TO: Distribution

FROM: M. S. Hodges

DATE: May 23, 1974

SUBJECT: Multics Change Requests

Attached are copies of Multics Change Requests which
were approved from May 1 - 15, 1974

MULTICS CHANGE REQUEST	MCR 486
	Page 1 of 1 Pages

TITLE: mstrds command	STATUS	DATE
	Written	04/23/74
	Approved	H 5/1/74
AUTHOR: Bill Silver	Rejected	
SOURCE: (if external) e.g., "User", "Marketing"	Postponed	
	Withdrawn	
	Expires	11/7/74

CLASSIFICATION		JUSTIFICATION		Replaced by proposal MCR _____
	Incompatible Change		Marketing Requirement	Implemented in System _____
x	Extension		Conformance to Standard	Objections/Comments:
	Restriction		Increased Consistency	This is an interim command for use during change in size of standard record length.
x	Performance Improvement		Simplification	
	Reliability Improvement	x	Generalization	
			Bug Fix	

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

REASONS:

A new command, mstrds, has been written. It allows a user to specify the record size when writing a Multics standard tape.

IMPLICATIONS:

This command will work only with the new version of tape_. It should be used with care since other Multics sites may not have the version of tape_ which can read long (1024 words of data) records.

Detailed Proposal:

If mstrds is called with no arguments it displays the current record data size for the user's process. The following arguments can be used to change the record data size.

"-lg" or "-long" will set the record data size to 1024 words.
"-st" or "-short" will set the record data size to 256 words.

MULTICS CHANGE REQUEST		MCR 488	
		Page 1 of 1 Pages	
TITLE: Addition of -unique option to sort_seg command		STATUS	DATE
		Written	4-25
AUTHOR: Ross E. Klinger		Approved	5/7
		Rejected	
SOURCE: (if external) e.g., "User", "Marketing" MIT - PDO		Postponed	
		Withdrawn	
		Expires	11/7

Replaced by proposal MCR _____

Implemented in System _____

Objections/Comments:

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

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

REASONS: It has been suggested (by Jerry Stern, DSO) that the object of many sorts is the elimination of duplicate lines from a file. sort_seg currently does not have this capability; however, the implementation of such a function is trivial, and can be done in a manner such that no additional overhead is forced on the user not requiring the feature.

SUMMARY: Add a new control option, -unique (-uq), to the sort_seg command. (MCR 107) Add a new bit to the control bit string of the sort_seg subroutine.

IMPLICATIONS: None - the documentation for sort_seg and sort_seg_ has not yet been submitted for publication.
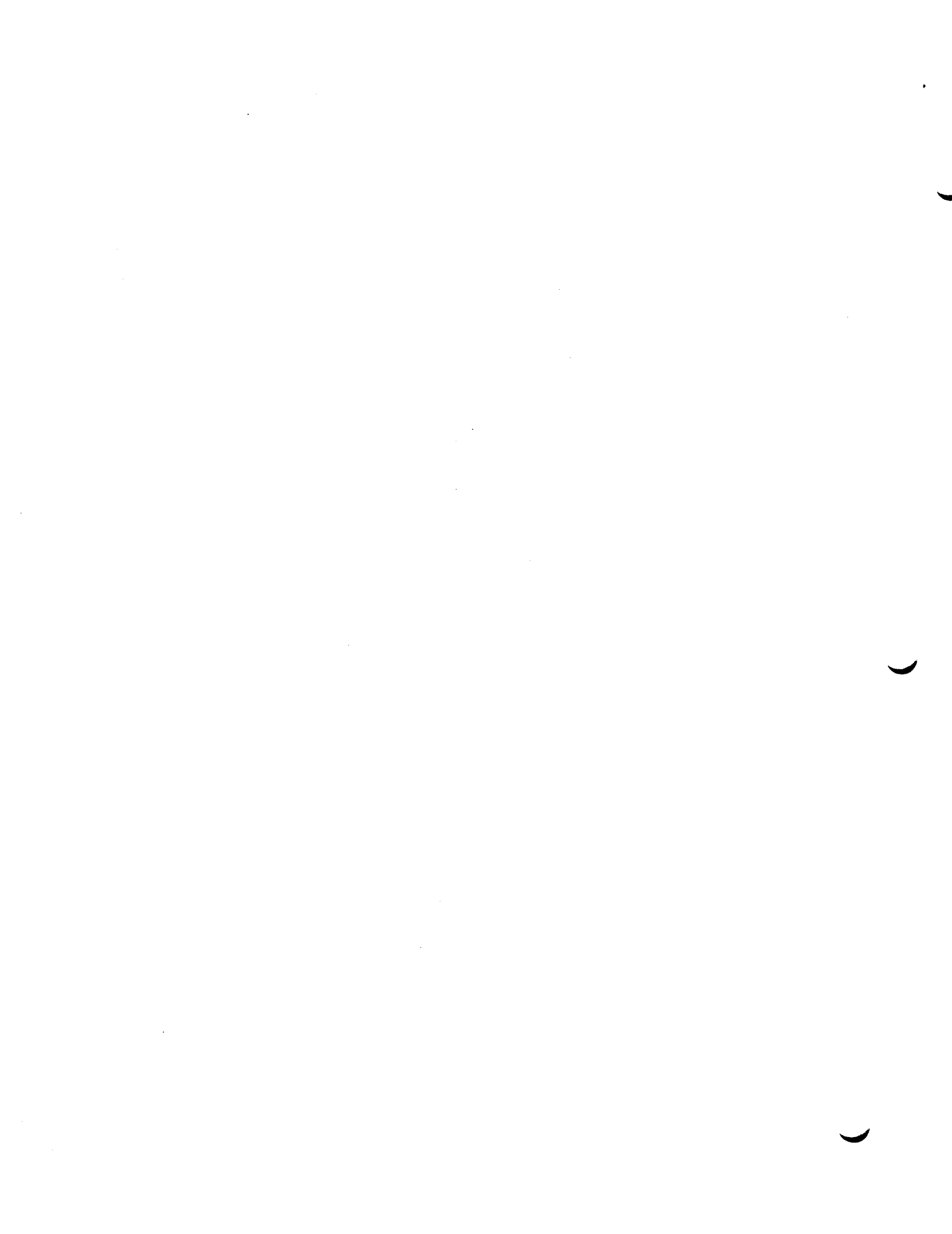
MULTICS CHANGE REQUEST	MCR 490
	Page 1 of 2 Pages

TITLE: Bug fixes to Debug	STATUS	DATE
	Written	04/28
AUTHOR: Susan Barr	Approved	5/7
	Rejected	
SOURCE: (if external) e.g., "User", "Marketing"	Postponed	
	Withdrawn	
	Expires	11/7

CLASSIFICATION		JUSTIFICATION		Replaced by proposal MCR _____
	Incompatible Change		Marketing Requirement	
				Implemented in System _____
	Extension		Conformance to Standard	
				Objections/Comments:
	Restriction		Increased Consistency	
	Performance Improvement	x	Simplification	1. Don't do 1-c; change documentation.
	Reliability Improvement		Generalization	
		x	unreported Bug Fix	

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

REASONS:

1. Printing Instructions:

   a) The line number is printed at the wrong place if there are multiword instructions.

   b) "eis" instructions are not disassembled.

   c) Instead of printing the number of instructions requested, debug prints that many words.

   d) There are some instructions missing from the op code table.

2. Breaks:

   a) All the global break commands cause a reference through a null pointer if there are no breaks set.

   b) The break skip command (.bsl n) does not work if there is a condition line with the break.

   c) If the caller tries to set a regular break at the same location as the last temporary break an invalid break results.

   d) Breaks can not be set at the start of eis instructions.

3. Assigning values to variables:

   a) Precision is lost on assigning floating point data with a large fraction part. Each digit of the fraction was converted to a floating point number and then divided by the appropriate power of ten.

   b) When reading several floating point number to fill an array, the minus sign is ignored if the previous number had no fraction. (i.e., -10. -10 would be read -10. +10.)

c) Debug overwrites its storage if the user tries to read a character string of more than 80 characters.

4. Printing Variables:

a) Debug is not compatible with the new ioa_ which requires that the control argument matched the descriptors. Debug uses a fixed binary variable based on a pointer to print floating point data.

b) Varying character strings used as arguments are not printed correctly.

5. Debug searches the directory in which a program was compiled for the source segment. It should search the working directory as well.

6. Debug has no error handlers and the user returns to command level when an error occurs in the debugger itself.

SUMMARY:

1. The disassembler routine was rewritten using portions of the disassembler from the pl 1 compiler. The op_ mnemonic table of the compiler was used instead of the debug table.

3. The assignment of arithmetic values is done using assign_ which uses a better algorithm.

6. An "anyother" handler was set up which uses the default error handler to print an error message and then reads a debug input line. The "anyother" condition must be reverted or disabled when leaving the debugger. (e.g., when issuing ".." and ":=".

MULTICS CHANGE REQUEST	MCR 492
	Page 1 of 2 Pages

		STATUS	DATE
TITLE: Modify initialization to ease the "high water mark" problem.		Written	04/30/
		Approved	5/7/
AUTHOR: Steve Webber		Rejected	
SOURCE: (if external) e.g., "User", "Marketing"		Postponed	
		Withdrawn	
		Expires	11/7/

CLASSIFICATION		JUSTIFICATION		
	Incompatible Change		Marketing Requirement	Replaced by proposal MCR _____
	Extension		Conformance to Standard	Implemented in System _____
	Restriction		Increased Consistency	Objections/Comments:
	Performance Improvement		Simplification	
	Reliability Improvement		Generalization	
			Bug Fix	
		x	Allow system to expand when necessary	

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

REASONS: Due to the method that the system is initialized it is possible to run out of core memory early in initialization. This MCR proposes a method of minimizing this difficulty. The problem only occurs if there is 128k of memory.

SUMMARY:

The technique proposed is to move several procedures and data bases from collection 1 to collection 2.

IMPLICATIONS:

If the change is done in a clever way there can be a breakage of about $\frac{1}{2}$k to 1k of core that will be lost. In the ideal case breakage can be reduced to near zero, but it should never exceed 1k.

DETAIL DESCRIPTION:
1. The following modules and data bases will be moved to collection 2.
        emergency_shutdown
        d 355_data
        bound_355_wired
        bound_iom_wired
        bound_tc_wired
        pxss
        tc_data
        tty_ctl
        tty_buf
        disk_traffic_data
    These total to about 30k.

2. Changes will have to be made to the software to change the initialization
    of the 355 software and certain other I/O modules.

3. The initialization "waiting" mechanism used by page control will have to be
    slightly changed.

4. The initialization of disk_traffic_data will have to/ be slightly changed.

5. The programs and read only data bases above should be bound together to minimize
    breakage.

6. The fabrication of the length of tc_data will be removed from bootstrapl.

7. The I/O buffer tty_buf should be forced in abs_usable core.

MULTICS CHANGE REQUEST	MCR 493
	Page 1 of 1 Pages

	STATUS	DATE
TITLE: Emergency Installation of pl1_operators_		
	Written	05/02
	Approved	H 5/7
AUTHOR: Richard A. Barnes	Rejected	
SOURCE: (if external) e.g., "User", "Marketing"	Postponed	
	Withdrawn	
	Expires	11/7

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	(At MIT)
	Reliability Improvement		Generalization	
		x	Bug Fix	

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

REASONS:
An obsolete version of pl1_operators_ was installed at MIT leaving several bugs unfixed and creating a minor inconsistency with the pl1 compiler in regards to bug 1044.

SUMMARY:

Fixes basic bug: 026
      PL/I bugs: 1044, 1065, 1078, 1082, 1083

any_to_any_, pl1_operators_ and power_ must be replaced.

Bugs 1065 (conversion to short unpacked string target)
and 1082 (assignment of null string to varying string)
are especially important.

MULTICS CHANGE REQUEST	MCR 494
	Page 1 of 1 Pages

TITLE: Repair Problems Introduced by Change to Tape Controller Specifications	STATUS	DATE
	Written	5/2
AUTHOR: Noel I. Morris	Approved H	5/7/7
	Rejected	
SOURCE: (if external) e.g., "User", "Marketing"	Postponed	
	Withdrawn	
Internal	Expires	11/7/7

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

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

REASONS:

A change was made to the MTS500 Magnetic Tape Controller specifications. This change causes end of tape status to be returned on all tape writes which follow the detection of the end of tape reflector. Formerly, only the first such write caused end of tape status to be returned.

Since the ntape package treats the end of tape status as an error, BOS SAVE runs off the end of SAVE tapes.

Summary:
The BOS ntape package will be modified to treat end of tape status differently. Other tape writing programs in BOS and Multics will have to be audited to see if the end of tape condition is handled properly.

Implications:
MTS500 controllers running level H1 firmware will be incapable of performing BOS SAVEs until the repaired software is installed. If SAVEs must be performed on the MTS500, the controller must be running level G firmware until the repairs are made.

MULTICS CHANGE REQUEST

MCR   495

Page 1 of 1 Pages

TITLE: Emergency Fixes to I/O Coordinator

AUTHOR: Robert S. Coren

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

STATUS	DATE
Written	5/7/7!
Approved	# 5/14/
Rejected	
Postponed	
Withdrawn	
Expires	11/1,

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	Bug Fix 264	
		x	Help detect bug 277	

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

REASONS:

1. I/O daemon was sometimes repeating same request over and over because of failure to delete a request (Bug 264).

2. I/O coordinator sometimes takes mysterious recursive linkage errors (Bug 277).

SUMMARY:

1. If an unsuccessful attempt is made to delete a message from a queue, drop the queue.

2. Correct handling of faults so spurious recursion will not occur; cause SCU data to be written onto "log_output" stream if actual recursion occurs.

IMPLICATIONS:

Already installed as an emergency installation.

MULTICS CHANGE REQUEST	MCR 496
	Page 1 of 1 Pages

TITLE: Version 1 Message Segment Primitive Bug fix	STATUS	DATE
	Written	5/7/
AUTHOR: _____ Peter Haber _____	Approved	5/14/74
	Rejected	
SOURCE: (if external) e.g., "User", "Marketing"	Postponed	
	Withdrawn	
	Expires	11/14/74

CLASSIFICATION		JUSTIFICATION	
	Incompatible Change		Marketing Requirement
	Extension		Conformance to Standard
	Restriction		Increased Consistency
	Performance Improvement		Simplification
	Reliability Improvement		Generalization
		x	Unreported Bug Fix

Replaced by proposal MCR _____

Implemented in System _____

Objections/Comments:

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

REASONS:

Primitive copies 13 bits of extended access from caller, should only copy first 5.

SUMMARY:
Change primitive to copy only 5 bits.

IMPLICATIONS:
Commands which use this interface will work whether they pass 5 or 13 bits of extended access.

Bug not reported.

MULTICS CHANGE REQUEST	MCR 497	
	Page 1 of 1 Page	

TITLE: Fix bug in del_dir_tree	STATUS	DATE
	Written	5/7/7
AUTHOR: E. Stone	Approved ⧸	5/14
	Rejected	
SOURCE: (if external) e.g., "User", "Marketing"	Postponed	
	Withdrawn	
	Expires	11/14

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 .	
X	Reliability Improvement		Generalization	
		x	Bug Fix 280	

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

REASONS:

The procedure del_dir_tree should have been changed in system 22-0 when the rules for deletion changed.

Currently if a request is made to remove a sub_tree containing a directory to which the user lacks SM access, the procedure returns rather than forcing access.

IMPLICATIONS:

Prevent looping in the user ring by the delete_dir command.

MULTICS CHANGE REQUEST	MCR 498
	Page 1 of 1 Pages

TITLE: Loss of form feeds on input	STATUS	DATE
	Written	5/7/7
	Approved	5/14/74
AUTHOR: R.B. Synder	Rejected	
SOURCE: (if external) e.g., "User", "Marketing"	Postponed	
	Withdrawn	
	Expires	11/14/74

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	
X	Reliability Improvement		Generalization	
		X	Bug Fix - 279	

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

REASONS:
    With the installation of 23.9, a bug was inserted wherein /014s (form feeds) typed as the last characters on a line are being thrown away.

SUMMARY:
    This bug will be fixed.

IMPLICATIONS:
    None

MULTICS CHANGE REQUEST	MCR 499
	Page 1 of 1 Pages

TITLE: DC_Pack Cleanup Handler bug	STATUS	DATE
	Written	5/6/7
	Approved #	5/14
AUTHOR: __Andrew Kobziar__	Rejected	
SOURCE: (if external) e.g., "User", "Marketing"	Postponed	
	Withdrawn	
	Expires	11/14

CLASSIFICATION		JUSTIFICATION	
	Incompatible Change		Marketing Requirement
	Extension		Conformance to Standard
	Restriction		Increased Consistency
	Performance Improvement		Simplification
	Reliability Improvement		Generalization
		x	unreported Bug Fix

Replaced by proposal MCR _____

Implemented in System _____

Objections/Comments: .

Use of "on" statement recommended instead.

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

REASONS:

The cleanup handler for dc_pack is established in a begin block but references variables that are set only in the parent. When envoked, these values are obtained from the begin block stack frame and are undefined. If the magnitude is larger than the bound on system_free_seg, the system will crash.

SUMMARY:

Change references to a variable that is set in the begin block.

MULTICS CHANGE REQUEST	MCR 500
	Page 1 of 1 Pages

TITLE: Improper ACL setting in Delete_	STATUS	DATE
	Written	5/6/
	Approved	5/14/74
AUTHOR: Andrew Kobziar	Rejected	
SOURCE: (if external) e.g., "User", "Marketing"	Postponed	
	Withdrawn	
	Expires	11/14/74

CLASSIFICATION		JUSTIFICATION	
	Incompatible Change		Marketing Requirement
	Extension		Conformance to Standard
	Restriction		Increased Consistency
	Performance Improvement		Simplification
	Reliability Improvement		Generalization
		x	Unreported Bug Fix

Replaced by proposal MCR _____

Implemented in System _____

Objections/Comments:

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

REASONS:

Delete_ adds an ACL for "USER RE" if unable to initiate a segment in order to terminate reference names. It later asks the user if it should force deletion of the segment. If the answer if "no" then the "USER RE" ACL is not removed.

SUMMARY:

Remove the "USER RE" ACL in this case.

MULTICS CHANGE REQUEST	MCR 501
	Page 1 of 1 Pages

TITLE: Fix bugs in meter_gate	STATUS	DATE
	Written	5/6/
	Approved	5/14
AUTHOR: Steve Webber	Rejected	
SOURCE: (if external) e.g., "User", "Marketing"	Postponed	
	Withdrawn	
	Expires	11/14

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

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

REASONS:

  There are 2 separate bugs in meter_gate as follows:
   1) The percentage of cpu time reported is incorrect if the configuration has or has had 2 CPU's

   2) The program did not work for "fast gates".

SUMMARY:

  Fix these bugs

IMPLICATIONS:

  All old output with percentages is wrong and comparisons should be made with this in mind.

MULTICS CHANGE REQUEST

MCR 502
Page 1 of 1 Pages

TITLE: Bug in process_input_string_	STATUS : DATE
	Written 05/3
AUTHOR: Steve Herbst	Approved # 5/14/74
	Rejected
SOURCE: (if external) e.g., "User", "Marketing"	Postponed
	Withdrawn
	Expires 11/14/74

CLASSIFICATION		JUSTIFICATION	
	Incompatible Change		Marketing Requirement
	Extension		Conformance to Standard
	Restriction		Increased Consistency
X	Performance Improvement		Simplification
	Reliability Improvement		Generalization
		X	Bug Fix 278

Replaced by proposal MCR _____

Implemented in System _____

Objections/Comments:

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

REASONS:

process_input_string_ discards an error code returned by eval_ec_if_test_ when there is a syntax error in an evaluated "&if" expression. It may print an erroneous error message.

SUMMARY:

Save the code and pass it to com_err_.

MULTICS CHANGE REQUEST

TITLE: Fix Bug in Tape DCM	STATUS	DATE
	Written	5/8/7
AUTHOR: ___Noel I. Morris___	Approved # 5/14	
	Rejected	
SOURCE: (if external) e.g., "User", "Marketing"	Postponed	
	Withdrawn	
	Expires	11/14

CLASSIFICATION		JUSTIFICATION		Replaced by proposal MCR _____
	Incompatible Change		Marketing Requirement	
	Extension	.•	Conformance to Standard	Implemented in System _____
	Restriction		Increased Consistency	Objections/Comments:
	Performance Improvement		Simplification	
⊠	Reliability Improvement		Generalization	
		⊠	Unreported Bug Fix	

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

REASONS:
The tape DCM can cause a system crash if no handler 1 is in
the configuration. Code in the force detach handler section
of the TDCM erroneously assumes the information in the handler .
table for drive 1 to be correct.

Summary:
Change TDCM not to examine the handler table entry for drive 1.

MULTICS CHANGE REQUEST		MCR 504
		Page 1 of 1 Pages

TITLE: Automatic System ID Generation by MST Generator	STATUS	DATE
	Written	5/8
	Approved H	5/14/74
AUTHOR: B. Greenberg	Rejected	
SOURCE: (if external) e.g., "User", "Marketing"	Postponed	
	Withdrawn	
	Expires	11/14/74

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

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

REASONS: Every hardcore installation is currently accompanied by the re-installation and re-assembly of active_all_rings_data, for the sole purpose of changing the system ID. In addition to being useless work, the complete updating procedure invoked on this module is devoid of semantic significance.

SUMMARY: Provide keyword and command option for generate_mst to insert the system ID in the copy of active_all_rings_data being written at system generation time.

IMPLICATIONS: Change the documentation for gm.

DETAILED PROPOSAL: The optional keyword "sysid" or "sys_id" followed by a colon and the name of an internal symbol in the segment under which this keyword appears is put in (any number) of header entries in the hardcore header. When encountered by the generator, a copy of the segment will be made, and the system ID will replace the two words at that symbol in the copied segment. The system ID used is defaultedly the same as the name which, suffixed by ".header", is sought as the name of the header. If the "-sysid" (or "-sys_id") option is used in the generate_mst command, the following argument is used as the system ID.
    Although it might be argued that the current proposal is something of a kludge, I contend, in the absence of some "sophisticated" mechanism such as writing the ID into bootstrap1, making a new type of SLT entry or MST header word, etc., that the proposed mechanism is viable, simple, and compatible.

MULTICS CHANGE REQUEST	MCR 506
	Page 1 of 1 Pages

TITLE: Fix for Message Segment Facility Bug	STATUS	DATE
	Written	5/9/
	Approved # 5/14/	
AUTHOR: Peter Haber	Rejected	
SOURCE: (if external) e.g., "User", "Marketing"	Postponed	
	Withdrawn	
	Expires	11/14/

CLASSIFICATION		JUSTIFICATION		
	Incompatible Change		Marketing Requirement	Replaced by proposal MCR _____
	Extension		Conformance to Standard	Implemented in System _____
	Restriction		Increased Consistency	Objections/Comments:
	Performance Improvement		Simplification	
	Reliability Improvement		Generalization	
		x	Bug Fix #277	

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

REASONS:

Message segment facility repeatedly initiates the same message segment, filling KST and causing i/o daemon to the linkage errors.

SUMMARY:

Change initiate call to return internal static ptr from first initiate.

IMPLICATIONS:

None

MULTICS CHANGE REQUEST	MCR __507____

TITLE: New versions of sort_items_ and sort_items_indirect_	STATUS	DATE
	Written	05/16/
AUTHOR: Ross E. Klinger	Approved #	5/24/2
	Rejected	
SOURCE: (if external; e.g., "User", "Marketing") MIT - POO	Postponed	
	Withdrawn	
	Expires	11/14/7

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

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

REASONS:

1) Changing the sort algorithm used by sort_seg_ (MCR 107) from combination of Shell and radix exchange sorts, performed by an intern procedure, to the QUICKERSORT algorithm, performed by sort_items_indirect results in a marked decrease in execution time. This decrease ranges fr 15% for a 1 record segment to 50% for a 30 record segment.

2) sort_seg_ requires that sort_items_indirect_ acce adjustable-length character strings.

3) The current sort_items_indirect_ (and sort_items_) entry sequenc necessitate an inordinate amount of argument manipulation due to alignme considerations. Their current data comparison methods execute superfluous cmpc instruction (= 80 microsec. for a 100 character string) 51% of the comparisons. The sort is currently accomplished using recursive inner procedure which can be made non-recursive.

4) Eliminating these inefficiencies reduces the execution time sort_items_ and sort_items_indirect_ by a factor of 4.

SUMMARY:

1) Change sort_seg_ to use sort_items_indirect_.

2) Change the internals of sort_items_ and sort_items_indirect_ produce more efficient code.

3) Add an entry point (adj_char) which accepts adjustable-leng character strings to sort_items_indirect_.

4) Change the calling sequences of sort_items_ and sort_items_indirect_ to accept pointers to structures containing aligned arrays.

5) Remove sort_items_ and sort_items_indirect_ from bound_utility_tools_ in system_library_tools, and create a new bound segment, bound_sort_routines_ in system_library_standard, which will contain sort_items_, sort_items_indirect_, sort_seg, and sort_seg_.

IMPLICATIONS:

1) User interface - minimal, as no system routines currently reference sort_items_ or sort_items_indirect_.

2) Performance

a) sort_seg and sort_seg_ will operate as much as 4 times faster than sort_file. The initial versions operated, at best, only twice as fast.

b) sort_items_ and sort_items_indirect_ will operate 4 times faster than the currently installed versions.

DETAILED PROPOSAL: see MTB-068 for changes made to the user interfaces of sort_items_ and sort_items_indirect_.