

TO: Distribution
FROM: Joan Scott
DATE: 23 June 76
SUBJECT: Approved MCR's

Attached are the Multics Change Requests which were approved from June 1, 1976 through June 15, 1976.

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TITLE: Add -brief option to binder		STATUS	DATE
AUTHOR: M. Weaver		Written	10 May 76
SHW		Status	P5/18 H 06/01/76
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL		Expires	12/01/76
-Planned for System MR 4.0		DOCUMENTATION CHANGES	
-Fixes Bug Number(s) _____		Document	Specify One or More
-Documented in MTB _____		MPM (Vol, Sect.)	Commands
-User/Operations-visible		PLMS (AN #)	
Interface change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no		MOSN (Sect.)	
-Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		MPAM (Sect.)	
-Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same		MSAM (Sect.)	
<input type="checkbox"/> Worse			
-Replaces MCR _____			
Objections/Comments:		Info Segs bind	binder changes
		Other (Name)	
		None (Reason)	

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

SUMMARY:

Add -brief (-bf) option to the bind command to suppress warning messages as well as the "Binding..." message.

Print bad control argument message for any unrecognizable argument beginning with "-".

The names returned by `expand_path` will be used in messages printed on the terminal. The full primary names will be used in the source map.

REASONS:

To allow suppression of irritating messages. More standard treatment of command arguments.

bind

bind

Name: bind, bd

This command produces a single bound object segment from one or more unbound object segments that are called the components of the bound segment. (Compilers and the assembler produce unbound object segments.) A reference in one component to an external symbol defined in another component may be resolved during the binding. This prelinking avoids the cost of dynamic linking, and it also ensures that the reference is linked to the component regardless of the state of a process at the moment that dynamic linking would take place. References to a symbol are prelinked unless the contrary is specified by an instruction in the bindfile. The bindfile is a segment containing instructions that control various aspects of the binding operation (see "The Bindfile" below).

Usage:

bind archive_paths -update- -update_paths- -control_arg-

where:

1. archive_paths are the pathnames of archive segments containing one or more component object segments to be bound. Up to 16 input archive segments can be specified. They are logically concatenated in a left-to-right order to produce a single sequence of input component object segments. The specified pathname of the archive segment need not contain an explicit archive suffix.
2. -update, -ud is an optional functional argument to the binder indicating that the following list of archive segments (update_paths) specifies update rather than input object segments. If this optional argument is used, it must be preceded by a hyphen.
3. update_paths are pathnames of optional archive segments containing update object segments. Up to a combined total of 16 input and update segments can be specified. The contained update object segments are matched against the input object segments by object segment name. Matching update object segments replace the corresponding input object segments; unmatched ones are appended to the sequence of input object segments. If several update object segments have the same name, only the last one encountered is bound into the bound segment. The specified pathname of the archive segment need not contain an explicit archive suffix.
- 4. control_arg can be one of the following ~~two~~ optional control arguments:
 - list, -ls produces a listing segment whose name is derived from the name of the bound object segment plus a suffix of list. The listing segment is generated for the purpose of dprinting; it contains the bound segment's bind control segment (see "The Bindfile" below), its bind map, and that information from the bound object segment that would be printed by the print_link_info command. (See the description of the dprint command in this document and the print_link_info command in the MPM Subsystem Writers' Guide.)

-map produces a listing segment (with the suffixes list and map) that contains only the bind map information.

In the absence of ~~these control arguments~~, no listing segment is generated.

-list and -map

-brief, -bf suppresses printing of warning messages.

Output

The binder produces as its output two segments: an executable bound procedure object segment and an optional, printable ASCII listing segment. The name of the bound object segment is, by default, derived from the entryname of the first input archive segment encountered by stripping the archive suffix from it. The name of the listing segment is derived from the name of the bound segment by adding the list suffix to it. Use of the Objectname master statement in the bindfile (see "Master Key Words" below) allows the name of the bound object segment to be stated explicitly. In addition, use of the Addname master statement in the binding instructions causes additional segment names to be added to the bound segment. The primary name of the bound object segment must not be the same as the name of any component.

The Bindfile

The bindfile is a segment containing symbolic instructions that control the operation of the binder. Its entryname must contain the suffix bind and it must be archived into any one of the input archive segments (at any location within that archive segment) where it is automatically located and recognized by the binder.

In case two bindfiles are specified, one in an input archive segment and the other in an update archive segment, the latter takes precedence and an appropriate message is printed to that effect.

The binder's symbolic instructions have their own syntax that allows for statements consisting of a key word followed by zero or more parameters and then delimited by a statement delimiter. Master statements pertain to the entire bound object segment; normal statements pertain to a single component object within the bound object segment. Master statements are identified by master key words that are distinct from normal key words in that they begin with a capital letter; normal key words begin with a lowercase letter. A key word designates a certain action to be undertaken by the binder pertaining to parameters following the keyword.

05/00/76 bind, bd

Function: produces a single bound object segment from one or more unbound object segments.

Syntax: bd paths -control_arg-

Arguments: paths are the pathnames of archive segments; the archive suffix need not be given.

Control arguments:

- update paths, -ud paths pathnames are update archives.
- list, -ls produces listing segment; it contains the bound segment's bind control segment, its bind map, and list of entries and links.
- map produces a listing segment (with the suffixes list and map) that contains only the bind map information.
- brief, -bf suppresses warning messages

This segment documents changes to the binder in reverse chronological order.

05/19/76

-brief (-bf) has been added as a command control argument to suppress warning messages.

12/15/75

The binder no longer binds segments containing break maps; these segments were never bound correctly anyway.

8/15/75

The following changes have been installed:

-binder bugs 8, 9, and 10 have been fixed,

-the binder now refuses to bind nonstandard alm segments and no longer accepts the control argument -no_old_alm or the bindfile keyword No_Old_Alm,

-components with separate static sections can now be bound; the bound segment will have a separate static section only if all nonzero length static sections are separate.

2/23/73

The binder is now capable of deleting symbol tables. Two new keywords have been added to the bindfile language, one master and one local. Neither one requires parameters. They are:

No_Table causes the symbol tables from all the component symbol sections containing them to be omitted from the bound segment, except when they are needed for v2pl1 I/O. If not given, all tables will be kept.

table overrides the No_Table keyword and causes the symbol table of the component to be retained.

NOTE

Some standard version II pl1 procedures have a flag indicating that their symbol tables are needed for get data or put data statements. The binder issues a warning in these cases. However, there is currently a bug in the pl1 compiler that often causes the flag to be set when it isn't necessary, so the warning can usually be ignored.

1/5/73 (Version 8 binder installed)

If you have problems with the new version, use oldbind\$bind, which is the previous version.

This version of the binder has the following new features:

- It creates standard object segments if all input components are standard object segments
- It enables the user to specify that no non-standard alm segments are to be bound (they will not work on the 6180);

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR 190 1901
TITLE: Add sequential capability to rdisk_		STATUS DATE
AUTHOR: J.L. Gildensleeve	CC 2	Written 05/18/76 Status 06/07/76 Expires 11/18/76
Planned for System: MR 4.0		
Fixes Bug Number(s): not applicable		CATEGORY (check one)
Documented in MTB: not applicable		() Lib. Maint. Tools
Incompatible Change: no		() Sys. Anal. Tools
User/Operations-visible Interface Change: yes		() Sys. Prog. Tools
Coded in: (X) PL/I () ALM () other-see below		() 355
Performance: () better (X) same () worse		() BOS
DOCUMENTATION CHANGES (specify one or more)		() Salvager
MPM (vol,sect) A593,3	MPAM (sect)	() Ring Zero
MOSN (sect)	MSAM (sect)	() Ring One
PLMs (AN#)		() SysDaemon/Admin
Info Segs		() Runtime
Other		(X) User Command/Supr
OBJECTIONS/COMMENTS:		

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

SUMMARY: Add sequential capability to rdisk_ I/O module.

REASON: Required by USAFDSC contract. (We are paying the USAF \$100 per day until they are satisfied with the "sequential" capability in the rdisk_ I/O module.)

IMPLICATIONS: Users will be able to do reads and writes without having to supply a key.

DETAILED PROPOSAL: The additional opening modes to be supported are sequential_input, sequential_output, and sequential_update.

The additional operations to be supported are write_record and position.

Attached to this MCR is a proposed MPM writeup, with the changed sections flagged. The MPM writeup for the installed rdisk_ I/O module was used as the starting document in which the changes were made.

Also attached to this MCR are marked_up copies of some of the tables from the MPM Reference Guide relating the supported opening modes, file types, and I/O operations to each other.

Table 5-2. Opening Modes Supported by I/O Modules

Opening Mode		I/O Module							
		discard_	rdisk_	record_stream_	tape_ansi_	tape_ibm_	tape_mult_	tty_	vfile_
No.	Name								
1	stream_input			X			X	X	X
2	stream_output	X		X			X	X	X
3	stream_input_output							X	X
4	sequential_input		⊗	X	X	X			X
5	sequential_output	X	⊗	X	X	X			X
6	sequential_input_output								X
7	sequential_update		⊗						X
8	keyed_sequential_input								X
9	keyed_sequential_output	X							X
10	keyed_sequential_update								X
11	direct_input		X						X
12	direct_output	X							X
13	direct_update		X						X

The syn_ I/O module is not included in this table because the allowed modes are a function of the switch to which the syn_ module is being attached.

⊗ denotes the new capabilities to be provided with the addition of sequential I/O to the rdisk_ I/O module.

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rdisk_ rdisk_

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(NOTE TO REVIEWERS:

This is a draft to show the proposed additions for sequential capabilities. This is a modified version of the writeup of the rdisk_ I/O module that is in the MPM Subroutines manual, AG93B. The line numbers in the left margin are present to facilitate the making of comments about this draft. The meaning of the symbols which follow the line numbers are:

- AAA The meaning of the text was changed in the 05/07/76 version which was sent to FSO for submission to the USAF.
- BBB This change took place after the 05/07/76 version was sent to FSO.
- Text was deleted from the MPM writeup for the 05/07/76 version which was sent to FSO.

END OF NOTE.)

Name: rdisk_

The rdisk_ I/O module supports I/O from/to removable disk packs. Sequential and indexed file types are supported.

Entries in this module are not called directly by users; rather, the module is accessed through the I/O system. See the "Multics Input/Output System" for a general description of the I/O system, and "File Input/Output" for a discussion of files, both in Section IV of the MPM Reference Guide.

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Attach Description

The attach description has the following form:

ndisk_ device_id pack_id -control_args-

where:

1. device_id is a character string identifying the type number of the required disk device. The supported disk devices are listed in the table below, along with the character string to use for device_id:

device_id	Device Type
d181	DSU181
d190	DSU190
d191	DSU190 with the high-efficiency format (40 sectors/track)
m400	MSU0400
m450	MSU0451

2. pack_id is a character string identifying the disk pack to be mounted.
3. control_args may be chosen from the following: may occur only once.

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- write indicates that the disk pack may be written on. If omitted, the operator is instructed to mount the pack with the PROTECT button pressed so that writing is inhibited.
- size *n* indicates that the value of *n* is to override the value of the buff_len parameter as a record size limit for the read_record operation. (See "Notes" below.)
- priv indicates that the attachment is being made by a system process and that a disk drive reserved for system functions is to be assigned.

The attachment causes the specified disk pack to be mounted on a drive of the specified type.

Opening

The following opening modes are supported:

- sequential_input
- sequential_output
- sequential_update
- direct_input
- direct_update

Note that if the opening mode is of the output or update type, the attach description must include the -write

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control argument so that the operator will not press the PROTECT button when the pack is mounted.

Delete_Record_Operation

This operation is not supported.

Read_Length_Operation

This operation is not supported.

Position_Operation

This operation is supported for only the sequential_input and sequential_update operating modes. The type and quantity values are interpreted as follows:

<u>type</u>		<u>quantity</u>
-1	--	position to the beginning of the file.
+1	--	position to the end of the file.
0	n	skip n sectors (forward if n > 0; backward if n < 0).
2	n	position to sector n.

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Read_Record_Operation

If the amount of data to be read does not terminate on a sector boundary, the excess portion of the last sector is discarded. A code of 0 is returned in this case. (See "Notes" below.) This operation is not supported for the sequential_output opening mode.

Rewrite_Record_Operation

If the amount of data to be written does not terminate on a sector boundary, the remaining portion of the last sector is filled with spaces in sequential modes and binary zeros in direct modes. A code of 0 is returned in this case. (See "Notes" below.) This operation is supported for only the update opening modes.

Seek_Key_Operation

This operation returns a status code of 0 for any key that is a valid sector number. The record length returned is always 256 (current physical sector size in characters) for any valid key. The specified key must be a character string that could have been produced by editing through a PL/I picture of "(B)9". (See "Notes" below.) This operation is supported for only the direct opening modes.

Control_Operation

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The following orders are supported when the I/O switch is open, except for getbounds, which is supported while the switch is attached.

changeback

causes the current pack to be dismounted and another pack to be mounted in its place. The info_ptr should point to a variable length character string (maximum of 32 characters) containing the identifier of the pack to be mounted.

getbounds

causes the lowest and highest sector numbers accessible by the caller under the current modes to be returned. The info_ptr should point to a structure of the following form:

```
oct 1 bounds,  
    2 low fixed bin(35),  
    2 high fixed bin(35);
```

setsize

causes the value of the record size override setting to be reset. The info_ptr should point to an aligned fixed binary(35) quantity containing the new override value.

Modes Operation

The modes operation is supported when the I/O switch is attached. The recognized modes are listed below. Each mode

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has a complement indicated by the circumflex character (^) that turns the mode off.

label, ^label

specifies that a system-defined number of sectors at the beginning of the pack are reserved for a pack label, and that a seek_key or position operation is to treat any key within this area as an invalid key. (The default is on.)

alttrk, ^alttrk

specifies that the pack has been formatted with the assignment of alternate tracks, so that a system-defined number of sectors at the end of the pack are reserved for an alternate track area. Therefore, a seek_key or position operation is to treat any key within that area as an invalid key. (The default is off.)

wrtcmp, ^wrtcmp

specifies that the write-and-compare instruction, rather than the write instruction, is used for the rewrite_record operation. This causes all data written to be read back and compared to the data as it was prior to being written. This mode should be used with discretion, since it doubles the data transfer time of every write. (The default is off.)

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Write_Record_Operation

If the amount of data to be written does not terminate on a sector boundary, the remaining portion of the last sector is filled with spaces. A code of 0 is returned in this case. (See "Notes" below.) This operation is supported for only the sequential_output opening mode. A series of writes will write successive records.

Closing

The closing has no effect on the physical device. For the sequential_output opening mode, the effect is as if an End Of File flag is placed just beyond the end of the available disk area.

Detaching

The detachment causes the disk pack to be dismounted.

Notes

This I/O module is a very elementary, physical-device-oriented I/O facility, providing the basic user-level interface to a disk device. All operations are performed through calls to various I/O Interfacer (IOI) mechanisms and resource control package (RCP) entries. Certain conditions must be satisfied before a user process

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can make use of this facility:

1. The system must be configured with one or more disk drives available as I/O disks.
2. The user must have access to assign the disk drive with RCP, access to the IOI gates, and access to the "acs" segment (e.g., >sc1>rcp>dskb_18.acs) that is used by the site to control access to the disk drive.

For input and update opening modes, the file occupies the entire available disk area (see the getbounds control order). For the sequential_output opening mode, the file is considered to be empty. That is, an open followed by a write will record data in the first sector of the available disk area.

For direct opening modes, the entire disk pack is treated as an indexed file, with keys interpreted literally as physical sector numbers. Hence, the only allowable keys are those that can be converted into fixed binary integers that fall within the range of valid sector numbers for the given disk device under the current modes, as returned by the getbounds control operation.

For the sequential_input and sequential_update opening modes, if an attempt is made to read beyond the end of the user-accessible area, the code error_table_\$end_of_info is returned. For all other opening modes, if an attempt is made to read or write beyond the end of the user-accessible area on disk, the code error_table_\$device_end is returned. If a defective track is encountered or if any other unrecoverable data transmission error is encountered, the

code error_table_\$device_parity is returned.

The record length is specified through the buff_len parameter in the read_record operation, and through the rec_len parameter for the write and rewrite operations, unless overridden by a -size control argument in the attach description, or by a setsize control order.

The following items must be considered when using this I/O module with language input/output:

1. Device Attachment and File Opening:

- a. PL/I: A file can be attached to a disk pack in PL/I by specifying the appropriate attach description in the title option of an op statement. After opening, the desired modes should be set and the current sector bounds should be obtained through direct calls to lox_\$find_iocb, lox_\$modes, and lox_\$control. These lox_ subroutine entry points are described in Section II.
- b. FORTRAN: It is not possible to attach a file to a disk pack within FORTRAN. Here, the attachment must be made external to the FORTRAN program, e.g., through the lc_call command (described in the MPM Commands) or through use of a PL/I subroutine. FORTRAN automatically opens the file with the appropriate attributes. Also, it is impossible to set modes or obtain sector bounds from within FORTRAN. This should be

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done through use of a PL/I subroutine prior to the first FORTRAN reference to the file.

2. Input:

- a. PL/I: The input record length (buff_len) is determined by the size of the variable specified in the into option.

For the sequential_input and sequential_update opening modes, use the PL/I read statement with the into option to read data. Use the ignore option to skip forward within the file. An open statement followed by a read statement will read in the first record. Successive reads will obtain successive records.

For the direct_input opening mode, use the PL/I read statement with the into and key options. The set option should not be used. The key should be a character string containing the character representation of the desired sector number.

The PL/I get statement can be used with the sequential_input opening mode if the record_stream_ I/O module is referenced in the attach description of the open statement.

- b. FORTRAN: In FORTRAN, buff_len has no relationship to input variable size. Hence, the -size control argument must be specified in the attach description if the disk pack is to be read through FORTRAN. The size should

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be set to the length of the longest expected record.

For the sequential_input opening mode, use the unformatted sequential read statement.

For the direct_inout opening mode, use the unformatted keyed version of the FORTRAN read statement. The key must be an integer, whose value is the desired sector number.

3. Output:

- a. PL/I: The size of the variable referenced in the from option determines the length of the record written to disk.

For the sequential_output opening mode, use the write statement with the from option. An open statement followed by a write statement will start writing at the beginning of the available area on the disk pack.

For the sequential_update opening mode, use the rewrite statement with the from option. A previous read statement must have been used to designate which record will be updated.

For the direct_update opening mode, use the rewrite statement with the from and key options. The key should be a character string containing the character representation of the desired sector number.

The PL/I put statement can be used with the sequential_output opening mode if the

614
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rdisk_

rdisk_

DRAFT OF 05/18/76

3-4.13

AG93A

record_stream_ I/O module is referenced in the attach description of the open statement.

b. FORTRAN: The size of the output record is determined by the amount of data specified in the write list.

For the sequential_output opening mode, use the unformatted sequential write version of the FORTRAN write statement.

For the direct_update opening mode, use the unformatted keyed version of the write statement. The key should be a character string containing the character representation of the desired sector number.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR 1902
TITLE: Fix erroneous calls to dir_control_error in append, reclassifv and quota		STATUS: DATE
AUTHOR: L. Scheffler		Written: 05/24/76
JCW		Status: A0661/76
		Expires: 11/24/76
Planned for System: MR4.0		CATEGORY (check one)
Fixes Bug Number(s): unreported		() Lib. Maint. Tools
Documented in MTB: not applicable		() Sys. Anal. Tools
Incompatible Change: no		() Sys. Prog. Tools
User/Operations-visible Interface Change: no		() 355
Coded in: (X) PL/I () ALM () other-see below		() BOS
Performance: () better (X) same () worse		() Salvager
DOCUMENTATION CHANGES (specify one or more)		(X) Ring Zero
MPM (vol,sect)	MPAM (sect)	() Ring One
MDSN (sect)	MSAM (sect)	() SysDaemon/Admin
PLMs (AN#)		() Runtime
Info Segs		() User Command/Subr
Other		
None (reason) None needed		
OBJECTIONS/COMMENTS:		

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

Summary: Change instances in append, reclassify, and quota, where calls to dir_control_error\$attributes should pass a pointer to the directory on which access is insufficient, instead of (as currently) passing a pointer to that directory's branch in its parent.

Reasons: These calls result in dir_control_error computing error_table_codes based on the user's access to the wrong directory (the parent of the directory of interest), and to auditing messages reporting access denials on wrong directories.

Implications: error_table_codes will be computed properly and auditing messages will report the proper directories in these cases.

Error messages for the create and create_dir commands and error_table_codes from append will change in some (rare) cases where they are incorrect today. (See Detailed Explanation below.)

Error messages for the move_quota command and error_table_codes produced by hcs_\$quota_move will not change because the logic of access checking in quota precludes cases where error codes would be different. However, the right codes will be computed for the right reasons instead of, as currently, for the wrong reasons.

Detailed Explanation: dir_control_error\$attributes accepts a pointer argument to determine the directory containing attributes (of real or soon-to-be-created branches) or quota cells to which access is insufficient. This pointer may be a directory pointer (offset = 0), or an entry pointer, in which case a directory pointer is made from the entry pointer and an offset of 0. dir_control_error computes the

error_table_code to be returned based on the user's access to the directory pointed to. In append, reclassify, and quota, some of the errors being reported are instances of incorrect access to attributes or quota cells contained in the directory whose entry pointer (in its parent) is currently being passed. This causes dir_control_error to check access on the wrong directory before deciding what error code to return.

In the case of append, this results in erroneous error codes (and therefore wrong error messages from the create and create_dir commands) in the case of "cr A>B>C>D" where the user's access on B and C is null. Currently, the user's access on A determines the error codes: null access on A results in error_table_\$no_info while non-null access on A results in error_table_\$incorrect_access. This is one directory level off.

Ver. 3	MULTICS CHANGE REQUEST	MCR 1903
741022		
TITLE: Install lv_attached active function.	STATUS	DATE
AUTHOR: VanVleck	Written	05/24/76
	Status	05/01/76
	Expires	11/24/76
Planned for System: MR 4.0	CATEGORY (check one)	
Fixes Bug Number(s): not applicable	<input type="checkbox"/> Lib. Maint. Tools	
Documented in MTB: not applicable	<input type="checkbox"/> Sys. Anal. Tools	
Incompatible Change: no	<input type="checkbox"/> Sys. Prog. Tools	
User/Operations-visible Interface Change: no	<input type="checkbox"/> 355	
Coded In: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other-see below	<input type="checkbox"/> BOS	
Performance: <input type="checkbox"/> better <input checked="" type="checkbox"/> same <input type="checkbox"/> worse	<input type="checkbox"/> Salvager	
DOCUMENTATION CHANGES (specify one or more)	<input type="checkbox"/> Ring Zero	
MPM (vol,sect) of MPAM (sect)	<input type="checkbox"/> Ring One	
MOSN (sect) MSAM (sect)	<input type="checkbox"/> SysDaemon/Admin	
PLMs (AN#)	<input type="checkbox"/> Runtime	
Info Segs	<input checked="" type="checkbox"/> User Command/Subr	
Other		
OBJECTIONS/COMMENTS:		

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

SUMMARY:

Install lv_attached active function, which returns "true" if the named logical volume is attached to the user's process.

REASONS:

User exec_com files may wish to check whether a volume is attached before proceeding.

Draft MPM documentation

Name: `lv_attached`

This active function returns "true" if the named logical volume is attached to the user's process or is a public volume.

Usage:

`[lv_attached volname]`

where `volname` is the name of a logical volume.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR 1904
TITLE: Install commands to manipulate BOS/Multics flags.		STATUS: DATE Written: 05/24/76 Status: A 06/01/76 Expires: 11/24/76
AUTHOR: VanVleck		
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 (B)same ()worse		
DOCUMENTATION CHANGES (specify one or more)		
MPM (vol,sect) MPAM (sect)		
MOSN (sect) MSAM (sect)		
PLMs (AN#) an51		
Info Segs		
Other		
OBJECTIONS/COMMENTS:		

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

SUMMARY:

Install new command set_flagbox and new command/active function get_flagbox.

REASONS:

These commands allow a privileged process to read and set the flagbox flags. This allows modification of system_start_up.ec to control the rebooting of the system.

IMPLICATIONS:

New system_start_up.ec and BOS runcoms must be created in order to put automatic rebooting into effect. This change installs the last program needed for this facility.

Name: get_flagbox

This active function returns either "true" or "false" depending on the value of a specified flag in the BOS/Multics communication area.

Usage:

[get_flagbox keyword]

where keyword may be either a number from 1 to 36, or the name of one of the flagbox flags. This active function can also be used as a command. Privileged access to phcs_ is required to use this program.

Name: set_flagbox

This command sets the value of a specified flag in the BOS/Multics communication area.

Usage:

set_flagbox keyword value

where keyword may be either a number from 1 to 36 or the name of one of the flagbox flags. Privileged access to hphcs_ is required to use the program.

Notes: The names of the flagbox flags are:

1	auto_reboot
2	booting
3	crashed
4	rebooted
5	bit5
6	bit6
7	bit7
8	bit8
9	bit9
10	bit10
11	bit11
12	bit12
13	bit13
14	bit14
15	bit15
16	bit16
17	bit17
18	bit18
19	bit19
20	bit20
21	bit21

22	bit22
23	bit23
24	bit24
25	bit25
26	bit26
27	bit27
28	bit28
29	bit29
30	bit30
31	bit31
32	bit32
33	bit33
34	bit34
35	bit35
36	bit36

Ver. 3 741022	MULTICS CHANGE REQUEST	EDS	MCR 1905
TITLE: Install display_kst_entry		STATUS: Written	DATE: 05/24/76
AUTHOR: Richard Bratt		Status: A06/01/76	Expires: 11/24/76
Planned for System: 5.0		CATEGORY (check one)	
Fixes Bug Number(s): not applicable		<input type="checkbox"/> Lib. Maint. Tools	
Documented in MTB: not applicable		<input checked="" type="checkbox"/> Sys. Anal. Tools	
Incompatible Change: no		<input type="checkbox"/> Sys. Prog. Tools	
User/Operations-visible Interface Change: no		<input type="checkbox"/> 355	
Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other-see below		<input type="checkbox"/> BOS	
Performance: <input type="checkbox"/> better <input checked="" type="checkbox"/> same <input type="checkbox"/> worse		<input type="checkbox"/> Salvager	
DOCUMENTATION CHANGES (specify one or more)		<input type="checkbox"/> Ring Zero	
MPM (vol,sect)	MPAM (sect)	<input type="checkbox"/> Ring One	
MOSN (sect)	MSAM (sect)	<input type="checkbox"/> SysDaemon/Admin	
PLMs (AN#) 51		<input type="checkbox"/> Runtime	
Info Segs		<input type="checkbox"/> User Command/Subr	
Other		<input type="checkbox"/> tools	
OBJECTIONS/COMMENTS:			

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

Summary: Install a private tool of mine which prints the contents of a KST entry given either a segment number or a relative pathname.

Name: display_kst_entry

The display_kst_entry command prints the contents of a KST entry. The KST entry to be dumped may be indicated by either a segment number or a relative pathname of the associated object. If the relative pathname looks like a segment number then it must be preceded by the -name (-nm) control argument.

Usage: display_kst_entry [-nm ! -name] target

where: target is either a segment number or relative pathname.

Note: This command uses phcs_ only when needed.

display_kst_entry start_up.ec

segno: 256 at 1551470
usage: 0, 0, 0, 0, 2, 0, 0, 0
entryno: 24315452
uid: 033100743603
dtbm: 416334652254
mode: 7 (4, 4, 4)
ex mode: 0 (0, 0, 0)
infcnt: 0
hdr: 4
flags: write

Ver. 3 741022	MULTICS CHANGE REQUEST <i>TVV</i>	MCR 1906
TITLE: Put useful information in tty DIM event messages		STATUS: Written
AUTHOR: Robert S. Coren		DATE: 05/24/76
Planned for System: MR 5.0		Status: 06/01/76
Fixes Bug Number(s): not applicable		Expires: 11/24/76
Documented in MTB: not applicable		CATEGORY (check one)
Incompatible Change: no		() Lib. Maint. Tools
User/Operations-visible Interface Change: no		() Sys. Anal. Tools
Coded in: (<input checked="" type="checkbox"/>) PL/I () ALM () other-see below		() Sys. Prog. Tools
Performance: () better (<input checked="" type="checkbox"/>) same () worse		() 355
DOCUMENTATION CHANGES (specify one or more)		() BOS
MPM (vol,sect)	MPAM (sect)	() Salvager
MOSN (sect)	MSAM (sect)	(<input checked="" type="checkbox"/>) Ring Zero
PLMs (AN#) AN85		() Ring One
Info Segs		() SysDaemon/Admin
Other		() Runtime
OBJECTIONS/COMMENTS:		() User Command/Subr

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

SUMMARY: Make the ring-zero typewriter DIM put the device index (devx) and a type code in the event message for all wakeups.

REASONS: At present the event message contains zero except for hangups, when it contains the devx; no system programs examine the event message. It would be useful, especially for a process that has attached extra terminals, to be able to tell from the event message what the meaning of a tty DIM wakeup is.

IMPLICATIONS: None.

DETAILED PROPOSAL: Use the event message format described by the attached include file. This mechanism won't work for fast ipc channels (normally used for tty I/O).

```

/*      BEGIN INCLUDE FILE ... tty_event_message.incl.pl1 */

/*      describes event message passed with wakeups from the tty DIM */
/*      Created 5/24/76 by Robert S. Coren */

dcl  tty_event_message fixed bin (71);

dcl  1 tty_msg based (addr (tty_event_message)),
     2 ev_devx fixed bin (17) unaligned,           /* device index */
     2 ev_type fixed bin (17) unaligned,          /* reason for wakeup (see below) */
     2 pad bit (36);

dcl  UNSPECIFIED_MSG fixed bin internal static options (constant) init (0); /* used for "start" order, etc.
dcl  DIALUP_MSG fixed bin internal static options (constant) init (1); /* dialup */
dcl  HANGUP_MSG fixed bin internal static options (constant) init (2); /* hangup */
dcl  DIALOUT_MSG fixed bin internal static options (constant) init (3); /* dialout status returned */
dcl  QUIT_MSG fixed bin internal static options (constant) init (4); /* quit */
dcl  READ_MSG fixed bin internal static options (constant) init (5); /* input arrived */
dcl  WRITE_MSG fixed bin internal static options (constant) init (6); /* output completed */

/*      END INCLUDE FILE ... tty_event_message.incl.pl1 */

```

TITLE: Change mailbox initial ACL		STATUS	DATE
AUTHOR: S. Herbst		Written	5/20/76
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL		Status	A 06/01/76
-Planned for System MR 5.0		Expires	12/01/76
-Fixes Bug Number(s)		DOCUMENTATION CHANGES	
-Documented in MTB		Document	Specify One or More
-User/Operations-visible		MPM (Vol, Sect.)	AG92
Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		PLMS (AN #)	AN69
-Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		MOSN (Sect.)	
-Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same		MPAM (Sect.)	
<input type="checkbox"/> Worse		MSAM (Sect.)	
-Replaces MCR		Info Segs	
Objections/Comments:		Other (Name)	
		None (Reason)	

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

SUMMARY:

Change the ACL placed on a newly created mailbox from:

```

adros      creator
as         *.SysDaemon.*
aow        *.*.*
    
```

to:

```

adrosw     creator
asw        *.SysDaemon.*
aow        *.*.*
    
```

REASON:

So that the creator of the mailbox can send himself wakeup messages, and the I/O Daemon can send him wakeup notifications.

Sending a Segment

The contents of the segment specified by path is sent to the mailbox:

```
>user_dir_dir>Project_idi>Person_idi>Person_idi.mbx
```

for each Person_id-Project_id pair specified in the command line.

The segment to be mailed must be less than one record long (4096 ASCII characters).

Composing Mail

If path is *, mail responds with "Input:" and accepts lines from the terminal until a line consisting only of a period (.) is typed; the typed lines are then sent to the specified user(s).

Creating a Mailbox

A default mailbox is created automatically the first time a user prints his own mail. The default mailbox is:

```
>user_dir_dir>Project_id>Person_id>Person_id.mbx
```

Access on a newly created mailbox is automatically set to adro^w for the user who created it, ^{asw} for *.SysDaemon.*, and aow^w for *.*.*. The types of extended access for mailboxes are:

add	a	add a message
delete	d	delete any message
read	r	read any message
own	o	read or delete only your own messages, that is, those sent by you
status	s	find out how many messages are in the mailbox

wakeup w send a wakeup when adding a message
The modes "n", "null", or "" specify null access.

*(Used by the
send-message
command.)*

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR _____ 1909
TITLE: Change charging for dprint requests		STATUS DATE
AUTHOR: Jim Homan		Written 05/18/76
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: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other-see below Performance: <input type="checkbox"/> better <input checked="" type="checkbox"/> same <input type="checkbox"/> worse		Status 106/01/76
		Expires 11/18/76
DOCUMENTATION CHANGES (specify one or more)		CATEGORY (check one)
MPM (vol,sect)	MPAM (sect)	<input type="checkbox"/> Lib. Maint. Tools
MOSN (sect)	MSAM (sect)	<input type="checkbox"/> Sys. Anal. Tools
PLMs (AN#)		<input type="checkbox"/> Sys. Prog. Tools
Info Segs	pending_changes	<input type="checkbox"/> 355
Other		<input type="checkbox"/> BOS
		<input type="checkbox"/> Salvager
		<input type="checkbox"/> Ring Zero
		<input type="checkbox"/> Ring One
		<input checked="" type="checkbox"/> SysDaemon/Admin
		<input type="checkbox"/> Runtime
		<input type="checkbox"/> User Command/Subr
OBJECTIONS/COMMENTS:		
Whitmore or VanVleck should audit before installation.		

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

SUMMARY

Charge for dprint requests on the basis of lines printed instead of blocks printed.

REASONS

The current method of charging for dprint usage is to charge for "blocks" printed. This is confusing to the user and is not as accurate a measure of printing costs as lines printed would be. Most other computer systems charge on the basis of lines printed. Originally, charges were based on blocks because the line count was not available. The block size (700 bits) was intended to be equal to the average line size. Now that the line count is available, dprint charges should be based on the actual line count.

IMPLICATIONS

The primary implication to users will be a change in dprint charges. The change will vary depending on the nature of the data being printed, but it is estimated that most users will see an increase if rates remain the same, although users who dprint longer than average lines will see a decrease.

Charges for dprinting a segment may differ for different printer page widths, if lines wrap around at one width but not at another.

User programs which calculate dprint charges based on the bit count of a segment will no longer give correct costs.

System programs and info files (e.g. billing programs, ed_installation_parms, resource_usage, rates.info) have always referred to lines rather than blocks and so will require no changes.

DETAILED PROPOSAL

Change `output_request_` to fill in `ordata.line_count` with the line count supplied by the DIM, if non-zero. If zero (as is the case for card DIMS), use block count as before. Change `io_daemon_account_` to use `ordata.line_count` instead of calculating the block count. Change `tail_sheet_` to print out "xxx lines at \$y.yy per 1000 lines."

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR 1910
TITLE: Add alarm order to operator console DIM		STATUS DATE
AUTHOR: Larry Johnson	NIM	written 05/25/76
		Status 06/01/76
		Expires 11/25/76
Planned for System: MK 4.1		CATEGORY (check one)
Fixes Bug Number(s): not applicable		() Lib. Maint. Tools
Documented in MTB: not applicable		() Sys. Anal. Tools
Incompatible Change: no		() Sys. Prog. Tools
User/Operations-visible Interface Change: yes		() 355
Coded in: (X)PL/I ()ALM ()other-see below		() BOS
Performance: ()better (X)same ()worse		() Salvager
DOCUMENTATION CHANGES (specify one or more)		() Ring Zero
MPM (vol,sect) MPAM (sect)		() Ring One
MOSN (sect) MSAM (sect)		(X) SysDaemon/Admin
PLMs (AN#)		() Runtime
Info Segs		() User Command/Subr
Other		
None (reason)		
OBJECTIONS/COMMENTS:		

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

Summary

Implement an "alarm" order in oc_ which will cause the next message written by the DIM to turn on the console beeper.

Reasons

This feature is needed by the message coordinator, which currently simulates it in an awkward manner.

Detailed Proposal

Currently, if the message coordinator needs to turn on the console beeper, it calls phcs_\$ring_0_message to print:

```
Initializer.SysDaemon.z: *****
```

which turns on the beeper when it is printed. There are two problems with the mechanism:

1. The operator's console and the syserr log are cluttered with uninteresting messages.
2. The alarm is often turned on too soon, as syserr messages have priority over messages from the DIM.

The message coordinator will be changed to use the "alarm" order instead of the phcs_ call.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR <u>1877</u>
TITLE: Fix dump_cdt		STATUS: <u>Written</u> DATE: <u>06/23/76</u>
AUTHOR: Mike Grady	JWG	Status: <u>106/13/76</u> Expires: <u>12/23/76</u>
Planned for System: MR5.0		CATEGORY (check one)
Fixes Bug Number(s): not applicable		() Lib. Maint. Tools
Documented in MTR: not applicable		() Sys. Anal. Tools
Incompatible Change: yes		() Sys. Prog. Tools
User/Operations-visible Interface Change: yes		() 355
Coded in: (X)PL/I ()ALM ()other-see below		() BOS
Performance: ()better (X)same ()worse		() Salvager
DOCUMENTATION CHANGES (specify one or more)		() Ring Zero
VPM (vol,sect) MPAM (sect)		() Ring One
MDSN (sect) MSAM (sect) Appendix A		(X) SysDaemon/Admin
PLMs (AN#)		() Runtime
Info Secs		() User Command/Subr
Other		
OBJECTIONS/COMMENTS:		

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

SUMMARY:

Have dump_cdt use proper form of control arguments and require control arguments be used to specify dumping of a particular channel or a specified CDT.

REASONS:

Commands should be consistent in support of various control arguments and should not have confusing usages.

IMPLICATIONS:

Users of dump_cdt will find certain incompatibilities.

DETAILED PROPOSAL:

Have dump_cdt accept the following control arguments:

-all, -a	print all CDT entries
-no_header, -nhe	don't print CDT header info
-fnp	print the entries for FNPs
-channel X, -chn X	print specified channel entry
-cmf X	dump CDT in the form of CMF into segment X
-pathname X, -pn X	dump info from specified CDT X

dump_cdt

dump_cdt

Name: dump_cdt

The dump_cdt command enables a system administrator to dump the channel definition table (CDT) residing in >system_control_1. Optional arguments control whether the header information is printed, and whether all CDT entries, or only a selected CDT entry, is printed.

Usage

dump_cdt ~~cdt_path name~~ -control_args-

where:

- 1. cdt_path is the relative pathname of the CDT to be dumped. If not specified, >system_control_1/cdt is dumped.
- 2. name is the name of a channel whose CDT entry is to be dumped. It must be of the form "ttyXXX", where XXX is the numeric channel designation. If not given, all CDT entries are printed.
- control_args may be selected from the following list:
 - all dump all CDT entries ~~(this is the default)~~.
 - nhe, -no_header do not print the CDT header variables.
 - channel name take "name" as a literal channel name. This allows any prefix, instead of just "tty", etc.
 - chn name where name is the name of a channel whose CDT entry is to be dumped.

Example

To dump the entire CDT, give the command:

dump_cdt -all

To dump only the CDT entry for "tty000", give the command:

dump_cdt ~~tty000 -nhe~~ -chn tty000 -nhe

- fnp dump entries for the configured FNP's.
- cmf X dump the CDT in the form of a CMFA. into the segment specified by X. The output of this command will be accepted by cv-cmf. Use of this control arg is incompatible with -nhe, -fnp or -chn.
- pathname X dump the CDT whose pathname is X.
- pn X

~~Adding X to the output of the command this segment X.~~

Ver. 3
741022

MULTICS CHANGE REQUEST

MCR 1912

TITLE: Install display_branch tool

STATUS	DATE
Written	05/27/76
Status	A 06/03/76
Expires	11/27/76

AUTHOR: Bernard Greenberg

TW

Planned for System: MR 4.0
 Fixes Bug Number(s): not applicable
 Documented in MTB: not applicable
 Incompatible Change: no
 User/Operations-visible Interface Change: no
 Coded in: (X)PL/I ()ALM ()other-see below
 Performance: ()better (X)same ()worse

CATEGORY (check one)
 () Lib. Maint. Tools
 (X) Sys. Anal. Tools
 () Sys. Prog. Tools
 () 355
 () BOS
 () Salvager
 () Ring Zero
 () Ring One
 () SysDaemon/Admin
 () Runtime
 () User Command/Subr

DOCUMENTATION CHANGES (specify one or more)

MPM (vol,sect) MPAM (sect)
 MOSN (sect) MSAM (sect)
 PLMs (AN#) 51
 Info Segs
 Other

OBJECTIONS/COMMENTS:

Add example of output to documentation

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

SUMMARY: Install print_branch, a tool to dump directory branches.

REASON: In the analysis of system problems, particularly those involving branch/vtoce connection failures, it is often necessary to find out information in the branch of a segment either not returned at all by the status command, or not returned without accessing the vtoce of the segment. Such information includes the UID of the segment, the Physical Volume name/id, and the VTOC index. Also, the segment number of the father of the segment is often difficult to determine.

IMPLICATIONS: Improved debuggability of the operating system.

DETAILED PROPOSAL: See attached documentation.

Name: display_branch

This command is used to print out information about directory entries not returned by the status command. It also lists the segment UID and the location of the branch. No attempt is made to access the VTOCE of the segment for any information.

Usage: display_branch path
OR display_branch segno
OR display_branch seg|offset
OR display_branch -name path

where

path is the pathname of the segment whose branch is to be displayed.

segno is the octal segment number of the segment whose branch is to be displayed.

seg|offset is octal pointer representation of address of the branch to be displayed (for example, 260|1664).

Notes:

If the pathname of a branch is a valid octal number or can be construed as a valid octal pointer, then the "-name" ("-nm") argument must precede the segment name.

The user of this command must have access to the gate phcs_, which is necessary in order to initiate directories.

display_branch >system_library_standard>bound_fscom1_

Branch for bound_fscom1_ in >system_library_standard at 231!37162

JID 035427542510, is vtoex 5777 on root3 (of log vol. root)

Switches: safety_sw

Ring brackets (1 5 5)

Entry modified 06/22/76 1356.7 mst Tue

Never dumped.

36 names.

r 1058 1.154 3.066 77

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR <u>1913</u>
TITLE: Install vtoc_pathname tool.		STATUS DATE
AUTHOR: Bernard Greenberg		Written 05/27/76
		Status <u>A 06/02/76</u>
		Expires 11/27/76
Planned for System: MR 4.0		CATEGORY (check one)
Fixes Bug Number(s): not applicable		() Lib. Maint. Tools
Documented in MTB: not applicable		(<input checked="" type="checkbox"/>) Sys. Anal. Tools
Incompatible Change: no		() Sys. Prog. Tools
User/Operations-visible Interface Change: no		() 355
Coded in: (<input checked="" type="checkbox"/>)PL/I ()ALM ()other-see below		() BOS
Performance: ()better (<input checked="" type="checkbox"/>)same ()worse		() Salvager
DOCUMENTATION CHANGES (specify one or more)		() Ring Zero
MPM (vol,sect)	MPAM (sect)	() Ring One
MOSN (sect)	MSAM (sect)	() SysDaemon/Admin
PLMs (AN#) <u>51</u>		() Runtime
Info Segs		() User Command/Subr
Other		
OBJECTIONS/COMMENTS:		
Add active function interface		

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

SUMMARY: Install the tool vtoc_pathname, which prints out the pathname of a segment given its volume and vtoc index.

REASONS: There is currently no way to determine the pathname of a segment given its vtoce. Not only is this important for system debugging, but the Physical Volume Salvager reports errors in terms of volume name and VTOC index, and cannot determine pathnames for the foreseeable future. Pathnames can be determined from vtoces only when the system is up and the entire root logical volume is mounted and salvaged.

DETAILED PROPOSAL: See attached documentation.

Name: vtoc_pathname,

This command is used to determine the pathname of a segment from the location of its VTOC entry (vtoce). The location of the vtoce is specified by giving its volume name (or Physical Volume Table index, if known), and index into the VTOC of that volume.

Usage: vtoc_pathname volname vtocx -control-args-
OR vtoc_pathname pvtx vtocx -control-args-

Where:

volname is the physical volume name of the volume on which the vtoce resides. This volume must be mounted, and part of a mounted logical volume.

pvtx is the physical volume table index of the volume on which the vtoce resides, if known. It must be given in octal.

vtocx is the vtoc index of the vtoce. It must be given in octal.

-control-args- can be "-brief", ("-bf"), which suppresses the printing of an error message if the vtoce is free. This facilitates the production of maps of an entire volume.

Notes:

This command requires access to the gate phcs_, as it must copy out directories.

The user's process must have status access to each of the containing directories of the segment in question. The command will supply "NO-ACCESS-" as the entry name at the level at which further access is necessary, if needed. If one of the containing directories specified in the vtoce does not exist in its containing directory, the command will supply "-NOT-LISTED-" as the entry name at that level. The command supplies "?????" as the entry name at any level below that at which either of the above problems exist.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR <u>1914</u>
TITLE: Fix force_pd_abandon command.		STATUS
AUTHOR: Bernard Greenberg		DATE
Planned for System: MR 4.0 Fixes Bug Number(s): not applicable Documented in MTB: not applicable Incompatible Change: no User/Operations-visible Interface Change: no Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other-see below Performance: <input type="checkbox"/> better <input checked="" type="checkbox"/> same <input type="checkbox"/> worse		Written
		Expires
		TVV
DOCUMENTATION CHANGES (specify one or more)		CATEGORY (check one)
MPM (vol,sect)	MPAM (sect)	<input type="checkbox"/> Lib. Maint. Tools
MOSN (sect)	MSAM (sect)	<input type="checkbox"/> Sys. Anal. Tools
PLMs (AN#)		<input type="checkbox"/> Sys. Prog. Tools
Info Segs		<input type="checkbox"/> 355
Other	MOH	<input type="checkbox"/> BOS
		<input type="checkbox"/> Salvager
		<input type="checkbox"/> Ring Zero
		<input type="checkbox"/> Ring One
		<input checked="" type="checkbox"/> SysDaemon/Admin
		<input type="checkbox"/> Runtime
		<input type="checkbox"/> User Command/Subr
OBJECTIONS/COMMENTS:		

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

SUMMARY: The force_pd_abandon command incorrectly reports failure when invoked. This is a problem in interface to delete_pd_records.

Change this command to correctly interpret delete_pd_records' return parameter.

REASONS: Fix the bug.

Ver. 3
741022

MULTICS CHANGE REQUEST

MCR

1915

TITLE: Introduce RPV-only directories.

STATUS

DATE

Written

05/27/76

Status

06/08/76

Expires

11/27/76

AUTHOR: Bernard Greenberg

TW

Planned for System: MR 4.0
Fixes Bug Number(s): not applicable
Documented in MTB: not applicable
Incompatible Change: no
User/Operations-visible Interface Change: no
Coded in: () PL/I () ALM () other-see below
Performance: () better () same () worse

CATEGORY (check one)

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

DOCUMENTATION CHANGES (specify one or more)

MPM (vol,sect) MPAM (sect)
MOSN (sect) MSAM (sect)
PLMs (AN#) 61
Info Segs
Other

OBJECTIONS/COMMENTS:

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

SUMMARY: Add a bit dir.force_rpv to the directory header, valid only for directories whose sons-LV is the root Logical Volume, which forces all inferior segments of this directory to be created on the Root Physical Volume (RPV) and not migrate off of it.

REASONS: In order for the Ring 1 volume administration and registration software to operate properly, the volume registration segments must be accessible at all times, including before the entire root has been accepted during system startup. Lack of these segments causes segment faults when registration lists are requested, or salvages of non-root volumes are attempted.

IMPLICATIONS: Correct operation of the ring 1 disk administration software.

DETAILED PROPOSAL: Implement a gate, hphcs_\$set_rpv, which given the pathname of a directory whose sons-LVID is that of the root logical volume, forces the bit dir.force_rpv on. This entry will be called by system startup (program "hdx") to force the directory ">lv" (volume registration segments) to live on the RPV. As this bit is set each time the system is brought up, this bit need not be dumped or reloaded.

Ver. 3
741022

MULTICS CHANGE REQUEST

MCR 1916

TITLE: Vtoc_man ESD state stabilizer.

AUTHOR: Bernard Greenberg

TW

STATUS	DATE
Written	05/27/76
Status	A 06/08/76
Expires	11/27/76

Planned for System: MR 4.0
 Fixes Bug Number(s): not applicable
 Documented in MTB: not applicable
 Incompatible Change: no
 User/Operations-visible Interface Change: no
 Coded in: PL/I ALM other-see below
 Performance: better same worse

CATEGORY (check one)

- Lib. Maint. Tools
- Sys. Anal. Tools
- Sys. Prog. Tools
- 355
- BOS
- Salvager
- Ring Zero
- Ring One
- SysDaemon/Admin
- Runtime
- User Command/Subr

DOCUMENTATION CHANGES (specify one or more)

MPM (vol,sect) MPAM (sect)
 MOSN (sect) MSAM (sect)
 PLMs (AN#) 61
 Info Segs
 Other

OBJECTIONS/COMMENTS:

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

SUMMARY: In certain crashes involving VTOC write errors, or disk problems in general, vtoc buffers may be left in an inconsistent state, causing lost notifies during emergency shutdown. Add an entry to the vtoc_man to requeue all operations at ESD time. This will involve running the disk dim until the queues are empty.

REASON: Make ESD more certain.

IMPLICATIONS: Greater reliability.

Ver. 3
741022

MULTICS CHANGE REQUEST

MCR 1917

TITLE: Change truncate to non-dir-mod
operation.

AUTHOR: Bernard Greenberg

T/V

STATUS	DATE
Written	05/27/76
Status	06/08/76
Expires	11/27/76

Planned for System: MR 4.0
Fixes Bug Number(s): not applicable
Documented in MTB: not applicable
Incompatible Change: 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)

MPM (vol,sect) MPAM (sect)
MOSN (sect) MSAM (sect)
PLMs (AN#) 61
Info Segs
Other

CATEGORY (check one)

- Lib. Maint. Tools
- Sys. Anal. Tools
- Sys. Prog. Tools
- 355
- BOS
- Salvager
- Ring Zero
- Ring One
- SysDaemon/Admin
- Runtime
- User Command/Subr

OBJECTIONS/COMMENTS:

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

SUMMARY: Change the ring zero truncate primitive to no longer set the directory modify switch. In the new storage system, truncation does not involve modification of a directory.

REASONS: Performance. Avoid storing processid into directory modifier-id word, avoiding subsequent paging I/O.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR <u>1918</u>
TITLE: Implement gates for segment migration.		STATUS DATE
AUTHOR: Bernard Greenberg		Written 05/27/76
		Status <u>A 06/08/76</u>
		Expires 11/27/76
Planned for System: MR 4.0		CATEGORY (check one)
Fixes Bug Number(s): not applicable		() Lib. Maint. Tools
Documented in MTB: not applicable		() Sys. Anal. Tools
Incompatible Change: no		() Sys. Prog. Tools
User/Operations-visible Interface Change: no		() 355
Coded in: (<input checked="" type="checkbox"/>) PL/I () ALM () other-see below		() BOS
Performance: () better (<input checked="" type="checkbox"/>) same () worse		() Salvager
DOCUMENTATION CHANGES (specify one or more)		(<input checked="" type="checkbox"/>) Ring Zero
MPM (vol,sect) MPAM (sect)		() Ring One
MOSN (sect) MSAM (sect)		() SysDaemon/Admin
PLMs (AN#) 61		() Runtime
Info Segs		() User Command/Subr
Other		
OBJECTIONS/COMMENTS:		

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

SUMMARY: Provide a ring-zero file system interface to the segment mover , and gates into it.

REASONS: A facility for compressing a logical volume on line is desired. A facility for forcing segments off a given physical volume is also desired. Although the segment mover moves segments automatically in response to segment faults induced by page control in out-of-physical-volume situations, an administrative interface to this facility is needed. Although full support of a segment migration facility is not planned for release 4.0, the existence of these gates will allow experimentation along these avenues for future releases.

DETAILED PROPOSAL: Implement hphcs_\$vacate_pv (pvid, pvtx, code) to start vacation of a physical volume

hphcs_\$stop_vacate (pvid, pvtx, code) to stop vacation.

hphcs_\$move_seg_file (dir, ent, code) to move a segment off its physical volume of residence to another in the same volume.

hphcs_\$move_seg_seg (segptr, code) (similar).

Ver. 3
741022

MULTICS CHANGE REQUEST

MCR 1919

TITLE: Fix fs_get mode bug.

STATUS	DATE
Written	05/27/76
Status	A06/08/76
Expires	11/27/76

AUTHOR: Bernard Greenberg

TJV

Planned for System: MR 4.0
Fixes Bug Number(s): not applicable
Documented in MTB: not applicable
Incompatible Change: no
User/Operations-visible Interface Change: no
Coded in: PL/I ALM other-see below
Performance: better same worse

CATEGORY (check one)
 Lib. Maint. Tools
 Sys. Anal. Tools
 Sys. Prog. Tools
 355
 BOS
 Salvager
 Ring Zero
 Ring One
 SysDaemon/Admin
 Runtime
 User Command/Subr

DOCUMENTATION CHANGES (specify one or more)

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

OBJECTIONS/COMMENTS:

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

SUMMARY: An uninitialized variable in the hardcore program fs_get causes process terminations upon certain calls.

properly initialize this variable (ep) in all cases.

REASONS: Fewer system crashes when the Initializer is the unlucky process.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR <u>1920</u>
TITLE: Fix activate demount window.		STATUS DATE
AUTHOR: Bernard Greenberg	TUV	Written 05/27/76
		Status A06/02/76
		Expires 11/27/76
Planned for System: MR 4.0		CATEGORY (check one)
Fixes Bug Number(s): not applicable		() Lib. Maint. Tools
Documented in MTB: not applicable		() Sys. Anal. Tools
Incompatible Change: no		() Sys. Prog. Tools
User/Operations-visible Interface Change: no		() 355
Coded in: (X)PL/I ()ALM ()other-see below		() BOS
Performance: ()better (X)same ()worse		() Salvager
DOCUMENTATION CHANGES (specify one or more)		(X) Ring Zero
MPM (vol,sect) MPAM (sect)		() Ring One
MOSN (sect) MSAM (sect)		() SysDaemon/Admin
PLMs (AN#) 61		() Runtime
Info Segs		() User Command/Subr
Other		
OBJECTIONS/COMMENTS:		

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

SUMMARY: A recent change to the module "activate" to unlock the AST during VTOC reads exposed a window during which the demounting of a physical volume can cause a segment to be incorrectly activated, and potentially deactivated onto a wrong volume.

REASONS: A PVT index is used without protection after the AST was unlocked. It must be revalidated after the AST is re-locked.

IMPLICATIONS: More reliable system operation.

Ver. 3
741022

MULTICS CHANGE REQUEST

MCR 1921

TITLE: Signal correct condition upon reference
to a 0 Max-Length segment.
AUTHOR: Bernard Greenberg

STATUS	DATE
Written	05/27/76
Status	06/08/76
Expires	11/27/76

TVV

Planned for System: MR 4.0
Fixes Bug Number(s): not applicable
Documented in MTB: not applicable
Incompatible Change: no
User/Operations-visible Interface Change: no
Coded in: PL/I ALM other-see below
Performance: better same worse

CATEGORY (check one)

- Lib. Maint. Tools
- Sys. Anal. Tools
- Sys. Prog. Tools
- 355
- BOS
- Salvager
- Ring Zero
- Ring One
- SysDaemon/Admin
- Runtime
- User Command/Subr

DOCUMENTATION CHANGES (specify one or more)

MPM (vol,sect)	MPAM (sect)
MOSN (sect)	MSAM (sect)
PLMs (AN#) 61	
Info Segs	
Other	

OBJECTIONS/COMMENTS:

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

SUMMARY: Setting a maximum length of zero on a segment does not work. Code was recently removed which signalled seg_fault error in the case of connecting to a segment at an address above its maximum length, letting the resulting boundsfault signal the correct condition (out_of_bounds). This does not work in the case of a zero maximum length, as no valid SDW is capable of being constructed to indicate this condition.

PROPOSAL: Put an explicit check in the segment fault handler to check for any out of bounds reference, and signal out_of_bounds directly from the segment fault handler if this be the case.

IMPLICATIONS: This is quite messy, and subverts the entire hardcore fault signalling mechanism, but is necessary to preserve the documented user interface.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR <u>1922</u>
TITLE: Remove AIM function from phcs_\$initiate		STATUS DATE
AUTHOR: Bernard Greenberg		Written 05/27/76
Planned for System: MR 4.0 Fixes Bug Number(s): not applicable Documented in MTB: not applicable Incompatible Change: no User/Operations-visible Interface Change: no Coded in: (X)PL/I ()ALM ()other-see below Performance: ()better (X)same ()worse		Status <u>106/08/76</u>
		Expires 11/27/76
DOCUMENTATION CHANGES (specify one or more)		CATEGORY (check one)
MPM (vol,sect)	MPAM (sect)	() Lib. Maint. Tools
MOSN (sect)	MSAM (sect)	() Sys. Anal. Tools
PLMs (AN#) 75		() Sys. Prog. Tools
Info Segs		() 355
Other		() BOS
		() Salvager
		(X) Ring Zero
		() Ring One
		() SysDaemon/Admin
		() Runtime
		() User Command/Subr
OBJECTIONS/COMMENTS:		

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

SUMMARY: Restore phcs_\$initiate to its original function, i.e., initiate at a validation level of 0. Remove AIM features which counteract AIM checks and invoke directory privilege.

REASONS: Under AIM, the phcs_\$initiate gate tries to invoke directory privilege for the caller. This allows access outside of AIM restrictions. However, the original function of the phcs_\$initiate interface is simply to allow segment numbers to be developed for lower-ring segments. Since access to phcs_ implies the ability to obtain passwords by dumping teletype buffers, etc., it seems that no process at a lower access class than system_high should be allowed access to this gate. Thus, the invocation of directory privilege here gains nothing. phcs_\$initiate has not been used in the past, and is not intended to be used to initiate segments outside of AIM restrictions (system_privilege_\$initiate exists for this purpose.) On the other hand, it causes a large number of auditing messages, and segfaults, as it clears SDW's to force access recomputation. This destroys the usefulness of this gate for several hardcore debugging tools (e.g., print_aste_ptp).

IMPLICATIONS: Processes at lower authorization than system_high, who have access to phcs_, cannot use it to obtain segment numbers for directories at higher authorization levels.

DETAILED PROPOSAL: Redirect call form level_0 to initiate\$priv_init to standard entry.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR <u>1923</u>
TITLE: Recode BOS SSTN to ignore AST hierarchy.		STATUS
AUTHOR: Bernard Greenberg		DATE
		Written 05/27/76
		Status <u>A 06/08/76</u>
		Expires 11/27/76
Planned for System: MR 4.0		CATEGORY (check one)
Fixes Bug Number(s): not applicable		() Lib. Maint. Tools
Documented in MTB: not applicable		() Sys. Anal. Tools
Incompatible Change: no		() Sys. Prog. Tools
User/Operations-visible Interface Change: no		() 355
Coded in: () PL/I (<input checked="" type="checkbox"/>) ALM () other-see below		(<input checked="" type="checkbox"/>) BOS
Performance: () better (<input checked="" type="checkbox"/>) same () worse		() Salvager
DOCUMENTATION CHANGES (specify one or more)		() Ring Zero
MPM (vol,sect)	MPAM (sect)	() Ring One
MOSN (sect)	MSAM (sect)	() SysDaemon/Admin
PLMs (AN#) BOS		() Runtime
Info Segs		() User Command/Subr
Other		
OBJECTIONS/COMMENTS:		

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

SUMMARY: Change the BOS SST name table filler to walk the AST ASTE by ASTE, filling in names from vtoces as he goes. Remove the clever but useless tree walk of the AST.

REASONS: In the pre-4.0 storage system, it was necessary to recursively abs-seg down the AST in order to extract names from directories. This was carried over into the 4.0 SSTN package, as a method of scanning the AST. However, the AST may be linearly walked, and SSTN can identify applicable segments by their non-zero unique ID. This is a fairly safe method, as 28-5 emergency shutdown uses it. This removes BOS' dependence on correctness of the AST-imbedded hierarchy, increasing reliability of the SSTN package.

IMPLICATIONS: Better reliability of BOS.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR 1924
TITLE: Reinstall lost fixes		STATUS DATE Written 05/26/76 Status 06/08/76 Expires 11/26/76
AUTHOR: VanVleck		
Planned for System: MR 4.0		
Fixes Bug Number(s): not applicable		CATEGORY (check one)
Documented in MTB: not applicable		() Lib. Maint. Tools
Incompatible Change: no		() Sys. Anal. Tools
User/Operations-visible Interface Change: no		() Sys. Prog. Tools
Coded in: (X)PL/I ()ALM ()other-see below		() 355
Performance: ()better (X)same ()worse		() BOS
		() Salvager
DOCUMENTATION CHANGES (specify one or more)		(X) Ring Zero
MPM (vol,sect) MPAM (sect)		() Ring One
MOSN (sect) MSAM (sect)		() Sys Daemon/Admin
PLMs (AN#)		() Runtime
Info Seqs		() User Command/Subr
Other		
None (reason) none		
OBJECTIONS/COMMENTS:		

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

SUMMARY:

Reinstall changes to init_printer, backup_util,
and scs_init which are installed in Phoenix but not at MIT.

REASONS:

The systems should be identical. These changes may have been lost due to the bug in the hardcore updater.

It is not certain whether these fixes are installed in the object code; at any rate, reinstalling the correct version will get the systems in synch again.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR _____ 1925 _____
TITLE: Recompile all hardcore programs not recently recompiled		STATUS DATE
AUTHOR: VanVleck		Written 05/26/76
Planned for System: MR 4.0		Status 06/02/76
Fixes Buq Number(s): not applicable		Expires 11/26/76
Documented in MTB: not applicable		CATEGORY (check one)
Incompatible Change: no		<input type="checkbox"/> Lib. Maint. Tools
User/Operations-visible Interface Change: no		<input type="checkbox"/> Sys. Anal. Tools
Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> AIM <input type="checkbox"/> other-see below		<input type="checkbox"/> Sys. Prog. Tools
Performance: <input type="checkbox"/> better <input checked="" type="checkbox"/> same <input type="checkbox"/> worse		<input type="checkbox"/> 355
DOCUMENTATION CHANGES (specify one or more)		<input type="checkbox"/> BOS
MPM (vol,sect)	MPAM (sect)	<input type="checkbox"/> Salvager
MOSN (sect)	MSAM (sect)	<input checked="" type="checkbox"/> Ring Zero
PLMs (AN#)		<input type="checkbox"/> Ring One
Info Seqs		<input type="checkbox"/> SysDaemon/Admin
Other		<input type="checkbox"/> Runtime
None (reason) none		<input type="checkbox"/> User Command/Subr
OBJECTICNS/COMMENTS:		

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

SUMMARY:

Recompile all hardcore programs not compiled with the installed compilers or the immediately previous PL/I compiler.

REASONS:

Fewer compilers are needed to re-create the system from its source.

IMPLICATIONS:

Better optimization may make the system slightly smaller and faster.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR 1926
TITLE: Give volume owner access without ACS		STATUS: DATE
AUTHOR: VanVleck		Written: 06/08/76
		Status: 06/02/76
		Expires: 12/08/76
Planned for System: not applicable		CATEGORY (check one)
Fixes Bug Number(s): not applicable		() Lib. Maint. Tools
Documented in MTB: not applicable		() Sys. Anal. Tools
Incompatible Change: no		() Sys. Prog. Tools
User/Operations-visible Interface Change: no		() 355
Coded in: (<input checked="" type="checkbox"/>) PL/I () ALM () other-see below		() BUS
Performance: () better (<input checked="" type="checkbox"/>) same () worse		() Salvager
DOCUMENTATION CHANGES (specify one or more)		() Ring Zero
MPM (vol,sect) MPAM (sect)		(<input checked="" type="checkbox"/>) Ring One
MUSN (sect) MSAM (sect)		() SysDaemon/Admin
PLMs (An#) an01		() Runtime
Info Segs		() User Command/Subr
Other		
OBJECTIONS/COMMENTS:		

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

SUMMARY:

When checking access to a volume, give Initializer.SysDaemon REW access without checking the ACS, and if the ACS does not exist, give the volume owner REW access.

REASONS:

This change means that the owner can always access a volume, even if the ACS is lost.

The change for Initializer.SysDaemon simplifies system cold boot, operation with incomplete RLV, and the management of logical volumes.

Multics Change Request

TITLE: Change salvager printing for unattended operation		STATUS	DATE
AUTHOR: A. Kobziar		Written	5/25/76
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR _____ -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____		Status	A 06/08/76
		Expires	12/08/76
		DOCUMENTATION CHANGES	
Category (Check One) <input type="checkbox"/> Lib. Maint. Tools <input type="checkbox"/> Sys. Anal. Tools <input type="checkbox"/> Sys. Prog. Tools <input type="checkbox"/> 355 <input type="checkbox"/> BOS <input checked="" type="checkbox"/> Salvager <input type="checkbox"/> Ring Zero <input type="checkbox"/> Ring One <input type="checkbox"/> SysDaemon/Admin. <input type="checkbox"/> Runtime <input type="checkbox"/> User Cmnd/Subr.		Document	Specify One or More
		MPM (Vol, Sect.)	
		PLMS (AN #)	
		MOSN (Sect.)	A001
		MPAM (Sect.)	
		MSAM (Sect.)	
Objections/Comments:		Info Segs	
		Other (Name)	
		None (Reason)	

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

SUMMARY:

Change utility_print to switch salvager output to the operator's console if unable to successfully initialize any printer after one minute of trying, and to abandon a printer and repeat initialization if an unrecoverable error is not corrected within three minutes. The time interval will be controlled by "PDLY min" placed on the SALV card.

REASONS:

The ability of the system to purge itself of faulty peripherals is a goal of unattended operation. Thus the salvager should not hang indefinitely waiting for printer corrections, but should switch its output to a device indispensable to Multics operation, i.e., the SYSERR console.

NEW_SALVAGER

The storage system structure repair procedures known collectively as the salvager have been extensively modified in MR 4.0, both for automating crash recovery and for handling the structural changes in the storage system data. The salvager programs are now part of the standard system tape; new salvaging modes have been introduced and some old modes redefined; and control of the salvager is now from command options rather than from the processor switches. There are now four kinds of salvaging operation which the system can perform. These are emergency shutdown, volume salvage, directory hierarchy salvage, and on-line salvage. The system has been modified to invoke the salvager automatically whenever data in the storage hierarchy may have been damaged.

The salvager will automaticall switch its messages from a printer to the SYSERR console if it cannot find a readied printer after 1 minute of searching, or if a printer stops and no printer is ready readied within 4 minutes.

EMERGENCY SHUTDOWN

Emergency shutdown has been reworked completely and greatly improved. It is much more reliable than in pre-4.0 systems.

Sometimes the system crashes before the storage system has been turned on. Previously, an attempt to emergency shutdown in such a situation would lead to another crash, and might do serious damage to the directory hierarchy. This has been changed so that if a premature emergency shutdown is attempted, the following message is printed:

ESD BEFORE FS ENABLED
SHUTDOWN COMPLETE

and the directory hierarchy is untouched.

It is always safe to attempt an ESD, and if emergency shutdown crashes it may be retried.

Volume Salvaging

Volume salvaging insures that there are no reused addresses or ill-formed VTOC entries in the VTOC and volume map of a single physical volume.

If a volume was in use by Multics and was not demounted or shut down by normal or emergency shutdown, it will be salvaged automatically the next time that the physical volume is accepted for paging.

The operator may force the volume salvage of a particular volume by typing the command

```
salvage_vol <vol_name> <drive> <options>
Example: salvage_vol new dska_02 -check_dir
```

TITLE: Restructuring directories by salvager	STATUS	DATE
AUTHOR: A. Kobziar TVV	Written	5/25/76

-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR -Fixes Bug Number(s) -Documented in MTB -User/Operations-visible Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input checked="" type="checkbox"/> Better <input type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR	Category (Check One) <input type="checkbox"/> Lib. Maint. Tools <input type="checkbox"/> Sys. Anal. Tools <input type="checkbox"/> Sys. Prog. Tools <input type="checkbox"/> 355 <input type="checkbox"/> BOS <input checked="" type="checkbox"/> Salvager <input type="checkbox"/> Ring Zero <input type="checkbox"/> Ring One <input type="checkbox"/> SysDaemon/Admin. <input type="checkbox"/> Runtime <input type="checkbox"/> User Cmnd/Subr.	Status A <u>06/02/76</u> Expires <u>12/02/76</u>
	DOCUMENTATION CHANGES	

Objections/Comments:	Document	Specify One or More
	MPM (Vol, Sect.)	
	PLMS (AN #)	
	MOSN (Sect.)	
	MPAM (Sect.)	
	MSAM (Sect.)	
	Info Segs	
	Other (Name)	
	None (Reason)	performance improvement

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

SUMMARY:

Rearrange the structure of a directory when it is rebuilt by the salvager to be as follows:

header, hash table, access name lists, entries (including acs and names), and initial acs.

REASONS:

Objects in directories are allocated on a first come, first served basis. Thus shared access names are scattered on several if not all pages of a directory. Although the salvager pre pages (request to read into core all pages of) a directory, it still encounters considerable page waiting time because one of the first operations done is the checking of access names.

IMPLICATIONS:

An improvement of 5-10% in the directory salvager's running time was noted at CISL, while a performance run showed an insignificant improvement.

TITLE: Rebuilding Disk Packs		STATUS	DATE	
AUTHOR: A. Kobziar TVV		Written	5/25/76	
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR _____ -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____	Category (Check One)	Status	A 06/08/76	
	<input type="checkbox"/> Lib. Maint. Tools	Expires	12/08/76	
	<input type="checkbox"/> Sys. Anal. Tools	DOCUMENTATION CHANGES		
	<input type="checkbox"/> Sys. Prog. Tools	Document	Specify One or More	
	<input type="checkbox"/> 355	MPM (Vol, Sect.)		
	<input type="checkbox"/> BOS	PLMS (AN #)		
	<input checked="" type="checkbox"/> Salvager	MOSN (Sect.)	A001	
	<input type="checkbox"/> Ring Zero	MPAM (Sect.)		
	<input type="checkbox"/> Ring One	MSAM (Sect.)		
	<input type="checkbox"/> SysDaemon/Admin.	Info Segs		
<input type="checkbox"/> Runtime	Other (Name)			
<input type="checkbox"/> User Cmnd/Subr.	None (Reason)			
Objections/Comments:				

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

SUMMARY:

Provide for the rebuilding of disk packs in order to add or delete partitions, and/or to increase or decrease partitions and vtocs. The command interface is equivalent to the ones used in volume salvaging disk pack copies and in initializing disk packs. The ability to interlace addresses has been added.

REASON:

Performance optimization and overcoming logical boundaries (for example, running out of vtoces when disk only 2/3 full) are necessary to meet long term changes in usage.

IMPLICATIONS:

Directory salvaging time improved by 5 - 10% on the CISL hierarchy when an interlace =2 was used (i.e. alternate physical address assignment to consecutive directory pages). An insignificant improvement was also noted in performance run testing.

MULTICS OPERATING STAFF NOTE MOSN-A001

Name: rebuild_disk

Function: Rebuild a disk by copying all information onto a spare disk. Make changes to partitions and/or vtoc as directed.

Syntax: rebuild_disk pvname drive_name1 -copy drive_name2 control_args

Arguments:

pvname	is the name of a mounted physical volume
drive_name1	is pvname's drive in the form <subsys>_<nn>
drive_name2	is the spare drive to be used for the copy

Control Arguments:

-console	Output to SYSERR console instead of printer
-check_dir	Delete VTOCE if no branch
-dump	Dump damaged objects
-debug	System programmer use

If the disk drives specified are ok, the command proceeds to list the average used to calculate the VTOC size and the partitions defined on the source disk. The request portion, where partitions must be restated and the VTOC size may be changed is entered when the command types: request.

The following are acceptable request lines:

part NAME HILOW SIZE Where NAME is a 4-character partition name, HILOW is either "high" or "low", and SIZE is the partition size in records

avg FFF.FFF Specifies the average segment length for segments on the physical volume. The default length is that of the original disk. This number is used to calculate the number of VTOC entires on the volume.

vtoc NNN specifies the new VTOC size numerically

lace N requests that physical address assignment be interlaced by N. The default lace is 2 as it is impossible to read in consecutive physical address on the same rotation via the page fault mechanism.

list lists the partitions and VTOC size defined so far.

end causes the disk rebuild to start. This operation takes about 1/2 hr. for D191's.

quit causes an exit without doing anything.

startover causes all portions defined so far to be discarded. (done automatically if a partition is redefined.)

Ver. 3 741022	MULTICS CHANGE REQUEST	TVV	MCR 1930
TITLE: Introduce automatic KST garbage collection.		STATUS	DATE
AUTHOR: Richard Bratt		Written	05/31/76
		Status	06/08/76
		Expires	11/30/76
Planned for System: not applicable		CATEGORY (check one)	
Fixes Bug Number(s): not applicable		<input type="checkbox"/> Lib. Maint. Tools	
Documented in MTB: not applicable		<input type="checkbox"/> Sys. Anal. Tools	
Incompatible Change: no		<input type="checkbox"/> Sys. Prog. Tools	
User/Operations-visible Interface Change: no		<input type="checkbox"/> 355	
Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other-see below		<input type="checkbox"/> BOS	
Performance: <input type="checkbox"/> better <input checked="" type="checkbox"/> same <input type="checkbox"/> worse		<input type="checkbox"/> Salvager	
DOCUMENTATION CHANGES (specify one or more)		<input checked="" type="checkbox"/> Ring Zero	
MPM (vol,sect)	MPAM (sect)	<input type="checkbox"/> Ring One	
MOSN (sect)	MSAM (sect)	<input type="checkbox"/> SysDaemon/Admin	
PLMs (AN#) AN81		<input type="checkbox"/> Runtime	
Info Segs		<input type="checkbox"/> User Command/Subr	
Other			
OBJECTIONS/COMMENTS:			

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

Summary: Most KST overflows, those rarely expected and often fatal gifts from hardcore, are the result of directories which are no longer of interest to a process choking its address space. This situation occurs because processes map many directories into their address space for the sole purpose of accessing inferiors of those directories. Since hardcore has never kept track of the reason for a directory being mapped into a process' address space it has been left to the user to clean up unwanted directory segment numbers. Unfortunately, it is nearly impossible for a process to do the necessary accounting. I propose that hardcore be careful to distinguish those directories which are known for the sole purpose of accessing inferior objects. This will allow uninteresting KST entries to be garbage collected when necessary.

Reason: Motherhood and apple pie. Simplify hierarchy walking programs and allow the removal of special case (and often fallible) code.

Detailed Proposal: At the heart of the problem is the fact that whenever find_dirsegno, the workhorse of find_, must make a directory known to a process, the usage count of the appropriate KST entry is incremented. Since no one ever decrements this usage count after using the target of the find_, the directory looks as if it is currently in use when in fact this may not be the case. It should be noted that we cannot take the obvious route of not incrementing usage counts when find_ is responsible for making a directory known since usage counts serve the important dual purpose of protecting one ring's segment numbers from termination by an outer ring and of protecting segment number from automatic garbage collection, the very feature we are trying to implement. But enough of this, on to the proposal:

1.) Provide two ring zero primitives to increment and decrement the usage counts kept in KST entries.

2.) Modify `find_dirsegno` in such a way that when it returns, the usage count of the terminal object has been incremented but its parent usage counts have not. The exact algorithm, which must take into account the pathname associative memory, is too complicated to describe here but it should be noted that `find_dirsegno` will have to initially increment the usage count of segments it makes known (especially when `find_` moves out of ring zero). Only when an inferior of a directory made known by `find_dirsegno` is itself made known can the usage count of the father be decremented, thus establishing the module post condition stated above. As should be obvious, the reason this can be done is that a non-zero inferior count also protects a KST entry from garbage collection. Thus, when `find_` returns, the terminal directory segment number involved is explicitly protected from garbage collection by the usage count field and its parents are implicitly protected from garbage collection by having non-zero inferior counts. If the terminal directory segment number left `find_` unprotected by usage count, then it might be invalidated by KST garbage collection before `find_'s` caller was finished using it!

3.) To make this scheme workable it is necessary to deal with the usage of the directory recorded by `find_` (really `find_dirsegno`). This must be done by modifying every caller of `find_` to call a cleanup procedure when it is done with the segment number in question. One approach would be to call `terminate_`. If we desired we could even have `terminate_` recursively inspect the parent of a KST entry when that entry is removed and remove the parent KST entry if its usage counts and inferior count are zero. This scheme has the advantage of keeping the KST ever clean. Unfortunately it's a loser. Such a scheme would cause severe KST entry thrashing. The scheme proposed here, which is vastly superior (even if I do say so), is to merely decrement the usage count. In effect this marks the segment number as uninteresting but leaves it in the process' address space for possible future use.

4.) Modify `makeknown_` to call a new module, `garbage_collect_kst` (please, let's not quibble over names), when it detects a KST overflow. Only if `garbage_collect_kst` fails need a KST overflow be signaled.

5.) Create `garbage_collect_kst` which locates all "uninteresting" KST entries and terminates them. To perform this task it must (at least logically) walk the hierarchy subtree defined by the KST from the leaves up. This order is necessary since terminating a leaf node may make its father eligible for garbage collection.

Note: The concept of an "uninteresting" segment number (otherwise known as a "twasn" or truly worthless segment number) developed above provides a powerful handle on a problem I shall call the "resource speculation problem". This problem deals with the conflicting desires of a module to release a resource so others may use it and the desire to keep the resource on speculation that it may be needed again in the near future. The introduction of a "twasn" allows a module to in effect have its cake and eat it too. A "twasn" stays bound to the same object, its SDW is not invalidated, nor is its KST entry. Yet, if KST space is exhausted, a mechanism exists for recovering "twasn"'s. If the mechanism for creating "twasn"'s were available outside of ring zero (a trivial accomplishment), then the expense of the `makeknown_`, `terminate_`, `makeknown_`, `terminate_`, ... sequences which result so frequently from users doing `compile`, `edit`,

compile, edit, ... sequences (and from many other sequences of user activities) would be greatly reduced! Many segfaults, setfaults, and directory lockings would be eliminated. As a result, system performance might be significantly enhanced. But this note is just a teaser, a future MCR will deal with this issue in more detail.

TITLE: Improve signalling of *system link		STATUS	DATE
AUTHOR: linkage_error M. Weaver		Written	6/1/76
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL		Status	A 06/08/76
-Planned for System MR 4.0		Expires	12/08/76
-Fixes Bug Number(s)		DOCUMENTATION CHANGES	
-Documented in MTB		Document	Specify One or More
-User/Operations-visible		MPM (Vol, Sect.)	
Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		PLMS (AN #)	
-Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		MOSN (Sect.)	
-Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same		MPAM (Sect.)	
<input type="checkbox"/> Worse		MSAM (Sect.)	
-Replaces MCR		Info Segs	
		Other (Name)	
		None (Reason) bug fix	

Objections/Comments:

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

SUMMARY:

Fix link_snap to signal linkage_error (bad self reference) for *system links.

Force metering bin number to be non-negative.

REASONS:

Currently link_snap thinks that *system links contain trap-before-links and proceeds to trap to garbage. This produces confusing error messages and also makes it impossible to set up a handler to snap *system links, which is a capability desired to enable new fortran programs with COMMON to be run under Multics.

Occasionally the bin number is negative, which causes the linker to fault.

TITLE: Save copy before message segment salvage		STATUS	DATE
AUTHOR: S. Herbst		Written	5/28/76
		Status	9 06/09/76
		Expires	12/08/76
-Coded in <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> AIM <input type="checkbox"/> other-explain in DETAILED PROPOSAL		Category (Check One)	
-Planned for System MR 5.0		<input type="checkbox"/> Lib. Maint. Tools	
-Fixes Bug Number(s)		<input type="checkbox"/> Sys. Anal. Tools	
-Documented in MTB		<input type="checkbox"/> Sys. Prog. Tools	
-User/Operations-visible		355	
Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		BOS	
-Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		Salvager	
-Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same		Ring Zero	
<input type="checkbox"/> Worse		X Ring One	
-Replaces MCR		SysDaemon/Admin.	
		Runtime	
		User Cmmd/Subr.	
		MSAM (Sect.)	
Objections/Comments:		Info Segs	
		Other (Name)	
		None (Reason) doc ok	

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

SUMMARY:

Modify the message segment salvager to make a copy of the message segment. it is salvaging in >dumps, if it deletes one or more messages in the process of salvaging.

REASON:

Allows a possible analysis of what went wrong.

DETAILED PROPOSAL:

Ring one segment >dumps>ms_salvager_.copy is written into if empty; contains a copy of the message segment plus its name, date salvaged, etc. The segment will be created by asu.ec as a ring 1 segment with multi-class privileges. phcs_ access needed to read segment.

IMPLICATIONS:

Only the first of a series of salvaged message segments gets saved, until the copy is manually reset to zero. However, we want this diagnostic feature to be implemented as simply as possible.

Multics Change Request

TITLE: Implement &sec_dir for exec_com's		STATUS	DATE
AUTHOR: Steve Herbst		Written	6-1-76
SHW		Status	A 6/8/76
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL		Expires	12/8/76
-Planned for System MR 5.0		DOCUMENTATION CHANGES	
-Fixes Bug Number(s) _____		Document	Specify One or More
-Documented in MTB _____		355	
-User/Operations-visible		BOS	
Interface change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no		Salvager	MPM (Vol, Sect.) AG92
-Incompatible change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no		Ring Zero	PLMS (AN #)
-Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same		Ring One	MOSN (Sect.)
<input type="checkbox"/> Worse		SysDaemon/Admin.	MPAM (Sect.)
-Replaces MCR _____		Runtime	MSAM (Sect.)
		<input checked="" type="checkbox"/> User Cmmnd/Subr.	
Objections/Comments:		Info Segs	
		Other (Name)	
		None (Reason)	

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

SUMMARY: Implement the &sec_dir parameter in exec_com's and absin segments, to be replaced by the directory portion of the exec_com or absin segment's pathname. The &O facility should be removed at some future time. It should remain in exec_com but not be documented.

REASONS: Exec_com's can call themselves by saying:

"&sec_dir>entry_point_name"

The &O parameter, which is supposed to give the pathname of the exec_com or absin segment as typed, does not work in absentee because that pathname is expanded when the absentee request is submitted. The &O facility will no longer be necessary when exec_com's and absin segments can call themselves using &sec_dir and &sec_name.

IMPLICATION: Incompatible change. The string &sec_dir currently is replaced by itself.

Argument Substitution

Strings of the form &i in the exec_com segment are interpreted as dummy arguments and are replaced by the corresponding argument to the exec_com command. For instance, optional_arg1 is substituted for the string &1 and optional_arg10 is substituted for &10.

The character & should be followed by a number, i, or by the string ec_name. If no corresponding optional_arg is provided, &i is replaced by the null string. The string &ec_name is replaced by the entryname portion of the exec_com pathname without the ec suffix.) ~~The string &0 is replaced by the pathname argument to exec_com, just as it was given to the command.~~

→ The string &ec_dir is replaced by the directory name portion of the exec_com pathname.

Argument substitution can take place in command lines, input lines or in control statements, since the replacement of arguments is done before the check for a control statement.

Control Statements

Control statements permit more variety and control in the execution of the command sequences. Currently the control statements are: &label, &goto, &attach, &detach, &input_line, &command_line, &ready, &print, &quit, &if, &then, and &else.

Control statements generally must start at the beginning of a line with no leading blanks. Exceptions to this rule are the &then and &else statements, that can appear elsewhere. Also when a control statement is part of a THEN_CLAUSE or an ELSE_CLAUSE, it does not have to start at the beginning of a line.

1. &label and &goto

These statements permit the transfer of control within an exec_com segment.

&label location identifies the place to which a goto control statement transfers control. location is any string of 32 or fewer characters identifying the label.

&goto location causes control to be transferred to the place in the exec_com segment specified by the label location. Execution then continues at the line immediately following the label.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR <u>1936</u>
TITLE: Change TEST and FMT to query before destroying labeled pack		STATUS: <u>Written</u> DATE: <u>06/01/76</u>
AUTHOR: VanVleck		Status: <u>A 06/08/76</u> Expires: <u>12/01/76</u>
Planned for System: MR 4.0		CATEGORY (check one)
Fixes Bug Number(s): not applicable		() Lib. Maint. Tools
Documented in MTB: not applicable		() Sys. Anal. Tools
Incompatible Change: no		() Sys. Prog. Tools
User/Operations-visible Interface Change: no		() 355
Coded in: <input checked="" type="checkbox"/> PL/I () ALM () other-see below		<input checked="" type="checkbox"/> BOS
Performance: () better <input checked="" type="checkbox"/> same () worse		() Salvager
<u>DOCUMENTATION CHANGES (specify one or more)</u>		() Ring Zero
MPM (vol,sect) MPAM (sect)		() Ring One
MOSN (sect) MSAM (sect)		() SysDaemon/Admin
PLMs (AN#) bos		() Runtime
Info Segs		() User Command/Subr
Other		
OBJECTIONS/COMMENTS:		

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

SUMMARY:

Cause TEST and FMT to read the label of the volume they are asked to write on; If this is a valid Multics label, to ask

DSKA 12 IS MULTICS STORAGE SYSTEM VOLUME RPV
DO YOU WISH TO WRITE ON DSKA 12?

and to abort unless the operator answers "yes."

REASONS:

Bitter experience (05/29/76) has shown that this is a possible operator error.

IMPLICATIONS:

Less downtime.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR <u>1937</u>
TITLE: Make drive number arguments to BOS be decimal		STATUS DATE
AUTHOR: VanVleck		Written 06/01/76
		Status <u>06/08/76</u>
		Expires 12/01/76
Planned for System: MR 4.0		
Fixes Bug Number(s): not applicable		CATEGORY (check one)
Documented in MTB: not applicable		<input type="checkbox"/> Lib. Maint. Tools
Incompatible Changes: no		<input type="checkbox"/> Sys. Anal. Tools
User/Operations-visible Interface Change: no		<input type="checkbox"/> Sys. Prog. Tools
Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other-see below		<input type="checkbox"/> 355
Performance: <input type="checkbox"/> better <input checked="" type="checkbox"/> same <input type="checkbox"/> worse		<input checked="" type="checkbox"/> BOS
		<input type="checkbox"/> Salvager
DOCUMENTATION CHANGES (specify one or more)		<input type="checkbox"/> Ring Zero
MPM (vol,sect) MPAM (sect)		<input type="checkbox"/> Ring One
MOSN (sect) a001 MSAM (sect)		<input type="checkbox"/> SysDaemon/Admin
PLMs (AN#)		<input type="checkbox"/> Runtime
Info Segs		<input type="checkbox"/> User Command/Subr
Other		
OBJECTIONS/COMMENTS:		

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

SUMMARY:

Make all drive numbers input by the operator to BOS be interpreted as decimal numbers only.

This change affects IF, FLAG, ABS, SAVE, RESTOR, BOOT, CORE, DUMP, LABEL, LOADDM, PRINT, TAPED, and all callers of ARGBOS such as DUMP and PATCH.

(The contents of the CONFIG deck and the COLD, WARM, and NLABEL cards are not affected.)

REASONS:

Allowing drive numbers to be either decimal or octal means that the operator may make a disastrous error by omitting a period.

This problem occurred at MIT on 05/29/76.

The primary need is to make disk drive numbers be decimal. Tape drive numbers are made decimal also in order to avoid confusion.

IMPLICATIONS:

Less downtime.

TITLE: To install a merged fortran_io_		STATUS	DATE	
AUTHOR: G. Chang SHW		Written	05/24/76	
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR 4.0 -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____	Category (Check One)	Status	06/17/76 R 06/15/76	
		Lib. Maint. Tools	Expires	12/15/76
		Sys. Anal. Tools	DOCUMENTATION CHANGES	
		Sys. Prog. Tools	Document	Specify One or More
		355		
		BOS	MPM (Vol, Sect.)	
		Salvager	PLMS (AN #)	
		Ring Zero	MOSN (Sect.)	
		Ring One	MPAM (Sect.)	
		SysDaemon/Admin.	MSAM (Sect.)	
	X Runtime			
	User Cmmnd/Subr.			
Objections/Comments:		Info Segs		
		Other (Name)		
		None (Reason)	Complete lang spec has yet to be worked out	

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

SUMMARY:

To install a merged fortran_io_ to replace the current fortran_io_ and the current fast_fortran_io_.

REASONS:

The fast_fortran_io_ was intended to be an interim version in the first place.

DETAILED PROPOSAL:

A copy on write fortran_buffer_ segment is also to be installed.

Ver. 3 741022	MULTIOS CHANGE REQUEST	MCR 1883
TITLE: Better handling when disk drops off line.	STATUS: Written	DATE: 05/13/76
AUTHOR: VanVleck / N. Morris	Status: PLM AG/15/76	Expires: 11/13/76
Planned for System: MR 4.1	CATEGORY (check one)	
Fixes Bug Number(s): not applicable	<input type="checkbox"/> Lib. Maint. Tools	
Documented in MTB: not applicable	<input type="checkbox"/> Sys. Anal. Tools	
Incompatible Change: no	<input type="checkbox"/> Sys. Prog. Tools	
User/Operations-visible Interface Change: no	<input type="checkbox"/> 355	
Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other-see below	<input type="checkbox"/> BOS	
Performance: <input type="checkbox"/> better <input checked="" type="checkbox"/> same <input type="checkbox"/> worse	<input type="checkbox"/> Salvager	
DOCUMENTATION CHANGES (specify one or more)	<input checked="" type="checkbox"/> Ring Zero	
MPM (vol,sect) MPAM (sect)	<input type="checkbox"/> Ring One	
MOSN (sect) MSAM (sect)	<input type="checkbox"/> SysDaemon/Admin	
PLMs (AN#) an61	<input type="checkbox"/> Runtime	
Info Segs	<input type="checkbox"/> User Command/Subr	
Other		
OBJECTIONS/COMMENTS:		

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

SUMMARY: Currently if a disk drive falls into standby we retry forever, logging messages and printing every tenth. This degrades system performance severely.

PROPOSAL: If the drive "fixes itself" within 5 seconds and sends a special interrupt, retry the I/O. If 5 seconds elapse without a special interrupt, try to use the drive again. If drive is still inoperative, place in broken state. In this state, all read operations are posted as errors and all write operations are left in the disk request queue until the drive is repaired. An attempt will be made every 10 minutes to use a drive in broken state.

Change disk DIM to log detailed status after every error which calls for detailed status to be read.

REASONS: The change to device-in-standby handling will allow the system to keep going if a disk falls offline, without overloading the CPU and the SYSERR log.

Repeating the message every 10 mins. will encourage operations to fix the problem sooner.

Printing the error messages and detailed status has been requested by FE, who would like to find out why the disk drives go standby.

IMPLICATIONS: More reliable operation.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR 1939
TITLE: Make VTOC Write errors nonfatal.		STATUS
AUTHOR: Bernard Greenberg		DATE
		Written 06/03/76
		Status 206/15/76
		Expires 12/03/76
Planned for System: MR 4.0		CATEGORY (check one)
Fixes Bug Number(s): not applicable		() Lib. Maint. Tools
Documented in MTB: not applicable		() Sys. Anal. Tools
Incompatible Change: no		() Sys. Prog. Tools
User/Operations-visible Interface Change: no		() 355
Coded in: (X) PL/I () ALM () other-see below		() BOS
Performance: () better (X) same () worse		() Salvager
DOCUMENTATION CHANGES (specify one or more)		(X) Ring Zero
MPM (vol,sect)	MPAM (sect)	() Ring One
MOSN (sect)	MSAM (sect)	() SysDaemon/Admin
PLMs (AN#) 61		() Runtime
Info Segs		() User Command/Subr
Other		
OBJECTIONS/COMMENTS:		

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

SUMMARY: Any error encountered in the writing of a VTOCE, which cannot be confined by the disk dim, currently crashes the system. This is because a previous policy whereby irreversible action was taken after the start VTOC writing which would assume correct completion of the write at some later time. Since there is now a mechanism which can await correct completion of a VTOC write (covered under previous MCR), irreversible action can be postponed until correct completion of the write has been assured. Remove the code from vtoc_interrupt which crashes the system on a write failure.

REASONS: Greater reliability. Not only do fatal VTOC write errors crash the system, but they tend to leave the VTOC buffer segment in an inconsistent state.

IMPLICATIONS: See "DETAILED PROPOSAL".

DETAILED PROPOSAL: Introduce the concept of a "hot" VTOC buffer, that is, one whose contents represent a known difference from the disk-resident VTOCE, but for which no I/O is outstanding. The unsuccessful completion of a write operation puts a buffer in this state. Reads may be done from such a buffer, and all future calls to write it retry the operation. Demounting of the physical volume (which includes shutdown) tries once to flush all hot buffers. Any volume for which a hot buffer is found at demount time causes a volume salvage to be scheduled, as does a VTOC I/O error code returned to a caller of await_vtoce. This is because either of these cases almost ensures that records were deliberately left undeposited, and need be collected.

An implication of this strategy is that hot buffers cannot be

replaced by the VTOC buffer selection algorithm. Hence, the system can fill up with hot VTOC buffers in a limiting case. We do not propose to solve this in this pass, but await a better policy on system write errors in general, which is in the offing. The proposal as it stands is a major increase to system reliability.

Multics Change Request

TITLE: Install new bound_plio2_		STATUS	DATE	
AUTHOR: R. Schoeman RAB		Written	6/4/76	
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR <u>4.0</u> -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____	Category (Check One)	DOCUMENTATION CHANGES		
		Lib. Maint. Tools	Document Specify One or More	
		Sys. Anal. Tools	MPM (Vol, Sect.)	
		Sys. Prog. Tools	PLMS (AN #)	
	355	MOSN (Sect.)		
	BOS	MPAM (Sect.)		
	Salvager	MSAM (Sect.)		
	Ring Zero	Info Segs		
	Ring One	Other (Name)		
	SysDaemon/Admin.	None (Reason) bugfix		
	X Runtime			
	User Cmmnd/Subr.			
Objections/Comments:				

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

REASON:

Fix a bug in opening stream files in PL/I I/O caused because plio2 was using iox_\$modes to get line length instead of get_line_length_.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCP <u>1943</u>
TITLE: Fix descriptor segment bound field		STATUS: <u>Written</u> DATE: <u>06/04/76</u>
AUTHOR: VanVleck		Status: <u>Bo6/19/76</u> Expires: <u>12/04/76</u>
Planned for System: MR 4.0		
Fixes Bug Number(s): not applicable		CATEGORY (check one)
Documented in MTB: not applicable		() Lib. Maint. Tools
Incompatible Change: no		() Sys. Anal. Tools
User/Operations-visible Interface Change: no		() Sys. Prog. Tools
Coded in: (X) PL/I () ALM () other-see below		() 355
Performance: () better (X) same () worse		() BOS
		() Salvager
DOCUMENTATION CHANGES (specify one or more)		(X) Ring Zero
MPM (vol,sect) MPAM (sect)		() Ring One
MOSM (sect) MSAM (sect)		() SysDaemon/Admin
PLMs (AN#) an61		() Runtime
Info Segs		() User Command/Subr
Other		
OBJECTIONS/COMMENTS:		

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

SUMMARY:

In systems 28-5 on, the descriptor segment boundary is set to 1K instead of 4K. Change it back to 4K.

REASONS:

Setting the bound field to 1K can lead to out-of-bounds faults on the descriptor segment, when the KST says that the maximum segment number is 1023. This bounds fault can crash the system.

IMPLICATIONS:

Fewer crashes and crawlouts.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCP 1944
TITLE: Prevent message coordinator flooding		STATUS: DATE
AUTHOR: VanVleck		Written: 06/04/76
		Status: AO6/5/76
		Expires: 12/04/76
Planned for System: not applicable		CATEGORY (check one)
Fixes Bug Number(s): not applicable		() Lib. Maint. Tools
Documented in MTB: not applicable		() Sys. Anal. Tools
Incompatible Change: no		() Sys. Prog. Tools
User/Operations-visible Interface Change: no		() 355
Coded in: (X) PL/I () ALM () other-see below		() BOS
Performance: () better (X) same () worse		() Salvager
DOCUMENTATION CHANGES (specify one or more)		() Ring Zero
MPI (vol,sect) MPAM (sect)		() Ring One
MOSH (sect) MSAM (sect)		(X) SysDaemon/Admin
PL#s (AN#) an66		() Runtime
Info Seps		() User Command/Subr
Other		
OBJECTIONS/COMMENTS:		

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

SUMMARY:

If a process sends messages to the message coordinator faster than they can be printed, cause the process to go into output wait status.

REASONS:

Currently if a daemon process goes into an output loop (printer drivers do this sometimes) the message coordinator receives messages faster than its terminals can print. This causes the physical device queues to fill up with unprinted messages, and the message router then takes an out-of-bounds on a queue. The out-of-bounds handler causes a message to be printed; this message gets a recursive boundfault and terminates the process, crashing the system.

When this problem was first encountered, the printer DIM was modified to sleep for one minute if too many errors occurred. But that change did not catch all the possibilities for message loops.

IMPLICATIONS:

Fewer crashes.

DETAILED PROPOSAL:

Implement a per-source counter in the MRT which counts up when a source has sent a message and counts down when the message has been output. Modify `mr_util_swrite` to set a flag and block the process if this count exceeds a preset number. If the counter goes to zero and the process is waiting, wake it up.

Ver. 3 741022	MULTICS CHANGE REQUEST	MCR 1945
TITLE: Speed up dc_pack		STATUS: DATE
AUTHOR: VanVleck		Written: 06/08/76
		Status: A 06/15/76
		Expires: 12/08/76
Planned for System: MR 4.0		CATEGORY (check one)
Fixes Bug Number(s): not applicable		() Lib. Maint. Tools
Documented in MTB: not applicable		() Sys. Anal. Tools
Incompatible Change: no		() Sys. Prog. Tools
User/Operations-visible Interface Change: no		() 355
Coded in: (X)PL/I ()ALM ()other-see below		() BUS
Performance: (X)better ()same ()worse		() Salvager
DOCUMENTATION CHANGES (specify one or more)		(X) Ring Zero
MPM (vol,sect) MPAM (sect)		() Ring One
MUSN (sect) MSAM (sect)		() SysDaemon/Admin
PLMs (AN#) an61		() Runtime
Info Segs		() User Command/Subr
Other		
OBJECTIONS/COMMENTS:		

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

SUMMARY:

Issue VTUC I/O requests in order of vtoc index when listing directories in dc_pack.

REASONS:

Sorting these requests by vtoc index will reduce the disk arm motion caused by the dumper.

IMPLICATIONS:

Performance improvement. Items are returned in the same order as before so no interface change is evident.

Multics Change Request

TITLE: Fix problems in Network routines -- supervisor

AUTHOR: D. Wells

STATUS	DATE
Written	7.6.76
Status	A 06/15/76
Expires	12/15/76

- Coded in: PL/I ALM other-explain in DETAILED PROPOSAL
- Planned for System MR 4.0
- Fixes Bug Number(s) unreported
- Documented in MTB _____
- User/Operations-visible Interface change? yes no
- Incompatible change? yes no
- Performance: Better Same Worse
- Replaces MCR _____

Category (Check One)

- Lib. Maint. Tools
- Sys. Anal. Tools
- Sys. Prog. Tools
- 355
- ROS
- Salvager
- Ring Zero
- Ring One
- SysDaemon/Admin.
- Runtime
- User Cmd/Subr.

DOCUMENTATION CHANGES

- Document Specify One or More
- MPM (Vol, Sect.)
- PLMS (AN #)
- MOSN (Sect.)
- MPAM (Sect.)
- MSAM (Sect.)

Objections/Comments:

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

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

SUMMARY: Fix two problems in IMP DIM and NCP: 1) add fault handler to NCP assignment module to trap and handle faults and signals, 2) add check to IMP DIM to ~~xxxx~~ avoid a zero length move while running on the PRDS.

REASONS: These problems cause the system to crash.

This is an emergency installation.

TITLE: Delete old list command		STATUS	DATE
AUTHOR: T. Casey		Written	6/7/76
		Status	A 06/15/76
		Expires	12/15/76
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL		Category (Check One)	
-Planned for System MR 4.0, 5.0		<input type="checkbox"/> Lib. Maint. Tools	
-Fixes Bug Number(s) <u>None</u>		<input type="checkbox"/> Sys. Anal. Tools	
-Documented in MTB		<input type="checkbox"/> Sys. Prog. Tools	
-User/Operations-visible		<input type="checkbox"/> 355	
Interface change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> BOS	
-Incompatible change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> Salvager	
-Performance: <input checked="" type="checkbox"/> Better <input type="checkbox"/> Same		<input type="checkbox"/> Ring Zero	
<input type="checkbox"/> Worse		<input type="checkbox"/> Ring One	
-Replaces MCR		<input type="checkbox"/> SysDaemon/Admin.	
		<input type="checkbox"/> Runtime	
		<input checked="" type="checkbox"/> User Cmmnd/Subr.	
		<input type="checkbox"/> MSAM (Sect.)	
Objections/Comments:		DOCUMENTATION CHANGES	
		Document Specify One or More	
		MPM (Vol, Sect.)	
		PLMS (AN #)	
		MOSN (Sect.)	
		MPAM (Sect.)	
		MSAM (Sect.)	
		Info Segs	
		Other (Name)	
		None (Reason) doc. ok	

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

SUMMARY:

For release MR 4.0, delete all of the names (ln, lt, listnames, listtotals, list_names, list_totals) from >sss>old_list.

For release MR 5.0, delete old_list.

REASONS:

Typing ln or lt invokes the old list command, which does useless VTOC I/O on every entry matching the given starnames, even though that information is not to be printed.

IMPLICATIONS:

Users who have not converted to using the new list command will be forced to. Removing the names but postponing the deletion for a while makes their conversion slightly more convenient.

TITLE: Make term_ always unsnap links		STATUS	DATE
AUTHOR: S. Herbst SHW		Written	6/10/76
-Coded in: <input checked="" type="checkbox"/> XPL/I <input type="checkbox"/> AIM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR 5.0 -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____		Status	A 06/15/76
		Expires	12/15/76
		DOCUMENTATION CHANGES	
Category (Check One)		Document	Specify One or More
<input type="checkbox"/> Lib. Maint. Tools			
<input type="checkbox"/> Sys. Anal. Tools			
<input type="checkbox"/> Sys. Prog. Tools			
<input type="checkbox"/> 355			
<input type="checkbox"/> BOS			
<input type="checkbox"/> Salvager		MPM (Vol, Sect.)	
<input type="checkbox"/> Ring Zero		PLMS (AN #)	
<input type="checkbox"/> Ring One		MOSN (Sect.)	
<input type="checkbox"/> SysDaemon/Admin.		MPAM (Sect.)	
<input type="checkbox"/> Runtime		MSAM (Sect.)	
<input checked="" type="checkbox"/> User Cmmnd/Subr.			
Objections/Comments:		Info Segs	
		Other (Name)	
		None (Reason)	doc. ok

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

SUMMARY:

Fix term_ to always unsnap links.

REASONS:

Some term_ entry points, e.g., term_\$nomakeunknown, do not call link_unsnap_ and it is possible for a segment to be terminated while links to it remain. In particular, the delete command can delete in some cases without unsnapping links.

TITLE: Bug fixes for debug		STATUS	DATE
AUTHOR: S. Barr		Written	6/4/76
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL		Status	06/15/76
-Planned for System MR 4.0		Expires	12/15/76
-Fixes Bug Number(s) _____		DOCUMENTATION CHANGES	
-Documented in MTB _____		Document	Specify One or More
-User/Operations-visible		MPM (Vol, Sect.)	Commands
Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		PLMS (AN #)	
-Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		MOSN (Sect.)	
-Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same		MPAM (Sect.)	
<input type="checkbox"/> Worse		MSAM (Sect.)	
-Replaces MCR _____		Info Segs	
Objections/Comments:		Other (Name)	
		None (Reason)	

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

REASONS:

1. debug occasionally prints out an incorrect error message "path now references a new segment" for the ".bgr" request.
2. debug doesn't print the argument value in the case where there were no descriptors for the "&pl" request.
3. If debug was entered via a mme2 because of the static handler mechanism and the user tries to quit, debug tries to return to the mme2 fault.

PROPOSAL:

Bugs described in #1 and #2 are one line fixes.

For #3 debug will follow this convention:

If the user tries to quit from debug, debug will return from the stack frame of the last time debug was called. If debug\$mme2_fault was invoked via a static handler and there is no previous called. frame for debug, then the ".q" request will cause the condition command_abort to be signalled.

This will be implemented by having a count that will be incremented each time debug is called and decremented before debug returns, so that the presence of a previous debug invocation will be known.