To: Distribution

From: Joan Scott

Date: 7 September 76

Subject: Multics Change Requests

Enclosed are the Multics Change Requests which were approved from 16 August 76 through 31 August 76.
MULTICS CHANGE REQUEST

TITLE: tape_mult_ extensions

AUTHOR: Larry Johnson

Planned for System: MR 5.0
Fixes Bug Number(s): not applicable
Documented in MTB: not applicable
Incompatible Change: no
User/Operations-visible Interface Change: no
Coded in: (I)PL/I ( )ALM ( )other-see below
Performance: ( )better (M)same ( )worse

DOCUMENTATION CHANGES (specify one or more)

MPM (vol, sect) MPAM (sect)
MOSN (sect) MSAM (sect)
PLMs (AN#)
Info Segs
Other
None (reason)

OBJECTIONS/COMMENTS:

Headings are: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (optional)

Summary

Add some extensions to tape_mult_ for the new volume dumper and reloader.

Detailed Proposal

Make the following changes:

1. Handle segfaults during put_chars operations. This is so the dumper can handle a segment being deleted while it is being dumped. If a segfault occurs copying data into the buffer, the operation will complete (supplying zeroes for the remaining characters) and the code error_table\$seg_fault_error.

2. Do not wait for rewinds to complete on close operations. A close call will return as soon as the rewind starts.

3. Implement a position operation. Only position type 3 will be implemented, which will skip the specified number of characters (in the forward direction only).
Usage

declare iox_position entry (ptr, fixed bin, fixed bin(21), fixed bin(35));
call iox_position (iocb_ptr, type, n, code);

where:

1. iocb_ptr points to the switch's control block. (Input)
2. type identifies the type of positioning. (Input)
   -1 goes to the beginning of the file
   +1 goes to the end of the file
   0 skips newline characters or records

3. n is the number of lines or records to be skipped (forward skip) or
   the negative of that number (backward skip). It may be 0.
   (Input)

4. code is an I/O system status code. (Output)

2 positions to an absolute character or record
3 skip characters (stream input only)

Notes

Absolute positioning moves the next byte or record position to the location specified by n.

Skipping characters moves the next byte position forwards or backwards over the specified, n, number of characters.
If the file contains too few characters, the next byte position will
be at the end of file [forward skip] or beginning of file
[backwards skip] and envr_table:$end_of_info will be returned.
SUMMARY:
Add the control arguments -header (-he) and -no_header (-nhe) to the print_link_info command.

REASONS:
It has been an oft requested feature.

IMPLICATIONS:
Users will not see as much output when specific control arguments are given.

DETAILED PROPOSAL:
It is proposed that the -no_header control argument suppress the printing of the header lines (which include name, date, date compiled, etc.) Further, if any of the -length, -entry, or -link control arguments are specified, the header is not, by default, printed. If the -header control argument is given, the header is printed no matter what.
**MULTICS CHANGE REQUEST**

**TITLE:** Add the -long control argument to print_link_info.

**AUTHOR:** Steve Webber

**Planned for System:** not applicable

**Fixes Bug Number(s):** not applicable

**Documented in MTB:** not applicable

**Incompatible Change:** no

**User/Operations-visible Interface Change:** yes

**Coded in:** ( )PL/I ( )ALM ( )other-see below

**Performance:** ( )better ( )same ( )worse

**DOCUMENTATION CHANGES (specify one or more)**

- MPM (vol,sect) Commands MPAM (sect)
- MOSN (sect) MSAM (sect)
- PLMs (AN#)
- Info Segs pending_changes
- Other

**OBJECTIONS/COMMENTS:**

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**SUMMARY:**

Add the -long (-lg) control argument to print_link_info. This control argument causes more information from the object segment's symbol section to be printed when the header for the output is printed (i.e. the -header control argument was given or applies by default).

**REASONS:**

It has been an oft requested feature.

**DETAILED PROPOSAL:**

See the attached output for an example of the additional information printed.
print_link_info form_link_info_ -long -length

form_link_info_ 07/30/76 1554.2 edt Fri

Object Segment >udd>m>w>s>form_link_info_
Created on 07/30/76 0010.1 edt Fri
by Webber.Multics.a
using Experimental PL/I Compiler of Thursday, July 29, 1976 at 21:38

Translator: PL/I
Comment: map table optimize
Source:
07/30/76 0010.1 edt Fri >user_dir_dir>Multics>Webber>source>form_link_i
12/15/75 1338.1 edt Mon >library_dir_dir>include>linkdcl.incl.pl1
06/30/75 1657.7 edt Mon >library_dir_dir>include>object_info.incl.pl1
10/06/72 1206.8 edt Fri >library_dir_dir>include>source_map.incl.pl1
05/18/72 1512.4 edt Thu >library_dir_dir>include>symbol_block.incl.pl1
01/17/73 1551.4 edt Wed >library_dir_dir>include>pl1_symbol_block.incl.pl1
Attributes: relocatable,procedure,standard

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r 1556 14.718 478.890 4432

Also included:

Severity if non-zero
Entry bound if non-zero
Text Boundary if not 2
Static Boundary if not 2
SUMMARY: Install a command/active function which underlines each of its input arguments. The command prints the input arguments on a single line, separated by a space and underlined. The active function returns a similar value as a single quoted string.

REASONS: This active function is used by the MPM runoff macros, and has proved useful in other instances where an underliner is needed. Since it may be of utility to general users, it should probably be documented in the MPM Commands.

IMPLICATIONS: A new facility is provided. We are one step closer to installing the MPM runoff macros in some macro tools library which is maintained at MIT, in Phoenix, and wherever Honeywell needs MPM-type macros.

DETAILED PROPOSAL:

! underline "Now is" the time "for all men."

Now is the time for all men.
Name: underline

The underline active function underlines each of its input arguments. Each input argument is underlined separately in the return value, and this value is canonicalized. Arguments containing quotes or spaces are quoted in the return value of the active function.

Usage

[underline arguments]

where arguments are the values to be underlined and returned.

Example

! loa_ [underline "Now is" the time "for all men."""]
Now is the time for all men."
### SUMMARY

pc$pd_flush_all waits for I/O to quiesce by unmasking and looping. Although this allows disk interrupts to come through, this does not notice Paging Device I/O which may have completed. This causes the system to occasionally hang at shutdown time. Remove this code, and replace it by masked code which calls page$run, which will notice ALL completed I/O.

### REASONS

Reliability, correct operation.
SUMMARY: Directory date/time modified, which drives the current Dumper, which will be around for a while, is set for a path of directories up to the root when page control notices a page being modified. The file_modified_switch (fms) is set up the tree in this case. pc$truncate which also turns on fms when it simulates modification, fails to propagate it up. Make pc$truncate propagate this switch.

REASONS: Truncated segments in directories with no legitimately modified segments will be dumped.
SUMMARY: Make changes to Message Coordinator for compatibility with bootload of FNP from Multics.

REASONS: Message coordinator must not try to listen for dialups on lines configured on an FNP that is not running.

IMPLICATIONS: None.

DETAILED PROPOSAL: Alter various programs in bound_oprcons as follows:

1. Use the CDT entry for each channel to hold the tty name, tty DIM device index, and tty "state" variable, instead of the "mc_anstbl" entry as at present.

2. Change the place in mc_commands$new_tty which does a "listen" order on a newly-accepted channel to do so only if the relevant FNP is up.

3. Add a new entry, mc_commands$listen_to_tty$s, to be called by the Answering Service program that recognizes that an FNP has been successfully loaded. This entry will issue "listen" orders for all channels on that FNP that have been accepted by the Message Coordinator.
**MULTICS CHANGE REQUEST**

**TITLE:** Make message coordinator understand tty

**AUTHOR:** Robert S. Coren

**Planned for System:** not applicable 5.0

**Fixes Bug Number(s):** not applicable

**Documented In MTB:** not applicable

**Incompatible Changes:** yes

**User/Operations-visible Interface Changes:** no

**Coded in:** PL/I ( ) ALM ( ) other-see below

**Performance:** ( ) better ( ) same ( ) worse

**DOCUMENTATION CHANGES (specify one or more):**

- MPM (vol,sect) MPAM (sect)
- MOSN (sect) MSAM (sect)
- PLMs (AN#)
- Info Segs
- Other

**OBJECTIONS/COMMENTS:**

**SUMMARY:** Change `mc_tty` to recognize the event message passed with wakeups from the ring-zero tty DIM (identifying the event as hangup, input arrived, output completed, etc.) and take appropriate action.

**REASONS:** This information is available, we might as well make use of it. The message coordinator currently wastes some time on such a wakeup trying to decide which of these events it probably represents.

**IMPLICATIONS:** None
SUMMARY:

When write_log fills one log and creates a next log, cause it to copy the ACL of the old log onto the new log.

REASONS:

Currently it is not possible to give anyone access to the initializer log files without placing them on the initial ACL of >sc1, because when the log overflows the new log gets a default ACL.

IMPLICATIONS:

Simpler access control for log files.
SUMMARY:

Create new commands copy_iacl, copy_iacl_seg, and copy_iacl_dir.

REASONS:

It is sometimes necessary to copy the ACL from one segment or directory to another. Only clumsy ways of doing this exist currently, although subroutines exist for the purpose.
Name: copy_acl

This command copies the ACL from one segment or directory to another.

Usage: copy_acl path1i path2i ...

The star convention may be used in path1i.
The equals convention may be used in path2i.

Name: copy_iacl_seg

This command copies the segment initial ACL from one directory to another.

Usage: copy_iacl_seg path1i path2i ...

The star convention may be used in path1i.
The equals convention may be used in path2i.

Name: copy_iacl_dir

This command copies the directory initial ACL from one directory to another.

Usage: copy_iacl_dir path1i path2i ...

The star convention may be used in path1i.
The equals convention may be used in path2i.

Note: The copied ACL's replace current ACL's or IACL's.
MULTICS CHANGE REQUEST

TITLE: bind_fnp version stmt and bug fixes

AUTHOR: Mike Grady

Planned for System: MR5.0
Fixes Bug Number(s): not applicable
Documented in MTB: not applicable
Incompatible Change: yes
User/Operations-visible Interface Change: no
Coded In: ( ) PL/I ( ) ALM ( ) other—see below
Performance: ( ) better ( ) same ( ) worse

DOCUMENTATION CHANGES (specify one or more)

MPM (vol,sect) MPAM (sect)
MOSN (sect) MSAM (sect)
PLMs (AN#) AN85
Info Segs
Other

CATEGORIES (check one)
( ) Lib. Maint. Tools
( ) Sys. Anal. Tools
( ) Sys. Prog. Tools
( ) Sys. Daemon/Admin
( ) Runtime
( ) User Command/Subr

SUMMARY

Add version statement to bind_fnp bind file and a -version control argument. The control argument will override the bind file as does the -sysid control arg to generate_mst.

Fix minor bugs in binder.

REASONS

It is convenient to be able to learn which version of MCS is running and to be able to specify the version for experimental systems.

DETAILED PROPOSAL

The bugs fixed are:

1) Fill in software communications region properly when using the simulator control argument.

2) Build the correct lom table when using less than the maximum number of HSLAs.
**MULTICS CHANGE REQUEST**

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**TITLE:** Cleanup FNP tools

**AUTHOR:** Mike Grady

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**Planned for System:** MR5.0

**Fixes Bug Number(s):** not applicable

**Documented in MTB:** not applicable

**Incompatible Changes:** no

**User/Operations-visible Interface Change:** no

**Coded in:** ( )PL/I ( )ALM ( )other-see below

**Performance:** ( )better ( )same ( )worse

**DOCUMENTATION CHANGES (specify one or more):**

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**OBJECTIONS/COMMENTS:**

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**SUMMARY:**

Cleanup two of the tools used for FNP assemblies and loading.

The map355 command will put all of its temp segments in the process directory instead of the working directory and cleanup better when finished.

The coreload command will be fixed to process the output of map355 (i.e., the object deck) rather than the simulator (a partially processed object deck). This saves a processing step in the simulator, which is very expensive.

**REASONS:**

Make these commands more reliable and easier to use.
## Title: Add linkage fault tracing to cumulative_page_trace

**Author:** J. Gintell  
**BSG:**

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### Objections/Comments:

Expand documentation

| Info Segs |
| Other (Name) |
| None (Reason) |

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### Use these headings:

**Summary of Proposal, Reasons for Proposal, Implications, Detailed Proposal.**

### SUMMARY:

Add the ability to accumulate linkage faults (caller and callee) and subsequently print them out.

### REASONS:

Users frequently want to know exactly what they have linked to.

### DETAILED PROPOSAL:

1. The following control arguments will be used to control linkage fault tracing.

   - **trace_linkage_faults**
     
     accumulate linkage faults information at same time that page and segment fault information is accumulated.

   - **print_linkage_faults**
     
     print all accumulated linkage faults and hcs_make_ptr calls.
Output will look like:

procal3741 referencing xxx$entry
or
bound_segment_name: procal\36 referencing yyy$zzz

2. Add the printout of the number of segment faults on each segment for the case where the -total control argument is used.

3. Fix the cleanup condition handler to work correctly.
## TITLE:
Unimplement safety_sw check in vfile_

## AUTHOR:
M. Asherman

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Use these headings:

### SUMMARY:

vfile_ currently uses the safety switch to determine whether a file opened for input_output will be truncated or extended. It is proposed that this feature be removed.

### REASONS:

This is a non-standard use of the safety switch. Alternative mechanisms exist to prevent accidental truncation, and it is not clear that there is any demand for this particular gimmick.

### IMPLICATIONS:

runoff users who set safety switch on runout segments will not have unexpected results (appending instead of replacement).
TITLE: Fix edm line length bug

AUTHOR: R. Mullen

STATUS DATE
Written 08/11/77
Expires 02/17/77

TICK

Category (Check One)
Lib. Maint. Tools
Sys. Anal. Tools
Sys. Prog. Tools

DOCUMENTATION CHANGES

- Explain in DETAILED PROPOSAL

- Planned for System MR 5.0

- Fixes Bug Number(s) MPRF9795

- Documented in MTF 355

- User/Operations-visible

- Interface change? yes no

- Incompatible change? yes no

- Performance: Better Same

- Replaces MCR

Objections/Comments:

Use these headings: Summary of Proposal, Reasons for Proposal, Implications, Detailed Proposal.

SUMMARY:

Fix bug causing edm to overestimate the length of the final line of text if it does not end in newline.

REASONS:

Currently prints garbage or takes OOB.

IMPLICATIONS:

Make world safer for people who don't heed warnings.
**TITLE:** Fix abbrev not to define useless abbreviations

**AUTHOR:** S. Herbst

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**User/Operations-visible**

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**Use these headings:** Summary of Proposal, Reasons for Proposal, Implications, Detailed Proposal.

**SUMMARY**

Change abbrev to not allow the user to define an abbreviation containing break characters (. $ etc.) and not beginning with a break character since such an abbreviation will never be replaced during expansion.

**IMPLICATIONS:**

1. Abbreviations beginning with break characters are currently replaced and will still be allowed.
2. We are referring to the current set of break characters, which can be changed by calling abbrev_set_break and abbrev_reset_break.
Abbreviations

`.la <letter1> ... <lettern>` list all abbreviations starting with the specified letters. `<letter1>` is expected to be a single character. If no letters are specified, all abbreviations in the current profile are listed.

`.q` quit using the abbrev command processor. This request resets the command processor to the one in use before invoking abbrev and, hence, prevents any subsequent action on the part of abbrev until it is explicitly invoked again.

`.r` enter a mode that remembers the last line expanded by abbrev. See the `.f` and `.s` requests.

`.s <rest of line>` show the user how `<rest of line>` would be expanded but do not execute it. The `.s` request with no arguments shows the user the last line expanded by abbrev and is valid only if abbrev is remembering lines. See the `.f` and `.r` requests.

`.u <profile>` specify to abbrev the pathname of a profile to use. `<profile>` becomes the current working profile. The user needs "r" access to use the profile and "w" access to add and delete abbreviations.

`.p` print the name of the profile being used.

`. <space> <rest of line>` pass `<rest of line>` on to the normal command processor without expanding it. Using this request, the user can issue a command line that contains abbreviations that are not to be expanded.

Break Characters

When abbrev expands a command line, it treats certain characters as special or break characters. Any character string that is less than or equal to eight characters long and is bounded by break characters is a candidate for expansion. The string is looked up in the current profile and, if it is found, the expanded form is placed in (a copy of) the command line to be passed on to the normal command processor.

An abbreviation cannot contain break characters, unless it begins with a break character.
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**SUMMARY:**

1. Make abbrev faster using EIS.

**IMPLICATIONS:**

No interface changes.
TITLE: Fix header bug in mseg

AUTHOR: S. Herbst

- Code in XPL/I
- Planned for System MR 5.0
- Fixes Bug Number(s)
- Documented in MTB
- User/Operations-visible Interface change?
- Incompatible change?
- Performance:
- Replaces MCR

Category (Check One)
Lib. Maint. Tools
Sys. Anal. Tools
Sys. Prog. Tools

Written
08/11/77

Status
A
02/17/77

Expires
02/17/77

DOCUMENTATION CHANGES
- Lib. Maint. Tools
- Sys. Anal. Tools
- Sys. Prog. Tools

SUMMARY:
Fix bug in mseg_ causing a message segment header to be only partially initialized for certain error exits, and thus causing later operations on that message segment to blow up.
TITLE: Add hcs_smake_entry

AUTHOR: M. Weaver

Planned for System: MR 5.0
Fixes Bug Number(s): not applicable
Documented In MTB: not applicable
Incompatible Changes: no
User/Operations-visible Interface Changes: no
Coded In (B)PL/I ( )ALM ( )other-see below
Performance: ( )better ( )same ( )worse

DOCUMENTATION CHANGES (specify one or more)
MPM (vol,sect) Subroutine MPAM (sect)
MOSN (sect) MSAM (sect)
PLMs (AN#) Info Segs
Other

OBJECTIONS/COMMENTS:

---

SUMMARY:
Add the subroutine hcs_smake_entry, which is just like hcs_smake_ptr except that it returns an entry value instead of a pointer.

REASONS:
Several interfaces in the system require (or should require) an entry value. Constructing an entry value from a pointer is awkward.

IMPLICATIONS: none

DETAILED PROPOSAL:
Add a new entrypoint to link_snap. Most of the code will be shared with the make_ptr entrypoint.
The hcs_$make_ptr entry point, when given a reference name and an entry point name, returns a pointer to a specified entry point. If the reference name has not yet been initiated, the search rules are used to find a segment with a name the same as the reference name. The segment is made known and the reference name initiated.

Usage

```
display hcs_$make_ptr entry (ptr, char(*), char(*), ptr, fixed bin(35));
call hcs_$make_ptr (ref_ptr, entryname, entry_point_name, entry_point_ptr, code);
```

where:

1. `ref_ptr` is a pointer to the segment that is considered the referencing procedure. See "Notes" below. (Input)
2. `entryname` is the entryname of the segment. (Input)
3. `entry_point_name` is the name of the entry point to be located. (Input)
4. `entry_point_ptr` is the pointer to the segment entry point specified by `entryname` and `entry_point_name`. (Output)
5. `code` is a storage system status code. (Output)

Notes

The directory in which the segment pointed to by `ref_ptr` is located is used as the referencing directory for the standard search rules. If `ref_ptr` is null, then the standard search rule specifying the referencing directory is skipped. See "System Libraries and Search Rules" in Section III of the MPM Reference Guide. Normally `ref_ptr` is null.

The `entryname` and `entry_point_name` arguments are nonvarying character strings with a length of up to 32 characters. They need not be aligned and can be blank padded.

If a null string is given for the `entry_point_name` argument, then a pointer to the base of the segment is returned. In any case, the segment identified by `entryname` is made known to the process with the `entryname` argument initiated as a reference name. If an error is encountered upon return, the `entry_point_ptr` argument is null and an error code is given.

To invoke the procedure `entry_point` pointed to by `entry_point_ptr`, use `cu$gen_call` or `cu$sr_call`. (See the description of the `cu_subroutine` in the MPM Subsystem Writers' Guide.)
**Title:** RCP bug fixes

**Author:** B. Silver

**Summary of Proposal:**

Fix bug in RCP.

**Reasons:**

Access checking fails for private logical volumes.

**Implications:**

This change has been made in Phoenix on System M.

**Detailed Proposal:**

1. Fix bug that causes RCP to incorrectly interpret access to user disk drives.
SUMMARY:

Implement varying size hash tables and name hash threads for directory searches as described in MTB 293. The initial sizes will be 61, 251, and 1021. Add a version number to the directory header.

REASONS:

The current hashing algorithm limits the number of names in a directory; causes performance to degrade in a non-linear way for nearly full directories; and wastes space in small directories that use only a fraction of the fixed size hash table.

PROPOSAL:

Change directory control to use the new hash table formats and the salvager to reconstruct them.

IMPLICATIONS:

A full salvage which rebuilds directories is necessary to install this change.
Title: Change IMP DIM to not doubly wire temporary buffers

Author: D. M. Wells

- Coded in PL/I AM
- Planned for System MR
- Fixes Bug Number(s) Unreported
- Documented in MTB
- User/Operations-visible
- Interface change? yes
- Incompatible change? no
- Performance: Better
- Replaces MCR

Summary: Change the IMP DIM to not abs wire its temporary pages when they are already wired. Change Host-Host allocation strategy slightly so that several fewer pages are used when sending data to the local host -- i.e., "looping back" to ourselves.

Reasons: A change to the absolute main memory management procedures on Multics has caused an attempt to re-wire an already-wired page to have random effects, as these procedures now assume that their callers have already checked for this case. This sometimes causes the system to crash. A slight change in the Host-Host allocation policy will fewer small-buffer messages to be sent out when transmitting data to ourselves. This will reduce the need for space for small buffers, to hold untransmitted data.

Implications: Fewer crashes.

Detailed Proposal: Change the IMP DIM to not re-wire pages already wired. A later MCR will propose a mechanism for unwiring pages no longer needed, but that seems to be a minor performance change not worth waiting for, because

This is an emergency installation.
<table>
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**TITLE:** Move translator search rules Commands to SSS  
**AUTHOR:** Dennis Capps

Planned for System: MR 5.0  
Fixes Bug Number(s): not applicable  
Documented in MTB: not applicable  
Incompatible Change: no  
User/Operations-visible Interface Change: yes  
Coded in: ( )PL/I ( )ALM ( )other-see below  
Performance: ( )better ( )same ( )worse

**DOCUMENTATION CHANGES (specify one or more):**
- MPM (vol, sect) Commands
- MOSN (sect)
- PLMs (AN#)
- Info Segs
- Other

**OBJECTIONS/COMMENTS:**
- ( )Lib. Maint. Tools
- ( )Sys. Anal. Tools
- ( )Sys. Prog. Tools
- ( )355
- ( )BOS
- ( )Salvager
- ( )Ring Zero
- ( )Ring One
- ( )SysDaemon/Admin
- ( )Runtime
- ( )User Command/Subr

Headings are: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (optional)

**SUMMARY:**
Move the existing commands print_translator_search_rules (ptsr) and set_translator_search_rules (stsr) from the system tools library to the standard service system.

**REASONS:**
Several users of runoff have requested an explanation of how inserted files are located (runoff uses find_include_file_).
Some reorganization of the system libraries with respect to include files is planned and thereafter it will be necessary to provide users with a way to change their translator search rules.
A general search facility, on which there seems to be general agreement as the proper way to proceed with search rules, is languishing for lack of personnel, etc., and an interim solution is needed.
If these programs, which already exist, are moved from tools into the standard system, they can be documented for users and user documentation can refer to them.

**IMPLICATIONS:**
These will become fully supported commands with Honeywell committed to their maintenance.

**DETAILED PROPOSAL:**
Remove print_translator_search_rules and set_translator_search_rules from >system_library_tools>bound_search_tools_ and put them instead in >system_library_standard>bound_ti_term_ (where find_include_file_resides).
Move the documentation from the System Tools PLM to the MPM.
Name: set_translator_search_rules, stsr

The set_translator_search_rules command is a command interface to the find_include_file subroutine which allows manipulation of the search rules used to find include files by the language translators.

Usage

set_translator_search_rules paths

where paths are pathnames that are to be searched, in the order given, when searching for an include file. The default search rules are:

working_dir
>user_dir_dir>Project_id>include
>library_dir_dir>include

The command recognizes the following keywords which can be used instead of pathnames:

-working_dir
-home_dir
-referencing_dir
-default

Example

stsr >udd>m>include >ldd>bos>include >ldd>include
Name: print_translator_search_rules, ptsr

The print_translator_search_rules command prints the current translator search rules in effect for the calling process.

Usage

print_translator_search_rules
SUMMARY:

1. Change the manner in which the Answering Service outputs messages to the user so that ftp_dialup_ and other Answering Service modules recognize that they are communicating with an FTP user, and generate messages in accordance with this protocol.

2. Change Answering Service to refuse login if the user supplies a login argument such as -process_overseer, -home_dir, etc. and does not have the corresponding user attribute (vinitproc, vhomedir, etc.), instead of ignoring the argument and logging the user in anyway.

3. Change Answering Service to not print out any messages associated with a successful login if the user logs in using -brief control argument, and to suppress all operator/system warning messages while logged in if the user logs in using -no_warning. Presently, some messages are printed in spite of the use of these arguments.

4. Fix miscellaneous bugs.

REASONS:

1. This finishes the work begun earlier to cease using the transmogrifier (see MCR 2039) presently used to implement the Network File Transfer Protocol.
2. Multics conventions dictate that if a control argument to a command is unacceptable, the command should not perform the action at all.

3. The documentation says that the Answering Service presently functions in this manner. Also, this meaning of -brief is more in keeping with its meaning for other commands.

IMPLICATIONS:

1. FTP server will be much more robust and flexible.

2. User has greater control over the circumstances under which he is logged in.

3. Software will operate as documented and be more consistent.
-no_warning, -nw

suppress even urgent system warning and emergency messages from the operator, both at login and during the user's session. Use of this argument is recommended only for users who are using a remote computer to simulate a terminal, or are typing out long memoranda, when the process output should not be interrupted by even the most serious messages.

-outer_module p, -om p

attach the user's terminal via the outer module named p rather than the user's registered outer module, if the user has the privilege of specifying his outer module.

-terminal_type XX, -ttt XX

set the user's terminal type to XX, where XX is a string acceptable to the -terminal_type control argument of the set/tty command. (See the description of the set/tty command for a complete explanation of possible devices.) This control argument overrides the default terminal type.

-modes XX

set the I/O modes associated with the user's terminal to XX, where the string XX consists of modes acceptable to the tty_ I/O module. (See the tty_ I/O module description in the MPM Subroutines for a complete explanation of possible modes.) The XX string is usually a list of modes separated by commas; the XX string must not contain blanks. (See "Examples" below.)

Notes

Several parameters of the user's process, as noted above, can be controlled by the user's project administrator. The project administrator can allow the user to override some of these attributes by specifying control arguments in his login line.

If the project administrator does not allow the user to specify the -home_dir, -process_overseer, or -ring control arguments or if he does allow one or more of these control arguments and they are incorrectly specified by the user, these control arguments are ignored and the default values are used. A message is printed and the login is refused.
TITLE: Provide message to user when his password is given incorrectly

AUTHOR: Roy P. Planap (LCS-CSR)

Planned for System: not applicable
Fixes Bug Number(s): not applicable
Documented in MTB: not applicable
Incompatible Change: no
User/Operations-visible Interface Change: yes
Coded In: ( )PL/I ( )ALM ( )other-see below
Performance: ( )better ( )same ( )worse

DOCUMENTATION CHANGES (specify one or more)
MPM (vol.sect) MPAM (sect)
MOSN (sect) MSAM (sect)
PLMs (AN#) Info Segs
Other AL40

SUMMARY:

Have the Answering Service use the interuser message facility to inform the user that his password is being given incorrectly.

REASONS:

Provides more information to the user, since each attempt will produce a message giving type and identification of the offending terminal.
Also provides immediate notification if the user is logged in at the time.

IMPLICATIONS:

Information from the Answering Service becomes more easily accessible to the user. Greater aid in detecting attempted penetrations.

DETAILED PROPOSAL:

Text of message:

Password for user Smith,Proj given incorrectly from <type> terminal "<id>".

The Initializer will try to send the message to the user at the project specified in the login line; failing that, at the user's default project. If the message can not be sent at all, it is
Your password was given incorrectly xxx times recently.
Last bad password at <date-time> from <type> terminal "<id>".

or

Your password was given incorrectly at <date-time> from <type> terminal "<id>".

the next time the user logs in without using the "-brief" control argument.
Multics then, typing on the user's terminal, the printing of the password is either suppressed or hidden in a string of cover-up characters typed by the system. It is essential that the user keep his password secret to prevent unauthorized use of his programs and data and his account. If the user feels that his password has been compromised, he should notify his project administrator and immediately change his password. If the user ever forgets his password, he must notify the system administrator and request a new password. (Once a password is registered on the system, it is encoded and cannot be decoded by anyone, including the system administrator.)

If the user makes an error during the log-in procedure, the system informs him of it and asks him to try again.

Login Incorrect
Please try again or type "help" for instructions.

login TSmith
Password:

(The help command referred to in the system-generated printout is described in Section V.)

Each Multics installation sets its own limit on how many attempts a user may make to log in before the system automatically disconnects the line to the terminal.

Login incorrect
hangup

Project administrators may interpose another authentication procedure after the user types his password. The format of this procedure is determined by the individual project administrator.

After the user has successfully typed his password, the system responds with information regarding the user's last login.

TSmith ProjA logged in 07/03/73 0937.5 mst Tue from terminal "234"
Last login 07/02/73 1359.8 mst Mon from terminal "234"

The log-in statistics can be used to detect unauthorized use of the user's name and password on previous logins, since the user knows when he was last logged in. In addition, the log-in statistics inform the user of unsuccessful attempts to gain access to the system through his password. (Typing errors made by the user also count as unsuccessful attempts; see Section V for how to correct typing errors.)

In addition, the system informs the user of unsuccessful attempts to gain access to the system through his password.

login TSmith
Password:

Your password has been given incorrectly 2 times since last correct use.

TSmith ProjA logged in 07/03/73 0937.5 mst Tue from terminal "234"
Last login 07/02/73 1359.8 mst Mon from terminal "234"

From I nitializer, Sys Daemon (answering service ),
Password for user TSmith, ProjA given incorrectly from 2741"524"
**Title:** Provide new order calls for Network Answering Service software

**Author:** Roy P. Planalp (LCS-CSR)

---

**Planned for System:** not applicable

**Fixes Bug Number(s):** not applicable

**Documented in MTB:** not applicable

**Incompatible Change:** no

**User/Operations-visible Interface Change:** no

**Coded in:** (B)PL/I ( )ALM ( )other-see below

**Performance:** ( )better ( )same ( )worse

---

**DOCUMENTATION CHANGES (specify one or more):**

- MPM (vol,sect) MPAM (sect)
- MOSN (sect) MSAM (sect)
- PL1s (AN#) AN64
- Info Segs
- Other

---

**OBJECTIONS/COMMENTS:**

---

**SUMMARY:**

Provide "enable_xmog" and "disable_xmog" order call for Network Answering Service software to turn on and off transmogrification on channels being used by Network File Transfer Protocol (FTP).

**REASONS:**

Now that changes have been made to the Answering Service to talk FTP language directly, the transmogrifier will not be needed. The code is being retained temporarily to maintain compatibility between differences in the Network software and standard system software at RADC.

**IMPLICATIONS:**

Greater system robustness as the transmogrifier falls into disuse.

---

**SUMMARY:**

Provide "enable_xmog" and "disable_xmog" order call for Network Answering Service software to turn on and off transmogrification on channels being used by Network File Transfer Protocol (FTP).

**REASONS:**

Now that changes have been made to the Answering Service to talk FTP language directly, the transmogrifier will not be needed. The code is being retained temporarily to maintain compatibility between differences in the Network software and standard system software at RADC.

**IMPLICATIONS:**

Greater system robustness as the transmogrifier falls into disuse.
MULTICS CHANGE REQUEST

TITLE: Improve get_definition interface.

AUTHOR: Richard Bratt

Planned for System: not applicable
Fixes bug number(s): not applicable
Documented in Mid: not applicable
Incompatible Change: yes
User/Operations-visible Interface Change: yes
Coded in: ( ) PL/I ( ) ALM ( ) other-see below
Performance: ( ) better ( ) same ( ) worse

DOCUMENTATION CHANGES (specify one or more)

MPM (vol,sect) MPAM (sect)
MUSN (sect) MSAM (sect)
PLMs (AN#) tools
Info Segs
Other

OBJECTIONS/COMMENTS:

Summary: Improve the interface to get_definition_.

Reasons: This module, which has recently become user callable, has a rather poor interface. Fortunately it has yet to be documented. While we still have control over the callers of this program we should improve its interface.

Implications: The fast run unit manager, the prelinker, and a few private tools will have to be trivially changed.

Detailed Proposal: Change arguments two and three from pointers to fixed length varying strings to character (*) varying. Add a fifth argument to return an error code. (see attached writeup)
## Multics Change Request

**TITLE:** Fix trace bugs and inconsistencies  
**AUTHOR:** R.A. Barnes  
**CATEGORY:** Sys. Anal. Tools  
**STATUS DATE**  
**Written:** 08/11/76  
**Expires:** 02/24/77

### SUMMARY:

Fix bugs and make trace's handling of `-io_switch` control argument consistent.

### DETAILED PROPOSAL:

1. Fix bug that causes trace to misbehave when given a pathname of greater than 32 characters (as in MCR 2035).

2. Fix trace to call `com_err_` with `error_table_$bad_conversion` when non-numeric argument given where a numeric argument was expected.

3. Fix bug that caused trace to get incorrect statistics if metered procedure did a non-local goto.


5. Change documentation to reflect the fact that `%USAGE` is based on (virtual) CPU time, not real time.

6. Have `-io_switch` only affect output produced while monitoring (or tracing). Use `ioa_` for output produced in responding to a request.
CPU time does not include the time spent in any traced procedure called by the procedure, but it does include time spent in called procedures that are not being traced. The local and global versions of real time and page faults are calculated in a similar manner. Metering is only done when the first, last, every, and depth tracing conditions are satisfied.

The control argument:

- meter on, -mt on

sets the metering switch in the TCT; any procedures added to the trace table or that have their table entries updated after this argument is used are metered.

The control argument:

- meter off, -mt off

turns off the metering switch in the TCT; any procedures currently being metered continue to be metered.

The control argument:

- total

causes trace to print the metering statistics of all procedures in the trace table. The output gives the number of calls (#CALLS), global CPU time (GCPU), global real time (GREAL), global page waits (GPWS), local CPU time (LCPU), local real time (LREAL), local page waits (LPWS), and the usage percentage (%USAGE) based on local real time, of all the procedures being metered. The metering statistics are set to 0 after they are printed.

The control argument:

- subtotal, -stt

prints the same information as the -total control argument, but does not clear the statistics.
Changing Output Switch

All of the messages from the trace command that may be generated while actually monitoring procedures are normally written on the user_i/o switch so that trace can conveniently be used with procedures that change the attachment of the normal switch, user_output. The control argument:

-io_switch XX

causes trace to write further output on the switch specified by XX, which must already be attached and opened for stream_output.
TITLE: Change access required to carry

AUTHOR: Steve Herbst

Category (Check One)
- Lib. Maint. Tools
- Sys. Anal. Tools
- Sys. Prog. Tools

- Lib. Maint. Tools
- Sys. Anal. Tools
- Sys. Prog. Tools
- Document (Specify One or More)

User/Operations-visible
- Interface change? Yes
- Incompatible change? Yes
- Performance: Better
- Replaces MCR

Expires 02/24/76

Objections/Comments:

Use these headings: Summary of Proposal, Reasons for Proposal, Implications, Detailed Proposal.

SUMMARY:

1. Require less access on entries to be carried, as follows:
   - r to the carry administrator(s) and user on all segments
   - s to the carry administrator(s) and user on all directories

2. Carry the requestors' Person-Project id's for all carry requests and compute the access needed by the requestor to load his request at the target site. Do not load if the requestor could not load it himself.

REASONS:

1. This is just the access needed by the administrator process in order to read everything onto the tape (r & s). Currently, carry enforces the following additional unnecessary access checks (described in MCR 1691):
   - r to the user on all segments
   - s to the user on all directories
   - sma to the user and the administrator(s) on the parent directory.

2. The user should not require access to the parent directory, since this is at best a poor approximation to his access to the parent at the target site. Carrying user id's makes it possible to compute the actual access to the target parent.
The Multics Library command carry can be used to request that a copy of
a segment or a directory subtree be moved from one Multics system to
another. It can also be used to list or cancel pending carry requests.

Usage:

\texttt{carry \texttt{pathname(s)} -control\texttt{_args}-}

1) \texttt{pathname(s)} are one or more pathnames of segments or directory
subtrees to be carried. They can precede or follow
the control arguments.

2) \texttt{control\texttt{_arguments}} can be chosen from the following:

-destination \texttt{dest}

carry to (or list or cancel requests for) the
specified destination. Known destinations are:

- \texttt{ds \texttt{dest}}

carry to (or list or cancel requests for) the
specified destination. Known destinations are:

- \texttt{PCO} System M in Phoenix (default at MIT)
- \texttt{CISL} MIT Service System (default at PCO)
- \texttt{MIT} a synonym for CISL
- \texttt{DEV} CISL Development Machine (from MIT only)

A destination argument is required if a destination
other than the default is to be used, or if there is
no default at the user's installation.

-hold, -hd
do not delete the request from the message segment
when the carry tape is made. This will cause a copy
of the segment or subtree to be carried every time a
carry tape is made. This argument should be used
judiciously to avoid wasting resources with
unnecessary carries.

-cancel
remove one carry request from the message segment
for the specified destination. This argument can be
used to cancel both normal and -hold requests. There
are two restrictions:

1) The full pathname of the segment or subtree must
be typed exactly as it is stored in the message
segment (see -list below). An absolute pathname
given in a carry request is stored exactly as
typed. However, a relative pathname usually
expands into an absolute pathname containing long
names for the superior directories.

2) Only one request can be canceled at a time. If
more than one pathname is typed, the last one
typed is canceled.

A message is typed, either verifying that the
request has been canceled, or warning that the
request was not found.

-list, -ls
causes all the user's requests for the specified
destination to be typed on the terminal. The full
pathname of each request is typed. (These are
the pathnames that must be used in a -cancel
request.)

-admin
causes -list and -cancel to look at all users'
requests for the specified destination. However,
Notes:
To obtain just totals, or requests for a specific user or specific files, or to obtain usable copies of long, awkward-to-type pathnames for use in -cancel requests, use of the file_output command is recommended.

Note that the process that makes the carry tapes removes requests from the message segment several minutes before the tape is actually written. Therefore it is not safe to modify or delete segments immediately after carry requests for them disappear from the message segment.

Information on access required:
Access: In order for the entries being carried to be reloaded properly the following access requirements must be met:

1) Carry.Multics.* and the requester.* must have 'sm' access to the parent directory of the entry being carried.

2) For single segment carries, Carry.Multics.* and the requester.* must have 'r' access to the segment.

3) For directory subtree carries, Carry.Multics.* and the requester.* must have 's' access to all directories and 'r' access to all segments in the subtree.
**TITLE:** Streamline message segment facility

**AUTHOR:** S. Herbst

---

**Category (Check One):**
- Lib. Maint. Tools
- Sys. Anal. Tools
- Sys. Prog. Tools

**PLANNED FOR SYSTEM:** MR 5.0

**DOCUMENTATION CHANGES**

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<td>PLMS (AN #)</td>
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<tr>
<td>MPAM (Sect.)</td>
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<tr>
<td>MEAM (Sect.)</td>
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</table>

**STATUS DATE**

| Written | 08/17/76 |
| Status | A 08/24/76 |
| Expires | 02/24/77 |

---

**SUMMARY:**

Improve the performance of the message segment facility by making the following changes:

1. Change `mailbox_get_message_count_index` and `message_segment_get_message_count_index` to return `error_table_bad_segment` if the message segment has been salvaged since last read.
2. Change message segment programs to call `hcs_level_get` and `hcs_level_set` instead of the corresponding `cu_` entries.
3. Change the mail command not to close the user's own mailbox and to keep its index in internal static.

---

**REASONS:**

1. Eliminates mail's call to `mailbox_check_salv_bit_index`.
2. Fewer linkage faults. `cu_` was used as an intermediary for obsolete reasons.
3. Saves calling `mailbox_close` always and calling `mailbox_open` after the first time, for operations on the user's own mailbox.
TITLE: Improve hardware fault logging mechanism

AUTHOR: Noel I. Morris

Use these headings: Summary of Proposal, Reasons for Proposal, Implications, Detailed Proposal.

Reasons:
It is desired to get better information in the syserr log for certain faults induced by hardware malfunctions.

Summary:
Change the fault mechanism to log much more information on parity, startup, shutdown, and op-not-complete faults. Log all machine conditions (SCU data, PRs, regs, fault register, etc.) plus all history register data.

Proposal:
Replace the module parity_fault with the module hardware_fault. Minimize the amount of information printed online on the operator's console. Log all information which might be of use to programming staff and FED.

Implications:
The size of the largest binary message which can be logged via syserr$binary must be increased to 168 words.

The mechanism to attempt retry of a memory reference after a parity fault is removed. This mechanism never worked properly.

Programs which reference the syserr log for the faults mentioned above will have to be modified to recognize the new format.
## Multics Change Request

### TITLE: Fix bugs in rcp_init for tape

**AUTHOR:** Noel I. Morris

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<tr>
<th>Category (Check One)</th>
<th>Document</th>
<th>Specify One or More</th>
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<td>MPM</td>
<td>(Vol, Sect.)</td>
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<tr>
<td>User Cmmnd/Subr.</td>
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</tbody>
</table>

### Objections/Comments:

- Use these headings: **Summary of Proposal, Reasons for Proposal, Implications, Detailed Proposal.**

### Summary:

rcp_init currently does not recognize certain density capability codes in tape survey data. These codes are returned by certain MTH600 series drives. rcp_init also assumes that tape survey data will contain data for the tape drives in numerical order. This is not always so.

### Proposal:

Make rcp_init recognize new density codes. Change rcp_init to search the survey data for the data pertaining to each drive. (The drive number is encoded in the survey data.)

### Implications:

Multics will work with 600 series handlers and GM will have fewer problems when they reconfigure tape handlers via their peripheral switch.
TITLE: Remove lot_maintainer from pre_linking path

AUTHOR: Noel I. Morris

Use these headings: Summary of Proposal, Reasons for Proposal, Implications, Detailed Proposal.

Forthcoming changes to the linker will cause the lot_maintainer to be replaced. Thus, the only mechanism which would use the ALM procedure, lot_maintainer, would be the initialization pre-linking path. Most of the code used during initialization is straightforward and could be done in line where needed.

Proposal:
Modify pre_link_1, segment_loader, and slt_manager to perform LOT manipulation functions in line.
Summary:
A command fault which is not a packed pointer fault currently causes the FIM to go into an infinite loop. Change the fault handling mechanism to log a syserr message for such a fault in a manner identical to the logging done for other hardware-induced faults (e.g. parity).

Detailed Proposal:
Change the fim_table to have an additional entry for other command faults, in a manner similar to IPR faults. Create a new SCT index for this fault. Add code to hardware_fault to log this fault.

Implication:
This is not really an incompatible change since this fault cannot be generated by a user, and therefore, a user should not need to set an entry in the SCT for this fault.
Title: Fix bug in patch_fnn command

Author: Robert S. Coren

Planned for System: MR 5.0
Fixes Bug Number(s): not applicable
Documented in MTB: not applicable
Incompatible Changes: no
User/Operations-visible Interface Change: no
Coded in: ( ) PL/I ( ) ALI ( ) other—see below
Performance: ( ) better ( ) same ( ) worse

DOCUMENTATION CHANGES (specify one or more)
( ) APW (vol, sect)
( ) MPAM (sect)
( ) MDSN (sect)
( ) MSAM (sect)
( ) PLMs (AN#)
Info Sens
Other

None (reason) Bug fix

OBJECTIONS/COMMENTS:

Readings are: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (optional)

SUMMARY: Fix bug in patch_fnn command such that an extra word was sometimes patched with garbage.

REASONS: Code which was supposed to check and make sure that old contents of even-odd word pair were obtained didn't always work.

IMPLICATIONS: None.
MULTICS CHANGE REQUEST

TITLE: Implement VIP 7700 interface in MCS

AUTHOR: Robert D. Coren

Planned for System: MR 5.0
Fixes Bug Number(s): not applicable
Documented in "TB": not applicable
Incompatible Change: no
User/Operations-visible Interface Change: no
Coded in: ( ) PL/I ( ) AL ( ) other—see below
Performance: ( ) better ( ) same ( ) worse

DOCUMENTATION CHANGES (specify one or more)

1. Documentation
2. Info Secs
3. Other

OBJECTIONS/COMMENTS:

SUMMARY: Add control tables to FND to run Honeywell VIP 7700 terminal in non-pooled mode.

REASONS: A customer (RADC) has a need for this feature, and others might need it later. It is always good to support additional types of terminal if reasonably feasible.

IMPLICATIONS: None.

DETAILED PROPOSAL: Add new module, vip_tables, to MCS core image, with associated modifications to control tables interpreter. Allow "VIP" as an acceptable value for the "line_type" keyword in the CMF.

NOTES: 1. Coded in 855map.
2. This is the first stage toward eventual support of a particular poll-and-select interface.
From: Robert S. Coren
To: MCR Board
Date: 8/20/76
Subject: Documentation associated with MCR 2140

The accompanying documentation tells users what they need to know about using the VIP terminal on Multics. It should probably be incorporated somehow into the 5.0 SRB. Where it should ultimately end up is a question I do not propose to answer.
Use of VIP Terminal On Multics

Multics Release 5.0 supports the Honeywell VIP (Visual Information Projection) Type 7705 Keyboard Display Station, a 2400-baud CRT/keyboard terminal. For a general description of this terminal, see the publication “7700 Series Visual Information Projection (VIP) Systems,” Order No. AL29. As of MR5.0, the terminal is supported for non-pollled operation only.

The following jumper options must be selected on the VIP 7705:

<table>
<thead>
<tr>
<th>Option</th>
<th>State</th>
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</thead>
<tbody>
<tr>
<td>Transmit Block Size</td>
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<tr>
<td>Non-Pollled Operation</td>
<td>YES</td>
</tr>
<tr>
<td>2-Wire Communication System</td>
<td>YES</td>
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</tbody>
</table>

CONNECTION TO MULTICS

The VIP terminal may be connected to an ASCII synchronous subchannel of an HSLA by means of a Bell 201C (or compatible) modem.

CMF SPECIFICATION

The VIP terminal should be defined by an entry in the Channel Master File of the following form:

```
name: channel_name; /* depends on HSLA subchannel selection
line_type: VIP;
baud: 2400;
terminal_type: ASCII;
dataset: 201C;
attributes: hardwired; /* if appropriate */
```
USE OF THE VIP TERMINAL ON MULTICS

Transmission of Input

The VIP terminal does not transmit character by character, but rather sends an entire message when the TRANSMIT key is depressed. Pressing this key causes transmission of everything on the screen from the end of the most recent input or output message up to the present position of the entry marker (cursor), followed by a newline character. Normally, the user should use the TRANSMIT key at the end of each line of input, rather than the NEW LINE key.

The terminal's operation is strictly half duplex; input cannot be entered while output is being displayed.

Terminal Modes

The default modes for a terminal type of ASCII are suitable for the VIP terminal except that the line length may be set to 80 and the page length should be set to 23. Since the terminal clears its screen on receipt of a formfeed character, vertsp mode may be used. The delay timings should all be set to zero. The following command line should be entered early in the terminal session:

```
set_tty -delay 0,0,0,0,0,0 -modes p123,1180,vertsp
```

Clearing the Screen

Output which cannot fit on the screen is discarded. Accordingly, the page length should be set as described above; when the end-of-page warning appears on the screen, the CLEAR key should be depressed to clear the screen, and a formfeed should be entered by simultaneously pressing the CTR (control) and L keys, followed by any input (the terminal will not transmit the CTR-L combination without at least one visible character; the 0 character can be used for this purpose if the user does not wish to enter any input). The CLEAR key does not cause transmission of any characters.
Use of VIP Terminal On Multics

**Quit Signals**

The terminal is not equipped with a break (interrupt, attention, etc.) key. In order to generate a quit signal, the user must input the combination CTR-Q, along with some visible input (which is discarded). It is not possible to quit while the terminal is displaying output (this can be circumvented by entering the quit sequence in response to the end-of-page warning).

**Blanking**

The BLANK key (with case shift) causes display of all succeeding characters up to the next space or the end of the line to be suppressed. It also transmits a tilde (˜) character. Thus, in order to conceal a password, the user should type BLANK, the erase (§) character, and the password. Overstrike on the VIP terminal is destructive, so the password mask is ineffective.

Output of a tilde also causes the remainder of the line up to the next space to be suppressed.

**Blinking**

The BLINK key (no case shift) behaves like BLANK except that following characters, instead of being suppressed, will blink. The character transmitted is a circumflex (ˆ). Similarly, output of a circumflex causes the following characters up to the next space or end-of-line to blink. The circumflex itself is displayed as a space. Additional circumflex characters within the blinking field are displayed as circumflexes.
MULTICS CHANGE REQUEST

TITLE: Install general_ready

AUTHOR: Cynthia W. Anderson (PDO)

Planned for Systems: not applicable
Fixes Bug Number(s): not applicable
Documented In MTB#: 113
Incompatible Changes: no
User/Operations-visible Interface Changes: yes
Coded in: PL/I (ALM) other-see below
Performance: better (same (worse

DOCUMENTATION CHANGES (specify one or more)
- MPM (vol, sect) commands, 3 MPAM (sect)
- MOSN (sect)
- PL/I (AN#)
- Info Segs: general_ready.info
- Other

OBJECTIONS/COMMENTS:

SUMMARY: Install general_ready.

REASONS: New command would allow user to set up a ready message containing values he specifies, in a format he specifies.

IMPLICATIONS: Increased flexibility in ready message format.

DETAILED PROPOSAL:
See attached documentation.
Name: general_ready, gr

general_ready is a command/active function which allows the user to produce a ready message containing specific values in a user specified format. The program is designed to allow an almost arbitrary format at no additional cost (relative to the system's ready procedure) other than the cost associated with the general_ready command which sets up the ready message. Once a ready message has been specified, the ready_on, ready, and ready_off commands will control the printing of the ready message in the normal manner.

general_ready builds up an ioa_control string from the order of the keywords passed to it. The keywords specify which values to output in the ready message. Virtual cpu usage, real cpu usage, and dollar cost can be printed. Both incremental usage (usage accrued since the last ready message produced by general_ready) and total usage (usage accrued during this process) can be in the same ready message with the precision of the output (the number of decimal places to the right of the decimal point) specified by the user. As a command, general_ready can be used to either print a single ready message or define the contents of the ready message printed by the ready command (and after every command line if the ready_on command is executed). When used as an active function, general_ready's return value is the ready message specified by the active function arguments.

Usage

general_ready -prefix options- -format options- -control options-

The prefix options affect the format of the ready message but do not specify the values printed in the ready message. The format options specify both the values printed and their format in the ready message. The control options do not affect the format of the ready message, but instead control how the ready message and other facilities provided by general_ready are used. Control options may not be specified when general_ready is invoked as an active function. The prefix options must occur before any format options; while the control options may appear anywhere on the command line.

Format Options

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The format and content of the ready message is controlled by format options. These options include: keywords which identify values to be included in the ready message; optional arguments following these keywords which control the number of digits after the decimal point in numeric values; and literal character strings which are inserted in the ready message. The format options are combined in the order of their appearance in the general_ready command to form an loa_control string which controls the format of the ready message.

Six types of values may be used in a ready message: processor usage values (virtual and real CPU seconds); memory usage values (memory units); paging operations (both bulk store reads and demand page faults); usage cost values (dollar charges); command processor level numbers; and date/time values (date, time of day, day of the week, etc). Both total usage values (total usage accrued during this process) and incremental usage values (usage accrued since the last ready message printed by general_ready) can be output in the same ready message. The values are selected for use in the ready message by the format keywords which are given in the command. The format keywords are listed below by type.

1) processor usage values are selected from the following keywords. These keywords can be followed by an optional argument, a single numeric digit from 1 to 9, to indicate the number of digits which should appear to the right of the decimal point in the number which is output. The default is 3 digits. The output format of the value can be described by the loa_control string "-di" where d is 3 by default.

-ri
-rcpui incremental real cpu value

-rt
-rcput total real cpu value

-vi
-vcpui incremental virtual cpu value

-vt
-vcput total virtual cpu value

2) memory usage values are selected by the following keywords. These keywords are used in the same manner as the keywords for processor usage values above.
-memoryl
-mul
-mem1 incremental memory units

-memoryt
-memt
-mut total memory units

3) usage cost values are selected by the following keywords. These keywords are used in the same manner as the keywords for processor usage values with the following differences. The default number of digits following the decimal point is 2. The output format of the value can be described by the loa_control string "$-d$p$" where $p$ is 2 by default.

-dollarsl
-$sl incremental cost charges

-dollarst
-$st total cost charges

4) paging values are selected from the following keywords. These keywords are output by the loa_control string "$-d$-d$", where the first number is the number of bulk store pages read (formerly the number of pre-pages) and the second is the number of demand page faults.

-pagesl
-pgl incremental paging values

-pagest
-pgt total paging values

5) command processor level numbers are selected by the following keyword. This keyword indicates that the command processor and stack frame level numbers should be included in the ready message. No optional argument may be used to control the number of digits. The level numbers are output by the loa_control string "$-a$", but the printed format can be described by "level $-d$-$d$" where the first number is the number of command processor invocations and the second is the stack frame depth of the ready message procedure's stack frame. If the command processor level is 1, the printed format is the null string.

-level
-IV  command processor level numbers

6) date values are selected by the following keywords. These values can be described by the loa control string "a" except for the -min, -day, and -year keywords which use the loa control string "a" (without a leading space). No optional argument may be used to control the number of digits.

-`date and time (mm/dd/yy hh:mm m zzz www)
-`date 8 character date (mm/dd/yy)
-`month 2 digit month (mm)
-`day 2 digit day (dd)
-`year 2 digit year (yy)
-`time
-`tm 6 digit time of day (hh:mm)
-`hour 2 digit hour (hh)
-`minute
-`min 2 digit minute (mm)
-`dow 3 character day of week (www)
-`zone 3 character time zone (zzz)

Note that all values except those date values mentioned under 6 above are preceded by a space and none of the values are suffixed by a space. Any non-keyword argument (other than a single numeric digit following a floating point or dollar keyword) is assumed to be a literal string which is inserted in loa control string being built by general_ready. Refer to the examples below.

Prefix Options

There are two prefix options. These options must occur prior to any of the format options described above. The two prefix options allow the user to override the default formats for the contents of the ready message, they are:

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general_ready

String

-string

-sets

allows the user to specify the character string at the beginning of the ready message. The argument following this option is used instead of "r" at the beginning of the ready message. Since it is put into the loa_control string, "-s", "-r" and "-b" may be used to cause new lines, red ribbon shifts and black ribbon shifts, respectively.

Control Options

The following control options affect the operation of general_ready, but do not change the format of ready messages.

-set

causes general_ready to establish itself as the current ready message procedure. The command processor will then call general_ready to print a ready message after each command line is complete. In addition, the system commands, ready, ready_on, and ready_off, will affect the operation of general_ready. This option also causes general_ready to set an alarm timer to catch shift changes.

-reset

causes general_ready to make the system ready proc the current ready message procedure, and to reset any timer alarms which were established to catch shift changes.

-prmsg

-pm

when used with the -set control option, causes general_ready to call the print_messages (pm) program after the completion of every command line. This
allows the user to defer messages queued by the lpc_message_facility until each command line has completed execution. Any queued messages are typed just before the ready line, even if the ready_off command has been called to turn off ready messages.

-call command-line
-cl command-line

when used with the -set control option, causes general_ready to call the command processor to execute command-line after the completion of every command line. command-line is a single argument to general_ready and therefore, it must be enclosed in quotes if it contains any blanks. command-line is executed even if the printing of ready messages has been inhibited by executing the ready_off command.

The -set and -reset control options are mutually exclusive. A general_ready command which includes -set does not print a ready message. Instead, it saves the loa_control_string built from the format and prefix options in the command, and uses this loa_string to control the format of ready messages printed when command lines complete execution or when a ready command is issued.

A general_ready command which includes -reset prints a single ready message, only if format or prefix options appear in the command with the -reset option. Otherwise, no ready message is printed.

If neither -set nor -reset is given, then general_ready prints one ready message according to the format and prefix options given in the command.

Examples

The following examples illustrate some of general_ready's facilities:

gr -string READY -date "xTIME" -time "xVCPU" -vi -vcput -set

The above command line establishes general_ready as the current ready procedure since the -set keyword appeared. Each ready message would have the format:

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If the `set` keyword had not appeared, a single ready message having the above format would be printed.

The loa control string which `general_ready` uses to generate the above ready message would be:

```
"READY `a`TIME `a`VCPU `f`2/"
```

The command line:

```
gr -s READY -date -hour 1 -min `xVCPUI -vcpu1 -vCPU2 -VCPUI 2
```

would result in a single ready message of the format:

```
READY 01/15/74 09:16 VCPUI 2.345 VCPU 3.456 23.349
```

using the loa control string:

```
"READY `a` TIME `a`VCPU `f`2/"
```

The above ready message could have been specified by the command line:

```
gr -ctl "READY `a`xVCPUI `f`2/" -date -hour -min -vcpu1 -vCPU2
```

**Note**

The values for total virtual cpu time and total memory units are valid across new processes. The value for dollars will be valid unless a shift change occurred during a previous process. When `general_ready` is invoked for the first time in a process, the dollar cost of all usage (in that process) up to that point in time is computed at the rates then in effect.

Due to the manner in which ready message procedures and procedures which set up alarm timers are invoked, such procedures should not be terminated (by the `terminate`, `terminate_refname`, etc. commands). If it is desired to terminate `general_ready`, `general_ready` should be invoked with the `-reset` option before it is terminated.
general - ready

Control any changes

-vi → -inc_vcpu
-vt → -total_vcpu
-memoryi → -inc_num_units
-memoryt → -total_mem_units
-dollarci → -inc_cost
-dollarct → -total_cost
-pagei → -inc_pf
-pagect → -total_pf
-level → -level
-date-time → -date_time
-date → -date
-month, -day, -year, -time (-tm), -hr, -minute (-min),
-day-name (-dn), -zone, -string (-str), -control (-ctl)
-revert (new)

-printmsg → -print_messages
### SUMMARY:

1. Change MRDS bind file so that mrd$$_{\text{data}}$$ entries are external for use by future utilities such as the end user facility.
2. Fix bugs in selection expression translator to:
   - properly parse a ">=<" nonblank" character string,
   - correct a looping situation in certain situations.
3. Fix bugs in data base search procedures to:
   - allow for duplicate existential variables within a selection expression,
   - correctly handle ">" and ">=" relational operators between binary operands,
   - retrieve multiple tuple variables in certain cases,
   - retrieve tuples when no constant is specified in the selection expression.

### IMPLICATIONS:
Above bugs will be fixed.
**TITLE:** Change `p@_abs` to accept the `-profile` argument  

**AUTHOR:** Rick Kissel  

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| Status               | Written 8/25/76  |
| Exprires             | 08/31/77        |

**Objections/Comments:**

- Replaces MCR

**Use these headings:** Summary of Proposal, Reasons for Proposal, Implications, Detailed Proposal.

**Summary:**

Fix MPRF 009400 which says `p@_abs` does not accept the `-profile` control argument.

**Reason:**

Documentation specifies `p@_abs` should accept `-profile`. `p@_abs` currently replies with: "Control argument not implemented."

**Detailed Proposal:**

delete use of variable `compop_total` and use instead `lbounds(opt_table, 1)` and `hbounds(opt_table, 1)`.
TITLE: Make help accept pathnames

AUTHOR: S. Herbst

Status Date
Written 8/25/76
Expires 2/31/77

CATEGORY (CHECK ONE)
Lib. Maint. Tools
Sys. Anal. Tools
Sys. Prog. Tools

DOCUMENTATION CHANGES

Explain in DETAILED PROPOSAL

Fixes Bug Number(s)
355

User/Operations-visible
BOS
Salvager
MPM (Vol, Sect.) AG92

PLANED for System MR 5.0
- Anal. Tools
- DOCUMENTATION CHANGES
- Planned for System MR 5.0
- User/Operations-visible
- Planned for System MR 5.0

Objections/Comments:

MPM should show difference between help -pn foo and help foo

Use these headings: Summary of Proposal, Reasons for Proposal, Implications,
Detailed Proposal.

SUMMARY:

Change the help command to accept a relative or absolute pathname as the name
of a help file.

REASON:

Saves having to remember to type "-pn path" & is unambiguous. If the argument
contains > or <, it is a pathname, otherwise it is a name to be searched
for in the help directories.
help

**Usage**

```
help -name- -control_args-
```

where:

1. **name** specifies the info segment that the user wishes to read. The command searches for the name first in the installation-dependent information directory, then in the system information directory. If name does not have the info suffix, one is assumed. The star convention may be used. (See "Notes" below for information about the use of the star convention with the help command.) The name argument and the -pathname control argument (described below) conflict -- only one can be used.

2. **control_args** work "forward" in the info segment. They take effect at the header line and scan to the end of the segment; no wraparound feature is employed. The control arguments may be chosen from the following:

   **-pathname path,** specifies the info segment path that the user wishes to read. The command does not search in the installation-dependent or system information directories. If path does not have the info suffix, one is assumed. The star convention may be used. The -pathname control argument and the name argument (described above) conflict -- only one can be used.

   **-pn path**

   **-header, -he** prints only the heading line(s) (consisting of a title, segment modification date, and line count) of the info segment. The -header and -title control arguments conflict -- only one can be used.

   **-title**

   **-section SS,** searches the info segment for the section title SS and starts printing from that section. If the section title SS is more than one word, it must be enclosed in quotes. Printing continues only to the end of the first paragraph of that section. Then the user is asked if he wants more help. (See "Requests" below for information about the query and possible user responses to it.) If the -section and -search control arguments are given, the -section search is done first.
**TITLE:** Change location of default mailbox

**AUTHOR:** S. Herbst

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<tr>
<th>Category (Check One)</th>
<th>STATUS</th>
<th>DATE</th>
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<td>Written</td>
<td>8/23/76</td>
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<td>Expires</td>
<td>8/23/77</td>
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**Planned for System:** MR 5.0

**Expires:**

**Expires:**

**User/Operations-visible Interface change?** Yes

**Incompatible change?** Yes

**Performance:** Better

**Replaces MCR**

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**Objections/Comments:**

Pending changes notice required

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**Use these headings:** Summary of Proposal, Reasons for Proposal, Implications, Detailed Proposal.

**Summary:**

Change the mail command to look in

```
>udd>Project_id>Person_id
```

rather than in the home directory for the user's own mailbox when reading mail.

**Reason:**

Compatibility with accept_messages. Both mail and send_message send to Person_id.Project_id.

**Implication:**

Incompatible change should not affect most users.
The `mail` command allows the user to send a message to another user or to print messages in any mailbox to which he has sufficient access. The extended access used on mailboxes permits the creator of a mailbox to firmly control other users' access to his mailbox. Adding, reading, and deleting messages are independent privileges under extended access. For example, one user can be given access to only add messages, and another user to add messages and also read and delete only the messages he has added. For more information on extended access, see "Creating a Mailbox" below. Mail sent to a user is placed in the mailbox named `~user_dir_dir>Project_id>Person_id>Person_id.mbx` in his home directory.

**Usage**

To send mail:

```
mail path Person_id project_id ... -Person_id- -Project_id-
```

where:

1. **path** is the pathname of a segment to be sent or is an asterisk (*) to indicate that the user wishes to type a message to be sent (see "Composing Mail" below).
2. **Person_id** is the name of a person to whom mail is to be sent.
3. **Project_id** is the name of a project on which **Person_id** is registered.

To print mail:

```
mail -path- -control_arg-
```

where:

1. **path** is the pathname of a mailbox. If the mbx suffix is not given, it is assumed. If no path argument is given, the contents of the default mailbox is printed (see "Creating a Mailbox" below).
2. **control_arg** can be `-brief` or `-bf` so that only the total number of messages in the mailbox is printed. If the mailbox is empty, nothing is printed.
SUMMARY

Install a set of routines which understand the format of the CDT and the interfaces to the ring-0 FNP load and dump routines. These routines run in ring-4 and will live in bound_mcs_init_ on the tape, collection 3.

REASONS

These routines provide answering service support for FNP loading and dumping.

DETAILED PROPOSAL

tty_init_ - will parse the cdt and call ring 0 to initialize tty_buf

load_fnp_ - will find the coreimage, parse the cdt' to determine configuration, patch the coreimage and call ring 0 to initiate the load. A wakeup will be sent to the caller with load completion status.

fdump_fnp_ - will create a segment in >dumps and call ring 0 to dump the FNP into it, 1K at a time.

parse_tty_name_ - is a utility which will return an FNP number, adapter type and number, and subchannel number given a tty name.

NOTES

tty_init_ and load_fnp_report errors via sys_log_.

Page 1
SUMMARY

Install Answering Service 9.0. This answering service contains the final phase of support for Multics bootload of FNPs along with several bug fixes.

REASONS

This facility allows FNP crashes to be handled by Multics with the answering service taking dumps and reloading the FNP. This should improve the reliability and availability of Multics.

DETAILED PROPOSAL

Create a Version 2 CDT which contains the FNP configuration information previously supplied in the config deck. Modify the answering service to maintain this information. Modify as_init_ to bootload configured FNPs and accept dialups from them when the bootload completes. Install a new routine to handle FNP crashes by dumping and reloading the FNP.

The following points outline the major changes:

- add the baud and dataset statements to the channel entry and add a FNP entry consisting of several new statements to the CMF. Change cv_cmf to
translate the new statement types. See attached documentation for cv_cmf.

- add the fnp_manager_ routine to the answering service.

- modify as_init_ to do the following:
  - call fnp_manager_$fnp_manager_init to initialize the TTY DIM and start FNP loads.
  - start the message coordinator automatically.
  - turn on up_sysctl_ early, to allow table installations to be done. This may be necessary to correct problems which caused AS initialization failure (e.g., missing CLT).

- failure of FNP initialization will not be fatal, since users could login via the network or other FNPs if more than one is used.

- the "CET not found" condition during as_init_ will be fatal (instead of creating a null CDT) since information used to initialize the hardcore and the FNPs would not be present. Proceeding with this initialization using an empty CDT would prevent use of any tty channels for the rest of the bootload.

- define new service types: INACTIVE (it's there, but don't use it) and ACTIVE (opposite of INACTIVE, but only for FNPs)

- have fnp_manager_init call fnp_manager_$fnp_load for each ACTIVE and configured FNP in the CDT, after verifying that the FNP is in the config deck.

- have fnp_manager_$fnp_wakeup_handler handle the following two wakeups:
  - FNP_UP - fnp_manager_ will "listen" to all lines on the FNP which just came up, provided as_init_$go has been executed.
  - FNP_DOWN - fnp_manager_ will take a dump of the FNP, and will start a reload of the FNP unless the FNP appears to be in a crash loop.

- have as_init_$go call fnp_manager_$fnp_go, to listen to lines on FNPs already up.

- modify up_cdt_ to add and delete FNPs and channels. Mark added FNPs as not usable until the next Multics bootload.

- make slave service type work. This is really needed now since the answering service will now own all FNP channels. Use acs segments to control access to slave channels.

- remove most line_type setting "features" from the operator attach command. These are not documented and are very non-standard.

- fix problems in dial_ctl_. Clean up dial_term and dial_broom entries.

- line_type statements will be required for ARDS lines on 202C6 modems. This eliminates complicated guessing code, and removes the requirement that the ARDS control tables be loaded by MCS in order to run any 1200 baud terminal.
- install convert_cdt to translate version 1 CDTs to version 2. A correct CMF may be generated from the version 2 CDT by using "dump_cdt -cmf CMF".

- add the following operator commands:

```
load_fnp FNP_NC {-no_start -check}
```

used to force the bootload of an FNP that was INACTIVE or got into a crash loop.

```
start_fnp FNP_NC
```

to start answering phones on an FNP loaded by load_fnp -no_start

```
stop_fnp FNP_NC
```

to stop answering phones on this FNP, and inhibit automatic bootloads of the specified FNP, by setting its current service type to INACTIVE.

```
fdump_fnp FNP_NO
```

to force a dump of the specified FNP.

- add the bump-by-fnp option to the bump command. To bump all users on an FNP type "bump fnp a".

- make attach and detach be opposites, and make remove be a synonym for detach.

**INSTALLATION PLAN**

A three phase plan will be used for this answering service to become fully operational.

1) Install dummy interfaces to hardcore routines. (in 28-11)

2) Install AS9.0 in special session. Convert the CDT to version 2 and create a CMF from it.

3) Delete LD355 from runcoms and boot Multics 30-0.

4) Remove LD355 , B355 and MCS from BOS.
MH updates for new commands dealing with FNPs:

**ERROR_MESSAGES** (to be inserted on page 6-16.2)

The commands that expect an FNP tag as one of their arguments will produce the following error messages, under the circumstances described:

admin: COMMAND error - No FNP tag specified.

The FNP tag argument is missing.

admin: COMMAND error - Invalid FNP tag: TAG

The FNP tag given is not one of the letters "a" through "h".

admin: COMMAND error - FNP TAG was missing from CONFIG deck or CDT at bootload time.

The specified FNP is listed in the CDT. However, in order to be used, an FNP must have been in the CONFIG deck at Multics bootload time, and in the CDT when the startup or multics command was issued.

admin: COMMAND error - No CDT entry for FNP TAG

The specified FNP is not listed in the CDT. Before it can be used, it must be added to the CDT, and then Multics must be shut down and rebooted.
This command forces an immediate FDUMP of the specified FNP. This causes the FNP to crash, hanging up any users logged in over its channels. Therefore, if there are any such users, their number is printed, and the operator is asked if the dump should still be taken. Any reply other than "yes" causes the dump not to be taken, and the FNP to continue running. Type:

`fdump_fnp TAG`

to force an FDUMP of FNP TAG. TAG can be one of the letters "a" through "h".

A message is printed, giving the pathname of the segment containing the FDUMP. This is not a printable segment; its contents can be examined and interpreted by a system programmer, using the `online_dump_fnp (od_fnp)` command.

This command should only be used at the direction of the system programming staff. The answering service automatically dumps and then reloads an FNP if it crashes.
This command forces an immediate reload of the specified FNP. Reloading a running FNP hangs up any users logged in over its channels. Therefore, if there are any such users, their number is printed, and the reload is refused. The FNP should be stopped, and the users bumped, before the reload can take place. (See the stop_fnp and bump commands.) Type:

\texttt{load_fnp \texttt{TAG} \{-control\texttt{_args}\}}

to initiate a load of FNP \texttt{TAG}. \texttt{TAG} can be one of the letters "a" through "h". The optional control arguments can be:

- \texttt{-no\_start, -ns} do not listen for calls on this FNP's channels, when the load completes. The default is to listen to the channels. (See the start_fnp command.)

- \texttt{-check, -ck} check consistency between channels listed in the CDT and channels actually configured on the FNP, reporting inconsistencies on the FNP console. Should be used after any change in channel configuration.

This command should only be used at the direction of the system programming staff. The answering service loads FNPs automatically, under normal circumstances.

\textbf{Errors:}

\begin{verbatim}
admin: load_fnp error - unknown argument: ARG
admin: ERROR_MESSAGE load_fnp
\end{verbatim}
This command causes an FNP that is already UP (loaded) to be made ACTIVE, and all the channels configured on it to be listened to. This command can be used after a load_fnp command that was issued with the -no_start argument, or after a stop_fnp command, to reverse the effect of the latter command. For an FNP that is not UP, the load_fnp command must be issued. Type:

```
start_fnp TAG
```

To start FNP TAG. TAG can be one of the letters "a" through "h". If the FNP is up but not running, no messages are printed. If it is in the process of loading, the message:

```
start_fnp: FNP TAG will be started when its bootload (in progress) completes.
```

is printed.

Errors:

```
admin: start_fnp error - FNP TAG has not been loaded.
admin: start_fnp error - FNP TAG is already up and running.
admin: ERROR_MESSAGE start_fnp
```
**stop_fnn**

This command causes the specified FNP to be made INACTIVE. This makes the FNP stop listening for further calls on its channels, if it is up and running; it inhibits the listening to the channels after a bootload, if one is in progress; and it prevents automatic reloading of the FNP if it crashes (or is crashed by the dump_fnp command). Users currently logged in over the FNP's channels are not affected. Type:

```
stop_fnn TAG
```

to stop FNP TAG. TAG can be one of the letters "a" through "h".

Type:

```
bump_fnn TAG -MM- -MESSAGE-
```

to bump all users logged in over this FNP's channels (see the bump command for more information). This sequence of two commands is the recommended method of taking an FNP out of service while Multics remains up.

The effect of the `stop_fnn` command can be reversed by issuing the `start_fnn` command, provided that the FNP remains up during the time it is out of service. If it does not remain up, the `load_fnn` command must be used to return it to service.

**Messages:**

- **stop_fnn**: FNP TAG will not be booted. (if issued before startup)
- **stop_fnn**: FNP TAG is down and will not be booted.
- **stop_fnn**: FNP TAG is booting but will not be started.
- **stop_fnn**: FNP TAG is up and running, but no longer accepting calls.
MULTICS CHANGE REQUEST

TITLE: Fix FAST to prevent E request in edm

AUTHOR: Susan Barr

Planned for System: MR 5.0
Fixes Bug Number(s): not applicable
Documented in MTB: not applicable
Incompatible Change: no
User/Operations-visible Interface Change: no
Coded in: (B)PL/I ( )ALM ( )other-see below
Performance: ( )better ( )same ( )worse

DOCUMENTATION CHANGES (specify one or more)
MPM (vol,sect)  MPAM (sect)
MOSN (sect)  MSAM (sect)
PLMs (AN#)
Info Segs
Other

None (reason) bug fix

OBJECTIONS/COMMENTS:

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SUMMARY:

The FAST process overseer calls cu_$set_cp so that any attempt to reach command level from edm will cause a FAST error message to be printed and a return to be made. This call is made in the wrong location in the code such that it does not always get executed.

REASONS:

FAST is a limited subsystem.

DETAILED PROPOSAL:

Move call to correct location.
**Summary:**

Install new copy of bound_fortran_ (the old fortran compiler).

**Reasons:**

1. New copy required to maintain compatibility with code generator. Parts of internal interface have changed.

2. Performance improvement. Compiler has been recompiled with MR5.0 compiler, resulting in 4% reduction in records used by the compiler.

3. Implement new option "-new fortran" to allow this compiler to assume that all double precision and complex data items are double word aligned. Normal mode for this compiler does not make that assumption.

**Implications:**

1. The old fortran compiler will continue to work in MR5.0.

2. Faster compilation.

3. Faster execution times possible using this new option.