DATE: November 16, 1973
TO: Distribution
FROM: M. S. Hodges
SUBJECT: Multics Change Requests

Attached are copies of Multics Change Requests which were approved from November 1 through November 15, 1973.
**TITLE:** Fix to 1050 addressing problems

**AUTHOR:** R. B. Snyder

**SOURCE:** (if external) e.g., "User", "Marketing"

**CLASSIFICATION** | **JUSTIFICATION** | **Replaced by proposal MCR**
---|---|---
Incompatible Change | Marketing Requirement | Implemented in System
Extension | Conformance to Standard | Objections/Comments:
Restriction | Increased Consistency |
Performance Improvement | Simplification |
Reliability Improvement | Generalization |
X Improvement | X Bug Fix |

**REASONS:** A problem using IBM 1050's has existed wherein a user trying to type while the system was trying to send output resulted in the output being lost.

**SUMMARY:** A bug was found in the 355 code and a timing change was made in the tty control tables.

**IMPLICATIONS:** None
TITLE: Add disk to Multics via Salvager

AUTHOR: A. Kobziar

SOURCE: (if external) e.g., "User", "Marketing"

CLASSIFICATION | JUSTIFICATION | Replaced by proposal MCR
--- | --- | ---
Incompatible Change | Marketing Requirement | Implemented in System
X Extension | Conformance to Standard | Objections/Comments:
Restriction | Increased Consistency |
Performance Improvement | Simplification |
Reliability Improvement | Generalization |
| | Bug Fix |

Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

REASONS: Adding more disk requires increasing the device maps in the FSDCT which may have to grow onto another page(s). Since the FSDCT has no branch, the normal Multics mechanisms cannot be used.

SUMMARY: Adding more disk is accomplished simply by changing the PART cards and running a long salvage.

DETAILED PROPOSAL: If the salvager finds that the FSDCT constructed from PART cards is larger than the one Multics had previously, it will obtain free addresses from the Multics partition, update the FSDCT map (which is in the 1st page of the FSDCT) and write out the new FSDCT.
**MULTICS CHANGE REQUEST**

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Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**REASONS:**
Currently the Salvager views addresses starting with 777 ... as well as a device id = $\emptyset$ as being null addresses. Page control recognizer only did $\emptyset$ as a null address.

**SUMMARY:** Remove the recognition of addresses starting with 777 ... as null addresses, thus making these available for use if needed (and configured).
MULTICS CHANGE REQUEST

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Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

REASONS: If the Salvager crashes and ESD is typed on the operators console, the Multics emergency shutdown sequence is executed rather than one for the Salvager. This will always crash.

SUMMARY: Change emergency shutdown to call salv_esd if the salvager is running.
TITLE: Fix bug in delete subroutine

AUTHOR: E. Stone

SOURCE: (if external) e.g., "User", "Marketing"

CLASSIFICATION | JUSTIFICATION | Replaced by proposal MCR
Incompatible Change | Marketing Requirement | Implemented in System
Extension | Conformance to Standard |
Restriction | Increased Consistency |
Performance Improvement | Simplification |
Reliability Improvement | Generalization |
X | Unreported Bug Fix |

Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

REASONS: This procedure does not delete segments whose copy switch is on, but deletes the copy.

SUMMARY: The change involves altering a call to hcs_initiate.

STATUS: Coded and tested.
MULTICS CHANGE REQUEST

TITLE: Fix access violation in creation of outer ring stacks

AUTHOR: E. Stone

SOURCE: (if external) e.g., "User", "Marketing"

STATUS

Written 10/29/73
Approved 11/6/73
Rejected
Postponed
Withdrawn
Expires 5/6/74

CLASSIFICATION | JUSTIFICATION | Replaced by proposal MCR
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Incompatible Change | Marketing Requirement | Implemented in System
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Performance Improvement | Simplification |
Reliability Improvement | Generalization |
X Unreported Bus Fix

Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

REASONS: Remove security hole. Prevent user from using segment numbers reserved for stacks. Prevent user from creating stack explicitly.

SUMMARY: Change makestack to return a status code to segfault if an error results in creating the stack segment or in initiating it with the reserved segment number.

Change makestack to call terminate_proc; change terminate_proc to generate the code error_table_$illegal_stack_creation.

Remove the entry make_seg $ stack from make_seg.

STATUS: Coded and tested.
**TITLE:** Fix bugs in obtaining initializer console channel name

**AUTHOR:** E. Stone

**SOURCE:** (if external) e.g., "User", "Marketing"

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**Use these headings:** REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**REASONS:** These bugs were discovered while installing 21.0 in Phoenix and will affect other sites as well.

**SUMMARY:** Change leading blanks to leading zeros after picking up tty channel from opty configuration card, since present conversion from decimal number to character has no provision for this option.

Change default channel in active_all_rings_data_to_otw_; change default dim to oc.

**STATUS:** Coded and tested.
MULTICS CHANGE REQUEST

TITLE: Extend "list", "status", "copy", "move" to understand multi-segment files.

AUTHOR: M. G. Smith

SOURCE: (if external) e.g., "User", "Marketing"

CLASSIFICATION | JUSTIFICATION | Replaced by proposal MCR
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Incompatible Change | Marketing Requirement | Implemented in System
X Extension | Conformance to Standard | Objections/Comments:
Restriction | Increased Consistency |
Performance Improvement | Simplification |
Reliability Improvement | X Generalization |

Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

REASONS: In order to make multi-segment files behave as much like single-segment files as possible, the "list", "status", "copy", and "move" commands should be upgraded to handle them similarly.

SUMMARY: The "list" command will have a new option, "-files", which will cause it to list both single- and multi-segment files. The default option will become "-files" instead of "-segments". The existing options "-segments" and "-msf" will continue to work as they do today.

The "status" command will be changed to print the total bitcount and records used for multi-segment files by summing their components.

The "move" and "copy" commands will be changed to properly move and copy multi-segment files instead of considering this to be an error. No new options are required.

IMPLICATIONS: Some conditions which used to be treated as errors by "copy" and "move" will now be processed without error indication.

Procedures "copy seg_" and "nd_handler_" will have to be changed along with the commands mentioned.
**MULTICS CHANGE REQUEST**

**TITLE:** Signal "finish" and close files at process termination

**AUTHOR:** M. G. Smith

**SOURCE:** (if external) e.g., "User", "Marketing"

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**REASONS:** In order that files not be left in an inconsistent state, they should be automatically closed at process termination. This will ensure that buffers are flushed to devices, indices updated, locks unlocked, etc. Proper support of PL/I structured files requires this.

In addition, user programs maintaining data bases may also wish notification of process termination, in order to do the same kind of things.

**SUMMARY:** The "logout" and "new_proc" commands will be changed to signal the "finish" condition. While a user will be able to use this condition for whatever he wishes, the system's default handler for it will close all FORTRAN files, all PL/I files, and any open I/O control blocks.

It is not proposed at this time to catch bumps, fatal process errors, or to signal "finish" in other than the user ring, though these would be desirable extensions.

**IMPLICATIONS:** While the changes proposed here will signal "finish" upon most process terminations, users must be aware that bumps, fatal process errors, and crashes will still sometimes leave files in an inconsistent state.

If a user's "finish" handler never returns, then his process will not terminate. Since at this time "finish" is signalled only in response to a user-issued command, this should not pose a problem.

Users must have adequate notification of the new condition so that they can adjust their default handlers to accommodate it.
**MULTICS CHANGE REQUEST**

**TITLE:** Replace "endfile" command by "close_file".

**AUTHOR:** M. G. Smith

**SOURCE:** (if external) e.g., "User", "Marketing"

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Use these headings: **REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)**

**REASONS:** The "endfile" command and its interface are presently suitable only for FORTRAN files. Now that FORTRAN and PL/I files are being unified by the new I/O system, a single command which understands the new files is needed.

**SUMMARY:** A new command, "close_file", will be provided. It will accept the option "-all" or else a series of names. When given "-all", it will close all FORTRAN and PL/I files. When given specific names, it will close all so-named files.

For compatibility, the existing "endfile" command should remain for some time.

**IMPLICATIONS:** None.
MULTICS CHANGE REQUEST

TITLE: New "error_table" codes

AUTHOR: M. G. Smith

SOURCE: (if external) e.g., "User", "Marketing"

CLASSIFICATION | JUSTIFICATION | Replaced by proposal MCR
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Incompatible Change | Marketing Requirement | Implemented in System
Extension | Conformance to Standard | Objections/Comments:
Restriction | Increased Consistency
Performance Improvement | Simplification
Reliability Improvement | Generalization

Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

REASONS: The implementation of the new I/O system (see MSB-113) requires several new messages to be added to "error_table".

SUMMARY: Add to "error_table" the new error messages mentioned in MSB-113.

IMPLICATIONS: None.
# MULTICS CHANGE REQUEST

**Title:** Install upgraded PL/I runtime

**Author:** B. L. Wolman

**Source:** (if external) e.g., "User", "Marketing"

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Use these headings: **Reasons**, **Summary**, **Implications**, **Detailed Proposal** (Optional)

**Reasons:**

A number of changes have been made to bound PL/I runtime which are currently or will soon be required by standard PL/I; these include bug fixes as well as new features. All changes are currently installed in experimental library. Changes are:

1. New routines for getting and setting oncode, onsource, and onchar pseudo-variables.
2. Fix for bug causing fatal process error in translate.
3. Convert date and time BIF's to use single precision arithmetic and give correct time.
5. Fix before BIF to return value of first arg when second arg does not occur in first.
TITLE: Fix bug in remote formats (#744)

AUTHOR: B. L. Wolman

SOURCE: (if external) e.g., "User", "Marketing"

CLASSIFICATION | JUSTIFICATION | Replaced by proposal MCR
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Incompatible Change | Marketing Requirement | Implemented in System
Extension | Conformance to Standard | Objections/Comments:
Restriction | Increased Consistency |
Performance Improvement | Simplification |
Reliability Improvement | Generalization |

X Bug Fix

REASONS: The most common case of remote formats in PL/I stopped working because of error editing runtime program which handles them. A one-line change is required to correct problem. The change is installed in experimental library.
## MULTICS CHANGE REQUEST

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<th>TITLE:</th>
<th>Fix to syserr_real unlock bug</th>
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<tr>
<td>AUTHOR:</td>
<td>Bill Silver</td>
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Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**REASONS:** Change syserr_real to use stacq to unlock.
MULTICS CHANGE REQUEST

TITLE: Fix mail command to use set_lock_

AUTHOR: T. H. Van Vleck

SOURCE: (If external; e.g., "User", "Marketing")

CLASSIFICATION | JUSTIFICATION | STATUS | DATE
--- | --- | --- | ---
Incompatible | Marketing | Written | 10/9/77
Change | Requirement | Approved | 11/6/77
Extension | Conformance | Rejected |
Restriction | Consistency | Postponed |
Performance | Increased | |
Improvement | Simplification | |
Reliability | Improvement | |
Improvement | Generalization | |
| | | Expires | 5-6-77

REASONS:

Currently, the mail command uses the STAC built-in function to attempt to lock the mailbox, before reading or writing it. If a process which is reading or writing the mailbox terminates, or the system crashes, while the lock is set, the mailbox will continue to appear locked indefinitely, until "mail$unlock" is used to clear the lock.

The set_lock subroutine has been provided for just this situation. It has help from the hardcore, and can determine whether a lock ID corresponds to a currently valid process.

SUMMARY:

Replace STAC operation in mail by call to set_lock_. Announce to users that the mail$unlock entry point is no longer necessary and will be removed soon.

IMPLICATIONS:

Removes a glitch from the user interface. Should eliminate the possibility of a user blasting the lock on a mailbox while a message is being added.

A new version of mail is being worked on by Peter Haber, which will use message segments, integrate mail and send_message, be accessible by subroutine and usable by the system, and do a lot of other good things. However, this small change may still be worth doing for the interim.
MULTICS CHANGE REQUEST

TITLE: Install improved disk statistics program.

AUTHOR: T. H. Van Vleck

SOURCE: (if external: e.g., "User", "Marketing")

CLASSIFICATION | JUSTIFICATION
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Incompatible | Marketing
Change | Requirement
Extension | to Standard
Restriction | Consistency
Improvement | Performance
Reliability | Generalization
Improvement | Bug Fix

REASONS: Several improvements have been made in the disk usage statistics program, disk_usage_stat. These include improved output format, better segment name classification, ability to handle 256K segments, and better histogram scaling.

SUMMARY:
New version is checked out and in use locally.

IMPLICATIONS:
This tool is used by system administrators only. The driving file "suffix_list" is replaced by a file in a different format, called "starmame_list".
**MULTICS CHANGE REQUEST**

| TITLE: Improve active functions for arithmetic and string manipulation |
| AUTH: T. H. Van Vleck |
| SOURCE: (If external: e.g., "User", "Marketing") |

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**REASONS:**

The arithmetic and string-manipulating active functions would also be useful as commands. Quick calculations and experiments to find out what a particular PL/I construct does are two particular examples. In addition, this proposal corrects some observed deficiencies in the current active functions, and adds four new active functions.

**SUMMARY:**

The functions affected are:

- plus, minus, times, divide, mod, max, min
- length, index, substr, index_set
- search, verify

All of these active functions have been modified to type their value if invoked as commands.

In addition, the plus and times functions have been modified to handle any number of arguments: the substr active function will accept the two-argument form of substr as well as the three-argument form; and new active functions have been written for search, verify, max, and min. (max and min take any number of arguments.)

**IMPLICATIONS:**

No new programs are involved -- just new entry points in existing programs -- but this does make the system a little larger as perceived by the user.
MULTICS CHANGE REQUEST

TITLE: Extended Star Convention (Phase Two)

AUTHOR: Gary C. Dixon

SOURCE: (if external: e.g., “User”, “Marketing”)

CLASSIFICATION | JUSTIFICATION
| Incompatible | Marketing
| Change | Conformance
| Extension | to Standard
| Restriction | Consistency
| Performance | Simplification
| Reliability | Generalization
| Improvement | Bug Fix

REASONS:

Complete the implementation of the extended Star Convention, as described in MSB-103.

SUMMARY:

1) Change the finite state table in the hardcore program, match_star_name(), to make it treat the *'s in star names of the form, !!! or * or abc*def, as illegal characters. Phase one of the extended Star Convention treats these *'s as if these were ?'s to allow users to convert such *'s to ?'s.

2) This same change will enable the * in star name components of the form abc*def to be interpreted as meaning “matches any number of characters in the corresponding component and letter position”.

This change will complete the implementation of the extended Star Convention.

IMPLICATION:

Users will be given 1 month between the installation of phase one and phase two of the extended Star Convention. During this month, they can change the *'s in star names of the form shown above to ?'s. Users have already been notified of this pending change to the Star Convention via pending_changes_info, star_equals_info and TOS-P (MSB-103). They will be given further warning (probably via notices_info or motd_info) shortly before phase two is installed.
MULTICS CHANGE REQUEST

TITLE: compare_entry_names (bug fix).

AUTHOR: Gary C. Dixon

SOURCE: (if external: e.g., "User", "Marketing")

CLASSIFICATION | JUSTIFICATION
| Incompatible | Marketing | Replaced by proposal MCR
| Change | Requirement | Implemented In System
| Extension | to Standard | Objections/Comments:
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| Performance |
| Improvement | Simplification |
| Reliability |
| Improvement | Generalization |
| Bug Fix |

REASONS:

1) Follow system standards for the handling of equal names, rather than applying an internal standard.

2) Improve the performance of name comparison.

3) Fix the bug which currently prevents the comparison of the names on two entries when either or both has many names by allocating the name arrays in a very large area.

IMPLICATIONS:

After the changes, compare_entry_names will work as the user expects and with improved performance. The external interface to the command will not change.
MULTICS CHANGE REQUEST

TITLE: Fix bug in start_dump (not printing maps)

AUTHOR: Roger A. Roach

SOURCE: (if external: e.g., "User", "Marketing")
MIT IPC (Operations)

CLASSIFICATION | JUSTIFICATION
--------- | -------------
Incompatible | Replaced by proposal MCR
Change | Marketing
Requirement | Implemented in System
Extension | to Standard
Conformance | Objections/Comments
Restriction | Increased
Performance | Consistency

IMPLICATIONS: It will work again.

REASONS: Currently the dumper (start_dump) is not printing maps for complete dumpos. It is necessary to use backup_clean up to get the maps printed.

SUMMARY: The problem has been traced to a missing "end" statement. I purpose to insert it.
MULTICS CHANGE REQUEST

TITLE: Fix zeroing reused page in salvager

AUTHOR: A. Kohziz

SOURCE: (if external) e.g., "User", "Marketing"

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REASONS: Salvager wires down a reused page before zeroing it. This causes a salvager crash since cleanup can never get all of this segment's pages out of core.

SUMMARY: Change salv_check map to call pc_wired_read instead of $wired_wait. Also include an auditing suggestion not to regard an address starting with 777 as null. (Only rely on did = 0 as a null address)
### MULTICS CHANGE REQUEST

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<th>TITLE:</th>
<th>Fix bug in signaller causing EIS problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTHOR:</td>
<td>Steve Webber</td>
</tr>
<tr>
<td>SOURCE:</td>
<td>(if external) e.g., &quot;User&quot;, &quot;Marketing&quot;</td>
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<th>JUSTIFICATION</th>
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<tbody>
<tr>
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<tr>
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<tr>
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<td>Generalization</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Bug Fix #199</td>
<td></td>
</tr>
</tbody>
</table>

Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**REASONS:** There is currently a bug in the signaller which causes restarted faults (record quota overflows, e.g.) to execute incorrectly because the EIS pointers and lengths are not reloaded.

**SUMMARY:** The necessary instruction to load the pointers and lengths should be added.

**IMPLICATIONS:** None.
**Title:** Fix bugs in pxss  

**Author:** Steve Webber  

**Source:** (if external) e.g., "User", "Marketing"  

**Classification:**  
- Incompatible Change  
- Extension  
- Restriction  
- Performance Improvement  
- Reliability Improvement  
- Bug Fix  

**Justification:**  
- Marketing Requirement  
- Conformance to Standard  
- Increased Consistency  
- Simplification  
- Generalization  

**Objections/Comments:** Replaced by proposal MCR  

**Classifications:**  
- Incompatible Change  
- Extension  
- Restriction  
- Performance Improvement  
- Reliability Improvement  
- Bug Fix  

**Reasons:** There are a few bugs in pxss which have appeared over the last few weeks. These are:  

- **#205**  
  1. The set_proc_required code has a bug which can (and has) crashed the system.  
  2. A bug in the new "deact proc mechanism" allowing the initializer to block rather than wait was discovered.  

- **#200**  
  3. The cpu timer mechanism uses real_cpu_time to set the timer but checks against elapsed virtual_cpu_time.  

**Summary:** Minor edits to the program pxss.alm are required.  

**Implications:** None.
# MULTICS CHANGE REQUEST

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<tr>
<td>Reliability Improvement</td>
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**REASONS:** The truncation fault is really a stringsize condition and should be signalled as such for the sake of PL/I programs. Also, the default handling should be automatic start, but this now results in an op_not_complete fault.

**SUMMARY:** If pdsspll machine = 0 then the fault will continue to be signalled as it is now but called stringsize instead of truncation. Otherwise, the fim will adjust the machine conditions so that a restart is possible and then signal stringsize. Change handler for stringsize to return.

**IMPLICATIONS:** None.
**MULTICS CHANGE REQUEST**

**TITLE:** New I/O Daemon

**AUTHOR:** Robert S. Coren

**SOURCE:** (if external) e.g., "User", "Marketing"

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<tr>
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<tr>
<td>Reliability</td>
<td>Bug Fix</td>
<td></td>
</tr>
</tbody>
</table>

Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**REASONS:**
1. The I/O Daemon needs to be extended to operate remote devices.
2. Potential conflicts between multiple independent I/O daemon processes should be resolved.

**SUMMARY:** Separate I/O Daemon functions into coordinator which manages the queues and device drivers which perform output requests.

**IMPLICATIONS &**

**DETAILED PROPOSAL:** See MTR-004.

---

**STATUS**
- Written 11/5/73
- Approved 11/9/73
- Rejected
- Postponed
- Withdrawn
- Expires 5/13/73
## MULTICS CHANGE REQUEST

**TITLE:** Install Profile Command

**AUTHOR:** B. Wolman

**SOURCE:** (if external) e.g., "User", "Marketing"

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<td>Objections/Comments:</td>
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<tr>
<td>X Restriction</td>
<td>Increased Consistency</td>
<td>Control argument shall apply to whole line.</td>
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<tr>
<td>Performance Improver</td>
<td>Simplification</td>
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<td>Reliability Improver</td>
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</tr>
<tr>
<td>Bug Fix</td>
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</tbody>
</table>

Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**REASONS:** The profile command is used to print the execution statistics made available by the PL/I "profile" option. See attached documentation.
Name: profile

The profile control argument of the pll and fortran commands causes the compiler to generate an internal static table containing an entry for each statement in the source program; the table entry contains information about the source line as well as a counter that starts out as zero. Each statement in the program is modified to start with an instruction to add one to the counter associated with the statement. The profile command allows the user to print and reset these counters.

Usage

profile name1 ... namen -ctl_arg1- ... -ctl_argn-

1) name1
   is the pathname or reference name of a program whose counters are to be printed or reset.

2) ctl_arg1
   is selected from the following list. Control arguments take effect immediately and apply to all programs whose names appear later in the command line.

   -print, -pr
   causes profile to print the following information for each statement in the specified programs.

   1. line number
   2. statement number
   3. number of times the statement has been executed.
   4. cost of executing the statement measured in number of instructions executed online plus the number of jumps into pll_operators_. Note that each instruction and each jump into pll_operators_ count as only one unit.
   5. the names of all operators in pll_operators_ used by this statement.

The total cost for all statements is printed at the end.

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-brief, -bf causes profile to omit from the statement list statements that have never been executed.

-long, -lg causes profile to include the statement list statements that have never been executed.

-reset, -rs causes profile to reset to zero all counters in the specified program.

The default control arguments are -print and -brief.

Example

The PL/I program shown below counts the number of occurrences of one string in another string. It was compiled with the -profile control argument and executed once. The output from the profile command, which is printed below, shows an anomaly of the current implementation -- there is only one counter for the statement:

If ... then ...

so that one cannot determine the number of times the condition was satisfied.

The source code for the program is:

example: proc(s1,s2);

declare (s1,s2) char(*),
         (l,k) fixed bin,
         loa_ options (variable);

k = 0;
do l = 1 to length(s1) - length(s2);
   if substr(s1,l,length(s2)) = s2 then k = k + 1;
   end;

call loa_("-d",k);
end example;

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After executing the program once, the output from the profile command is:

<table>
<thead>
<tr>
<th>LINE</th>
<th>STM</th>
<th>COUNT</th>
<th>COST</th>
<th>PROGRAM</th>
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<tbody>
<tr>
<td>7</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>27</td>
<td>351 + 54</td>
<td>(set_cs cp_cs)</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>27</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>1</td>
<td>14 + 1</td>
<td>(call_ext_out_desc)</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>1</td>
<td>0 + 1</td>
<td>(return)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>428 + 56</td>
<td></td>
</tr>
</tbody>
</table>

Copyright, 1973, Massachusetts Institute of Technology and Honeywell Information Systems Inc. (END)
**MULTICS CHANGE REQUEST**

<table>
<thead>
<tr>
<th>TITLE:</th>
<th>Install corrected EIS-conversion routines</th>
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<tbody>
<tr>
<td>AUTHOR:</td>
<td>B. Wolman</td>
</tr>
<tr>
<td>SOURCE:</td>
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<td>Reliability Improvement</td>
<td>Generalization</td>
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<tr>
<td>X</td>
<td>Bug Fix</td>
<td></td>
</tr>
</tbody>
</table>

Objections/Comments:

Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**REASONS:** A number of bugs have been fixed in the EIS conversion package located in >ldd>ex>l>0. We propose to update the installed copy in >lang.

**SUMMARY:** The following bugs were fixed:
1) When conversion is signalled, a copy of input string is used, thus onsource and onchar BIF's do not alter original input.
2) Assignment (via conversion package) does not try to go char → number → char.
3) Sign was getting lost in conversion of scaled decimal with value such as -0.75.
4) Conversions involving varying strings were not working in all cases.
5) Conversion bit → fixed dec gave lpr fault.

**IMPLICATIONS:** None.
TITLE: Message Segment Primitive Changes

AUTHOR: Peter Haber

SOURCE: (if external) e.g., "User", "Marketing"

CLASSIFICATION | JUSTIFICATION | Replaced by proposal MCR | Implemented in System
--- | --- | --- | ---
Incompatible Change | Marketing Requirement | | |
Extension | Conformance to Standard | Objections/Comments: |
Restriction | Consistency | This is a subset of modifications proposed from feedback to MTB-006.
Performance Improvement | Simplification |
Reliability Improvement | Generalization |
| Bug Fix |

Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

REASONS: 1) The message segment primitives do not provide all the operations which they could to enhance caller subsystem operation.

2) The message segment facility is not clearly defined.

3) The message segment primitive pointer entries violate access control restrictions.

SUMMARY: Message segment primitive changes

1) Change the format of the message segment header to include a unique bit pattern, a version number, some free storage and a block of "special storage" in the header.

2) Provide "write_special_storage" and "read_special_storage" entries to read and write "special storage" in the header. Both entries will be callable from ring 1 and will provide the handle for a "send wakeup" facility with protected event channel and process id for the new send_message command.

3) Change the pointer entries to accept and return a unique index rather than pointers.

4) Provide a "rewrite_message" primitive for absentee.

5) Change ex_acl calls to calls to new ACL primitives.
6) Split out the "m.s" name check code into the "queue" message segment procedure.

For conversion make current message segment gate call a write-around which first makes sure the message segment is in the new format and if not converts it, then passes the call to the new primitives.

IMPLICATIONS: Empty message segments cannot be truncated unless special header information is all zeroes.
### MULTICS CHANGE REQUEST

<table>
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<th>TITLE:</th>
<th>Remove &quot;pdir&quot; abbrev mechanism from print_apt_entry. Also add -brief option.</th>
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<tr>
<td>AUTHOR:</td>
<td>Steve Webber</td>
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<tr>
<td></td>
<td>Bug Fix</td>
<td>Expires</td>
<td>5/13/74</td>
</tr>
</tbody>
</table>

Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**REASONS:** The print_apt_entry command currently defines the abbreviation "pdir". This is inconvenient.

**SUMMARY:** The abbrev mechanism is removed. A new option (-brief, -bf) is added which will only print out the state, flags and wait event for the process of interest.

**IMPLICATIONS:** None
MULTICS CHANGE REQUEST

TITLE: fix bug in star_

AUTHOR: Gary C. Dixon

SOURCE: (If external; e.g., "User", "Marketing")
MIT MPRF

CLASSIFICATION | JUSTIFICATION
Incompatible Change | Replaced by proposal MCR
Extension | Conformance to Standard
Restriction | Increased Consistency
Performance Improvement | Simplification
Reliability Improvement | Generalization

CLASSIFICATION | JUSTIFICATION
Incompatible Change | Replaced by proposal MCR
Extension | Conformance to Standard
Restriction | Increased Consistency
Performance Improvement | Simplification
Reliability Improvement | Generalization

Use these headings: REASONS, SUMMARY, IMPLICATIONS, and optionally DETAILED PROPOSAL

REASONS:

1) Fix the long-standing bug in hcs_$star_ (and hcs_$star_list_) which causes zero entry counts (or branch and link counts) to be returned when called with a null area pointer (i.e., the caller wants totals only) and a star name which is not "**".

2) Increase the performance of the loop which compares the names of directory entries with the star name.

SUMMARY:

1) Update the matching-name counter before branching out of the name comparison loop when a matching name is found and totals only are required.

2) The star name is compared with each entry name according to the type of the star name, as determined by check_star_name_. Type 0 means "contains no '*'s or '?'s", type 2 means "is equivalent to **", and all other star names are type 1. Currently, the value of type is tested by a series of if-statements to determine what type of comparison should be performed. Change this testing of type to a branch through a constant label array to the appropriate comparison code.

IMPLICATIONS:

1) An annoying bug will be eliminated.
2) Code in the name comparison loop will be more efficient and simple to understand.
MULTICS CHANGE REQUEST

TITLE: Creation of system trace table

AUTHOR: R. B. Snyder

SOURCE: (if external) e.g., "User", "Marketing"

CLASSIFICATION

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CLASSIFICATION JUSTIFICATION

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<td>Objections/Comments:</td>
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</table>

Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

REASONS: A system trace routine is required in order to find 355 bug. This routine could be generally usable to enable the finding of subsequent bugs in any area of the system.

SUMMARY: A trace routine will be constructed which will copy its arguments (which vary in number and type) into a system wide trace table in circular fashion. This table will normally be of 0 length but will be grown into an integral number of 1024 word wired core blocks by the presence of a SYST config card. This card specifies the size of the trace buffer. Calls to this system trace routine are being put in dn355 and tty_inter. These calls will be taken out when the bug is found.

IMPLICATIONS: Must coordinate with operators on insertion of SYST card.
**MULTICS CHANGE REQUEST**

**TITLE:** Improve listing tape system

**AUTHOR:** M. A. Meer

**SOURCE:** (if external) e.g., "User", "Marketing"

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<td>Objections/Comments:</td>
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<tr>
<td>Restriction</td>
<td>Increased Consistency</td>
<td>Keywords shall be revised to conform to standards and accepted practice.</td>
</tr>
<tr>
<td>Performance Improvement</td>
<td>Simplification</td>
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<td>Bug Fix</td>
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Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**REASONS:**
1) To ease printing of tapes  
2) To ease error recovery  
3) To ease error interpretation  
4) To ease extraction of subsets of files  

**SUMMARY:**
1) allow operations on tapes starting at other than the first reel of a set of reels.  
2) rewrite error messages for better analysis of errors  
3) add to syntax in the control file for printing, deleting or outputting subsets of a listing tape.

**IMPLICATIONS:** None

**DETAILED PROPOSAL:**
1) Disable with an input argument checking that the operation begins with the first reel of a sequence. This is a change to lts_tape_ and listing_tape_print.

2) Review and rewrite some error messages (changes to possibly all 5 routines)

3) Change lts_file_ to check expanded syntax and call appropriate internal subroutines to mark files for printing, deleting or output as required.
PROPOSED SYNTAX:

- **output**: set switch to mark for output (this is automatic for printing)
- **delete**: set switch to mark for deletion
- **area_name, -an**: use either separately or in conjunction with -sn, -dc or -these. Mark only files with the area name which follows.
- **sys_num, -sn**: mark only files with system number \( > \) or \( < \) the one which follows.
- **date_created, -dc**: mark only files created before or after date and time which follows.
- **these**: mark the files which follow.

**use**

- **these hcs.list -hardcore**
- **reload.list**
- **apnd.list -BOS**
- **blast.list**
- **salvager.list -SALV**

The syntax is free form.

The area name used with another control operates as a logical and.
**MULTICS CHANGE REQUEST**

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<tr>
<td>Bug Fix</td>
<td>Simplifies debugging</td>
<td></td>
</tr>
<tr>
<td>x ring 1 procedures</td>
<td></td>
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</table>

**REASONS:**
Currently, debugging procedures which manipulate extended access requires creating an environment to simulate extended access. There is not now an adequate environment to test the extended access primitives well. Creating that environment would be expensive. The proposed change is cheap.

**SUMMARY:**
Provide a privileged entry to the access control primitives which allow the caller to manipulate extended access on a segment which resides in any ring greater or equal to the caller's ring. Currently extended access can only be manipulated on segments in ring 1.

**IMPLICATIONS:**
Requires changes to ACL primitives for testing or duplicate ACL primitives in ring 0, and a new gate into ring 0.

**DETAILED PROPOSAL:**
Put field in pds with ring number checked by acl primitives. Default value of ring number is 1; changeable via phcs to caller ring number.