1, 11:39   DD2025
The DDP hung. Some channel commands might have been able to massage it
back to life,

Mon. 2/8, 14:45   DD2003
The disk controller on channel 24 broke,

Wed. 2/10, 22:48   DD2001
Low memory was wrecked with a copy of a CPU program. The SCR indicated
ECS errors. A bad ECS program load most probably occurred.

Wed. 2/10, 23:48   DD2003
The scopes blanked and the 74 (CB) indicated ECS errors. The dump was wrecked
by running diagnostics before the dump.

Fri. 2/12, 16:39   DD2004
The disk controller on channel 24 hung. A level-3 deadstart was required
to reload the control ware.

Mon. 2/15, 21:40   DD2005
Disk channel 25 broke, catching an IAF job halfway in rollout, which caused
the system to hang due to FNT interlocks being left set.

Tue. 2/16, 09:20   No Dump
EQ14 (an 885) broke and needed to be reloaded onto a spare FMD spindle.

Tue. 12/29, 09:25   DD2006
A jobs dayfile pointer got overwritten by its SRU accumulator which caused
the system to hang. The cause of this would become apparent later in the
day.

Tue. 12/29, 11:30   DD2007
CPUMTR moded out with register A3 out of range.

Tue. 12/29, 11:35   No Dump
CPU diagnostic ALX found an intermittant problem with register A3. The machine
was given to the CE's. They fixed this problem but this event marks a point
in time where the Cyber 74 started crashing often with inexplicable dumps.
There were two types of crashes to follow:

    1) The CPU seemed to go into monitor mode in the idle loop and
        halt. The free PPU list was corrupted.
    2) The system tried to start a job up at control point n+1 where
        N is the number of control points we have.

Neither was explainable except by assuming that register A3 was still bad
since A3 was used in recently in type 2 crashes. Well, onward...

Sun. 1/3, 21:25   DD2011
An operator typed DCH32 instead of DCN32 to clear a hung channel and caused
BATCHIO to hang.

Sun. 1/3, 21:43   DD2012
Type 1 crash.

Mon. 1/4, 20:12   DD2013
Type 2 crash.

Tue. 1/5, 13:48   No Dump
The CE's blanked the scopes while fixing a character garbling problem on
the console.

Sun. 1/10, 01:27   DD2014
Type 2 crash.

Mon. 1/11, 08:14   DD2017
Type 1 crash.

Mon. 1/11, 21:33   DD2015
Type 2 crash.

Mon. 1/11, 21:41   DD2020
Type 1 crash.

Mon 1/11, 22:29   DD2021
Type 2 crash. At this point, the CE's swapped some cards around in register
A3. This crash looked like an exchange to word 0 rather than control point
N+1.

Thur. 1/14, 11:53   DD24
The input register for PP31 got overwritten by an entry from the CLD (central
library director). No hint as to why.

Thur. 2/11, 16:05   DD2003
Central memory was wrecked and a subsequent deadstart indicated a DDP channel
error. A level-0 deadstart was successful and the problem seemed to go away.

Cyber 172 - MERITSS

Tue. 12/22, 16:22   DD10
The infamous mode 40 problem moved itself from the 720 (when the 730 was
a 720 and was MERITSS) to the 172. Mode 40 means memory to CPU data parity
error. The mode 40 happens right after an exchange into monitor mode.

Thur. 1/7, 11:37   DD11
Mode 40 again.

Mon. 1/18, 14:04   DD2
Mode 40 again.

Tue. 1/19, 21:53   DD12
Mode 40 again.

Mode 40 again. This time I wrote some code to restart CPUMTR after a mode 40. I never got a chance to install it. The mere writing of the code seems to have cured the problem.

VM/UNIX Down Time Summary 2/1-2/21

Tues. 2/9, 19:00-19:30
System was taken down for CMI. A bent pin on a newly installed DR-11B was causing intermittent corruption of data bit 0 on the UNIBUS. No dump.

Wed. 7/10 16:20-16:25
System panic trapped in INPUT when an impossible condition was detected. Dump on umcore .17.

Thur. 2/11, 15:06, 15:20
Two quick reboots were done to unhang the stock autodisks. The problem has been corrected. No dump.

Sun. 2/14, 16:00-16:45
The system was unavailable to users while a corrupted root file system was repaired. The cause of which has not been determined. No dump.