TO: Distribution
FROM: M. S. Hodges
DATE: October 14, 1974
SUBJECT: Multics Change Requests

Enclosed are copies of Multics Change Requests which were approved from September 15, 1974 - September 30, 1974.
**MULTICS CHANGE REQUEST**

**TITLE:** Message Segment Changes for the Access Isolation Mechanism

**AUTHOR:** Jerry A. Stern

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

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**REASONS:**
Due to the addition of Access Isolation Mechanism controls to the storage system, the message segment facility will not be capable of supporting system-wide queues in a multiple access class system without the modifications described in MTB-101.

**SUMMARY:**
Implement those changes to the message segment facility, the storage system daemon programs, and user commands described in MTB-101. Eliminate message segment metering, but use the syserr log to record message segment salvages as decided at the design review.

**IMPLICATIONS:**
An incompatible change will be made to the message segment reading primitive that these calls will return additional control information consisting of the message access class and sender authorization. However, this MCR proposes to change the affected commands and daemon programs so that no ill effects will occur.

**DETAILED PROPOSAL:**
See MTB-101. Concerning the use of syserr, a new entry in admin_gate will be used to call a new ring 0 program. This ring 0 program will call syserr after ensuring that the arguments supplied by ring 1 are safe, i.e., will not crash the system or cause other unwanted actions.
TITLE: Add meters to page control

AUTHOR: Steve Webber

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

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

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

REASONS: There are several useful meters that could be added to page control that would give us more insight into the workings of the system.

SUMMARY: Add the following meters:

1) count the number of times a page for a segment is on the paging device when the segment is activated.

2) count the number of times a page is moved from the paging device after its segment has been deactivated.

3) meter the cost of the hash lookup code for the paging device map used at segment activation time.

4) meter the time spent in the system spent looping waiting for a file system device to become unbusy.

5) change the "post_in_core" meter, a measure of working set size, to a histogram rather than a single average.

6) create a new meter in the form of a histogram, which measures the number of page faults taken as a function of virtual CPU time since the faulting process was made eligible.
MULTICS CHANGE REQUEST

TITLE: Modifications to the ALM assembler

AUTHOR: Alan R. Downing

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

CLASSIFICATION | JUSTIFICATION
---|---
Incompatible | Marketing Requirement
Change | Implemented in System
Extension | Objections/Comments
Restriction | Keep copy of old assembler in tools as old_alm
Improvement | Increased Consistency
Reliability | Simplification
Improvement | Generalization
Improvement | Unreported

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

REASONS:

To convert the assembler to version 2 pll. This is to permit better maintainability, and also to allow some recoding of programs to utilize version 2 pll features further increasing execution speed.

To fix bugs either reported or found during conversion; bugs fixed include, problem with 2 bit characters being used in acc, and aci strings, being able to specify the register in an address field separate from the offset part of the field with a variable previously defined by an equ.

To make some extensions to the assembler, namely: allowing the use of register names "pr0...pr7" in the address field. An optional field to the aci, acc, and bci pseudo-ops. This field specifies a length to which the assembler will pad the given string with the appropriate "blank" character for the pseudo-op being used. To allow a variable defined with either temp, or tempd to be used in the offset field of an address with a register other than pr0.

These modifications have been tested and are ready for submission.
### Fix bug in file dim

**AUTHOR:** E. Stone

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

**CLASSIFICATION** | **JUSTIFICATION** | **Replaced by proposal 'CP'**
---|---|---
Incompatible Change | Marketing | Implemented in System
Extension | Performance to Standard | Objections/Comments:
Restriction | Increased Consistency
Performance Improvement | Simplification
Reliability Improvement | Generalization

**SUMMARY:** Calculate length correctly.

**REASONS:**

A side effect of installing a new version of expand_path_ was that the gcps simulator stopped working. This is due to passing the file dim a pathname argument whose length is greater than 168 characters. The file dim behaves unintelligently in that it copies the pathname into a 168 character string, but takes the length of the pathname from the argument.

Other users of the file dim may encounter this undocumented restriction.
TITLE: Install bootstrapped pl1 compiler

AUTHOR: R.A. Barnes

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

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

REASONS: The new compiler fixes approximately 150 bugs and provides improved object code for programs that make quick procedure calls.

SUMMARY: The compiler fixes all starred (*) bugs on the accompanying listing of doc info pl1_status info. For many calls to quick internal procedures, the compiler produces a constant list of ITP pointers to the arguments. This change has produced a 5-10% improvement in compile speed for pl1. Object segment sizes and the system working set decrease with this change since calls with identical argument lists use the same constant list.

IMPLICATIONS: Improved performance and reliability since many serious bugs have been fixed.
This file contains Version 2 PL/I BUGS, PLANNED IMPROVEMENTS, PLANNED LANGUAGE FEATURES, UNDIAGNOSABLE PROBLEMS, and FURTHER INFORMATION.

BUGS marked with * have been fixed in the experimental compiler located in BUSS without * will, in general, exist in both the installed compiler and experimental compiler.

1222 next free number

1221.74.10.9.5 gic repeat operator uses x7, compiler thinks otherwise. (affects copy, high, low).

1222.74.9.13 gic substr(array,i,) = copy(constant,i): gets FATAL ERROR 33

1219.74.8.29 gic aggregate_fun() <op> aggregate_fun() fails -- bad code

1218.74.8.29 rab (ex1 only) if string(st) = ... then if string(st) = ... e else if string(st) = ... can get ERROR 313 + bad code if optimized. bug in Jump_op.

1217.74.8.28 rab bad code for more than one invocation of the same
returns(char_or_bit(*)) function in the same statement.

1216.74.8.27 rab a || varying_fun(... || ... can fail if optimized becauset
incorrect length used in building a temporary. Bug in
operator_semantics.

1215.74.8.27 gic x(i,* ) = ul(i,* ); where x is based produces a temporary of
wrong size, possibly causing FATAL ERROR 304.

1214.74.8.20 rab dasin(0,1) fails because of bug 1213.

1213.74.8.20 rab abs(foo) fails if foo is in the n but the indicators are
set for foo.

1212.74.8.19 gic varying_character, cn_array = char(bit_varying_array); get
ERROR 313 (mpf 75.37).

1211.74.8.15 rab end statement with no : causes fatal process error.

1210.74.8.13 gic second error message is incorrect for more than one mis
diagram statement (mpf 75.14).

1209.74.8.13 rab real_fixed_scaled = colx_float + colx_float; fails (mpf
1208.74.9.12 rab optimizer doesn't set externals at call with no args.

1207.74.8.18 rab (ex1 only) label_var = param_label_var gets bad code.

1206.74.8.18 rab substr(base,name,...) fails.

1205.74.8.16 gic reserve list change: decimal_exo should be reducible.

1204.74.8.16 rab (stringrange) causes fault on string declares char(2**16
mpf 75.4).

1203.74.8.16 rab dcl 1 unreal_str based(addr(unreal_array(i))). gets bad addr
for some elements of unreal_str.

1202.74.8.16 blw divide(fixbin71,fixbin71,35,0) loops in pl1_operators if
divisor is large and the dividend 1. (mpfr 75.43).

1201.74.8.16 blw divide(fixbin71,fixbin71,35,0) faults in pl1_operators if
divisor is large and the dividend 0. (mpfrs 75.42, 75.43).

1200.74.8.16 gic return(dimension/var_with_refer,1) faults in builtins.
(mpfr 75.41).

1199.74.8.16 gic complex3(4,1389,589) fails: precision of result wrong.
(mpfr 75.47).

1198.74.8.16 rab if "0 ... and do while("0); fail to work properly.

1197.74.8.16 gic char(complex_decimal) fails (mpfr 75.39).

1196.74.8.15 rab fixed_unal = fixed(char_str,27) may fail.

1195.74.8.15 gic on file_condition(nonfile) not diagnosed (mpfr 75.38).

1194.74.8.15 gic in expanding an aggregate expression, a non-aggr exor that
has been pulled outside of a loop may be overwritten inside the loop (mpfr 75.35).

1193.74.8.11 gic dcl foo(3) ptr init(accdr(x),addr(y),*); gets fault at
time because foo(3) is assigned to itself.

1192.74.7.31 blw any_to_any not setting error location for default_error when
signalling conversion condition

1191.74.7.26 rab complex(short_floatbin_aggregate) gets fatal process error
7513).
119.74.7.26 gdc real(decimal_array) fails because incorrect length used (mpf 7496).
118.74.7.24 rab conv(s, var) where var = 0 fails to return null string.
116.74.7.24 gdc dcl foo(entry(char(*)), fixed bin,(*)) bit(9), fixed bin,(*).
117.74.7.24 gdc dcl foo(entry(char(*)), fixed bin,(*)) bit(9), bit(72) aligned; call foo("t", "a", "b", 1, "00000100") b var; gets ERRORS 3128315 or fault in semantics (mpf 7494)
115.74.7.23 rab put data1; fails for varying arrays while out data(varying) works!
116.74.7.23 gdc dcl c char(*); auto[static] unaligned cb char(*) unaligned[alignment(c)]; references to cb are not passed while references to c are. This is part of a more general problem which has always existed and will not be fixed quickly.
114.74.7.20 gdc bad relocation bits generated for FIS descriptors of args to some decimal bulitins.
114.74.7.18 gdc out data(var_declared_by_implication); causes fatal processor error.
113.74.7.18 rab substr(int_static,1,parameter) can give bad addressing code.
112.74.7.17 gdc scalar passed as arg to proc expecting dim(*) fails to be promoted to array properly (mpf 7484).
111.74.7.17 gdc after anc before bulitins fail for array arguments (mpf 7497).
110.74.6.7.16 blw ext and int entry addresses not recorded correctly in runtime symbol table.
109.74.7.15 rab Use of complex fixed dec(>=32) in arith stmts fails due to improper scale in FIS inst.
108.74.7.15 gdc init of auto varying arrays fails because length words not set. Caused by not setting varying_ref bit (mpf/439).
107.74.7.15 rab subtract and add bulitins fail for binary args if result is scaled and does not have scale implied by precision rule (mpf 7491).
106.74.7.15 gdc implicit conversion of varying bit string to character fail (mpf 7379).
105.74.7.15 rab FATAL ERROR 336 when processing defined structure with tab cộtion (mpf 7373).
104.74.7.15 rab put list(substr("0101111"b,2,4)); gets ERROP 333 (mpf 7370).
103.74.7.12 rab translate(varying_str, var1, var2) fails (mpf 7390).
102.74.7.12 blw dcl x pic "ssssssss"f:x = -1: x = x+1; gets out_of_bounds.
101.74.7.12 blw mod(Scaled_binary,u) faults due to bad return (mpf/7418).
100.74.7.12 blw mod(Scaled_binary,scaled_binary) fails (mpf/7419).
99.74.7.12 gdc sqrt bulitin fails for many (not all) cases of colx args.
98.74.7.11 rab Use of complex decimal arith sometimes (rarely) causes illegal modifier condition in assign_op (mpf 7401).
97.74.7.11 rab compiler does not realize that stream Io, get, end, and out_end operators flush x6.
96.74.7.10 rab unal_str2 = unal_str1: if unal_str1 = "111"b ... sometimes gets ERROP 313. This rare bug is caused by a deficiency in save_value.
95.74.7.11 gdc put list((y(2,1))); fails where y(3,3) defined(x(2:sub1:sun))
94.74.7.11 gdc erroneous ERROP 315 for the statement: (strg) k = fixed(substr(unspec(substr(c,1,1)),6,5,4));
93.74.7.9 gdc sourious ERROP 179 for dcl 1 a(10), 2 x fixed bin: dcl 1 b define(a(1)), ? y fixed bin: b,y = ?
92.74.7.9 rab c = -c; fails where c is complex decimal. (a = -c; works!)
91.74.7.1 rab key_to_implementation fails: compiler/runtime bug.
90.74.7.1 rab proc() returns(*fixed bin); does not return properly, causes subripsection range condition. Also, element of aggregate return_value addressed improperly.
89.74.7.1 rab (size); has no effect on the statement put list(25+1/3):
the result is 2,533... instead of 25,333...

1158*74.17.61 rab a(1*, 1) = a(*, 2) causes fixed overflow on execution.
aggregate temporary is allocated within the loop rather
than without.

1157*74.C7.61 rab x = y where y[3, 3] defined(x[2sub, 1sub]); causes error 315
1156*74.66.20 blw symbol table entries built incorrectly for memb param st
1155*74.66.19 gic put list(substr(str, iscaled, jscaled)); either faults or
bad code because 2nd and 3rd args of substr not converte
integer.

1154*74.66.19 rab dcl vs char(12l) varying based(addr(varying_string)); gets
bad access code for vs (morf 7345).

1153*74.66.19 rab array(fixed(substr(unspec(substr(varying(i), 1, 1)), 3, 7), 1)
gets ERROR 112 & 315.

1152*74.66.18 blw e_v has trouble encoding bound of array with refer exten;
1151*74.66.17 gic onchar builtin does not compare correctly with constant
passed as_arg bit not set on temporary.

1150*74.66.17 rab all_operators_out return(bit); returns zeroes
(morfs 7323, 7324).

1149*74.66.14 blw assign does not set support bit; this can cause erroneous
identification of source of conversion signal.

1148*74.66.14 rab dcl bit_array(non_constant) bit(1) based unall: access code
to element of array may be incorrect if larger than 2**1!

1147*74.66.13 gic copy(varying_bit_string, n) fails.
1146*74.66.13 gic (fxl only) strucb = struct[i + 1]; produces bad code when
structure has the same declaration as an element of struct.

1145*74.66.13 gic second arg of copy builtin should be converted to bin int
not just fixed bin (morf 7330, 7331).

1144*74.66.13 gic reverse(varying_bit_string) fails (morfs 7342).

1143*74.66.13 rab dcl str char(<exp>*) ...; dcl var char length(str) vary
based: p => var = str; gets ERROR 315.

1142*74.66.12 rab bad code for comparison with element of array of entry,
label, or format vars.

1141*74.66.12 gic addr(char_unall()); = fixbin gets ERROR 332.
1140*74.66.12 rab KEYTO OPTION fails after RECORD condition signalled (morfs
1139*74.66.11 rab bool builtin fails with variable 3rd arg
1138*74.66.11 gic translate(varying_parameter,...) gets ERROR 313.
1137*74.66.10 rab Under rare circumstances rel(addr(unaligned_item)) can ca
bad code to be generated LATE in the program (morf 7344).

1136*74.66.10 gic dcl foo entry(fixed bin(17) unall); call foo(<exor>);
may fail because temporary created improperly.

1135*74.66.10 gic string range fails for substr(str,1,len)

1134*74.66.17 gic dcl a(5) fixed bin init(1, (4)*); gets ERROR 232 (morf 736
1133*74.66.16 rab conversion of packed pointer to offset fails.
1132*74.66.14 gic problem in expand_assign for aggregate with two refer opt

1131*74.66.14 gic dcl 1 str(10) auto unal, 2 a bit(36), 2 b fixed bin(17
2 b char(1); causes ERROR 332 if a or b is used.

1131*74.66.14 gic if a >= 7b then goto label; causes fault in the parse.

1131*74.66.14 rab freeing a controlled structure with adjustable extents ca
cause a fault in freen_. all_operators_bug. (morfs 7771)

1128*74.66.13 gic format stmt following a return stmt gets WARNING 56.

1127*74.66.13 gic dcl 1 str(10) unal, 2 a bit(36), 2 b fixed bin, 2 c char(1)
gets ERROR 332 in following stmt: a = "1614"!

1126*74.66.13 rab truc & cell builtin gets IPP fault with decimal args
(morfs 7269).

1125*74.66.13 gic float_deco*<large_constant fails (morfs 7264).
1124*74.66.13 gic fixed(1, float_deco) gets ERROR 262 (morfs 7267).

1123*74.66.13 rab char_varying = char(varying_bin); fails. (morfs 7289).
1122*74.66.13 gic sort(4, 21) fails (morfs 7279).

1121*74.53.30 rab = (a <op> b) gets ERROR 73) if a or b have length exprs

1120*74.53.24 rab floatbin.f_unal = floatbin; fails sometimes fails
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1119.74,5.24 rab addr(varying_parameter) sometimes fails if optimizer used.
1118.74,5.23 blw any_to_any_1 bit to char conversion fails for strings to-
(morf 7207).
1117.74,5.22 rab get data: fails if input variable is declared but not
referred to in the program.
1116.74,5.21 gic array(*) = scalar_fun(); where scalar_fun returns(fixed b
gets ERROR 315).
1115.74,5.21 rab rel(addr(p -> fool)) can cause later ERROR 313 if optimize
1114.74,5.21 rab fixed(length(varying_str),24) fails.
1113.74,5.16 gic call foo(char_star_fun()); fails if foo expects bit(*) be
compiler forgets to perform conversion!
1112.74,5.16 blw any_to_any_ gets IP? instead of signalling conversion whe
"111" to float bin (morf 7194).
1111.74,5.16 gic (optimize only) call ioa_foo(varying_str,x),varying_str
fails because length from first call used for both descri
(morf 7197).
1110.74,5.16 gic allocate for (based_area) set(offset); gets ERROR 313.
1109.74,5.16 gic call ioa((char_star_fun())); gets ERROR 313.
1108.74,5.14 gic allocation of a dimensional based array puts the compiler
1107.74,5.14 rab (x) only) call foo((varying_str[x])); gets ERROR 32 an
either ERROR 310 or fatal process error.
1106.74,5.14 gic sum(fixbin_unal_array) gets ERROR 2077 created sym ha
unaligned bits on.
1105.74,5.14 gic dec_exp fails for (1) x = 0 and y <= (0) x = -0 an
1104.74,5.13 gic dcl x(1,3) f(-)ed bin(17) unal init(2,10,0,0): gets ERROR
caused by assign-zero operator to unaligned target.
1103.74,5.13 rab use of read and write stmts to same file in any contex othe
right side of assignment st
ERROR 313.
1102.74,5.12 rab variables known to ON-UNITS not being flushed from
machine state at I/O or signal ops.
1101.74,5.12 rab if substr(str,a,b-a) = foo then goto label_var; blech =
substr(str,a,b-a); gets ERROR 315; bug in jum_op.
1100.74,5.11 blw exponent underflow in converting 1e+s0 to internal rea
1099.74,5.11 rab dcl 1 str(*,b), b(*,*) char(*); length(b(1,1,1,1)) fails
use in any context other than right side of assignment st
(morf 7148).
1098.74,5.11 gic (low priority) dcl 1 z, ? ins(0,1) bit(36), p entry(bit(*)
returns(char(12) varying); z = p(1,1); gets ERROR 313.
1097.74,5.11 gic subsr(addr(char4_auto(i)) -> str,n,i) gets fatal process
error due to bug in str_a.
1096.74,5.11 gic allocate for in(area) set(offset); causes loop in assign-
if it appears in different block than offset.
1095.74,4.29 gic allocate for in(area) set(auto_offset); fails because
auto_offset given bad address due to invalid symbol copy.
1094.74,4.29 rab dcl 1 str(n) aligned, 2 (a,b,c) bit(m) unal; dcl bits bit(1
based: addr(str(n)),b) -> bits causes fatal process error
in code generator. Bug in simplify_offset. Also, built-in
defined_reference, and simplify_offset fail to properly
reference, mod_words_in_offset when building defined
1093.74,4.29 rab In very rare circumstances a word of storage may be
simultaneously allocated to 2 different temps -- bug in
a Man%save_a.
1092.74,4.29 gic 1**a fails where a is decimal because decimal_exp_*_expect:
1 to be float dec(59).
1091.74,4.18 gic x**y fails for x and y decimal and y <= 0.
1090.74,4.18 blw dcl x oic"99999y939s99"; x = 1; gets fault at runtime
1089.74,4.18 blw any_to_any_ signals fault_tag_1 instead of conversion whe
assigning bad char to bit. Also, try compiling test484.

conversion to float each of products of short fixed
with short fixed scaled const whose binary rep is 1 may
Local optimization deletes mov 1,dl which would have

clears a register.

This happens only if the value of <expr> w

are mistakenly
diagnosed as illegal pictures.

members of a structure based on a parameter of struct
gets a fault in m_a when compiled with table option
(mprf 7041,7045).

Should generate call. Check other math builtins in complex cases.

dcl str char(len) based(loc); where len and loc are

ERROR 315 & 316.

fails because c_offset is ignore

in prepare_operand.

gets FATAL ERROR 335 in re

scale factors in picture formats have no effect (mprf 695

if bit is used with ~ operator or bool builtin.

validate_picture fails for pic "9v99cr" (mprf 6935)

validate_picture fails for pic "-zv3e-29" (mprf 6943)

fixed(unspec(substr(based_char_str,i,min(4,max(i,1)))) c

unpack_picture fails for picture with trailing - with pc

In rare cases, if a structure is not referenced in a pro-

with table option, a FATAL ERROR 315 can occur (mprf 6946

picture editing fails for ss4v.sss (mprf 6931).

cstr_length = based_string_with_adj_length;

gets ERROR 336 (mprf 6863).

Initialization of 2-dimensional unaligned fixed bin array
fails. (mprf 6790).

info from options and string, unspec builtins fail for a
connected array reference whose declaration doesn't have
own dimensions. This is a rare case. Example:

dcl : str(3); 2 a fixed bin; write from(a); Note that st
has no other members.

declare descriptor problems with descriptor templates for
structure parameters: if the structure has some members w
 extents and other members declared fixed bin or float bin
precision being supplied, the precision in the template (a
new version of trace_stack) will be zero. Also the packed
not be set correctly in the descriptor template. Note the
template is NOT used by the compiled program itself. It is
a descriptor passed by the caller.

gets ERROR 315 (mprf 6296).

Suggested Improvements
FURTHER INFORMATION

When a problem is discovered, it is given a date and a serial number. An attempt is made to produce a small test case which exhibits the problem. The test cases are named testnnn.pl (where nnn is the problem serial number and are kept in tools/testarchive). If the short description of an item in this file is not sufficient, the test case, if it exists, may provide further information. In addition, the test cases are used (albeit infrequently) to run regression tests on the compiler.

The fmtolox command has been installed in tools as a conversion aid in reformating old pl(1) record io files from fm_ to lox_ format.
TITLE: Operator's Console Recovery

AUTHOR: Bill Silver

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

CLASSIFICATION

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

REASONS: To prevent the loss of system messages when the operator's console is inoperative. This change will also allow the operator's console to be detached for T & D testing.

SUMMARY: Changes have been made to the ring 0 console software, system control, and the message coordinator.

IMPLICATIONS: As long as the message coordinator is running and at least one terminal is dialed to the initializer no operator's console is needed. This system will be installed in four phases.

1. Ring 0 operator's console software.
2. Message Coordinator
3. System control
4. Minor change to message coordinator

DETAILED PROPOSAL: See MTB-072
## MULTIPLE CHANGE REQUEST

**TITLE:** Bug fix to tape

**AUTHOR:** Bill Silver

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

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

### REASONS:
Bug may cause a fatal error when rewinding.

### SUMMARY:
Fix bug in tape_util module of tape_. A call to tdcn to perform a request status command was not set up correctly.
MULTICS CHANGE REQUEST

TITLE: fix bug in full_command_processor

AUTHOR: Jay Goloman

SOURCE (if external; e.g., "User", "Marketing"): MIT Programming Development Office

CLASSIFICATION: Replaced by proposal MCR

REASONS: The full_command_processor does not correctly handle an error code returned by proc_parenns. As coded, full_command_processor can write over stack frame headers eventually causing a fatal process error.

SUMMARY: The program should be changed to ignore the length of the atom returned by proc_parenns when the code 103 (i.e., the iteration set was exhausted) is returned. This variable (the length of the atom) is not set by proc_parenns in this case.

The following modules will be converted to version 2 plus:
- proc_parenns
- eval_ec_if_test
- proc_quotes

IMPLICATIONS: The full_command_processor will be more efficient and not cause fatal process errors.
**TITLE:** Bug fix to b_and_w

**AUTHOR:** F. C. Smith

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

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**reasons:**

On system black and white charts covering periods of time which overlap two different months, the wrong information is printed for days in the earlier month.

**Summary:** Correct b_and_w to print the correct information.

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

**TITLE:** Bug fix to system_monthly_report

**AUTHOR:** E. C. Smith

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

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**STATUS**
- Written: 9/6/74
- Approved: 9/17/74
- Rejected
- Postponed
- Withdrawn
- Expires 3/7/75

**REASONS:**
The total memory units printed on a monthly usage report is not correct.

**Summary:** Correct system_monthly_report to print the correct total.

**Implications:** None.
**TITLE:** Bug fix to punch_MIT_deck

**AUTHOR:** F. C. Smith

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

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

**REASONS:** Negative monthly charges are not punched correctly on decks sent to the MIT accounting office.

**Summary:** Modify punch_MIT_deck to handle negative charges correctly.

**Implications:** None.
TITLE: Fix bug in archive

AUTHOR: Steve Herbst

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

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

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

REASONS: Per-component error code for a component whose corresponding entry does not exist in the storage system is not set when the archive does not exist either.

SUMMARY: Fix one line to pick up the code.
**TITLE:** Add "-fm" to list_ref_names

**AUTHOR:** Steve Herbst

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

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

**REASONS:** list_ref_names accepts "-from" but not "-fm".

**SUMMARY:** Add "-fm" as a legal control argument.
Fix bugs found in systems testing.

SUMMARY: Install updated versions of: bound_gcos_daemon, bound_gcos_daemon_tls, gcos_daemon_stat.

IMPLICATIONS: None.

Detailed Proposal:
1. Change gcos_daemon_stat to specify >gdd instead of >ddd.
2. Change gcos_read to use Anonymous.GCOS.
4. Change gcos_queue_job to restrict unique name to 18 characters.
5. Change gcos_convert_sst to call com_err with "code" instead of "0".

bugs fixed: gcs (0013 0068 0070)p
# MULTICS CHANGE REQUEST

**TITLE:** Fix Multiple Argument Reference Security Holes  

**AUTHOR:** Andrew Mason, C. S. R.  

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

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**CLASSIFICATION JUSTIFICATION**: 
- Incompatible Change: Replaced by proposal MCR  
- Extension: Marketed Requirement  
- Restriction: Conformance to Standard  
- Performance Improvement: Increased Consistency  
- Reliability Improvement: Generalization  
- X: Bug Fix  

**REASONS**: Several programs in hardcore, notably asd and tty_write, do not copy their arguments before using them. An oversight of this nature can cause a security hole because it is possible for the value of an argument to change while the hardcore program is running. This can be done by careful construction of an argument list which uses a combination of indirect and indexed-auto-increment addressing modes. For further details, see an upcoming RFC by H. C. Forsdick and D. P. Reed.  

**SUMMARY**: Fix known bugs and review all user-accessible entries in hardcore to locate further bugs of this type.  

**IMPLICATIONS**: None: plugs a possible security hole.
TITLE: Add name to hphcs

AUTHOR: Bill Silver

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

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

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

REASONS: Needed for the orderly removal of tdcn from ring 0.

SUMMARY: The name tdcn_priv will be added to the gate hphcs. Procedures which call tdcn via this gate will be changed to call the new name of the gate.

IMPLICATIONS: When tdcn is removed from ring 0 and replaced by the tdcn simulator, tdcn, the name tdcn_priv will also be added to tdcn. Thus all calls to tdcn via hphcs will automatically go to tdcn.
MULTICS CHANGE REQUEST

TITLE: Reliability improvements to NCP

AUTHOR: D. Wells

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

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

REASONS:
1) There is a bug in ncp_access_ that will cause a process to loop indefinitely in hardcore.

2) The NCP references an error_table_ status code that doesn't exist.

3) Host-host message allocations are sometimes as low as J, causing TIPS to sometimes refuse to transmit characters to Multics.

SUMMARY
1) Fix bug in ncp-access_ to properly reset a variable.

2) Correct the typing error, thus referencing the desired error_table_ code.

3) Increase the message allocation, and alter the allocation updating mechanism to refresh the allocation to establish a four-fold buffering strategy.
Fix bug in ring_zero_dump

Steve Herbst

Fix bug in ring_zero_dump

ring_zero_dump gets the bounds of what it is dumping from the bounds field of the SDW. If the segment has not been referenced, the SDW has not been filled in and the bounds is zero.

ring_zero_dump says:

"First location is past end of segment."

SUMMARY:

Test the df bit in the SDW. If it is off, reference word 0 of the segment and pick up the bounds again.
TITLE: Delete obsolete interfaces from hcs

AUTHOR: Steve Webber

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

CLASSIFICATION | JUSTIFICATION | Replaced by proposal MCP
--- | --- | ---
X Incompatible | Marketing Inconsistency | Implemented in System
Extension | Performance to Standard | Objections/Comments:
Restriction | Increased Consistency |
Performance Improvement | Simplification |
Reliability Improvement | Generalization |
Bus Fix |

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

REASONS: Several hcs entries are obsolete and should be removed. These entries are not used as far as can be determined (from gate meters over several weeks).

The entries are:
get_linkage
get_count_linkage
set_lp
accept_alm_obj

By removing these entries the (hardcore) linker can be made faster and simpler in that it no longer need support the entries. The removal of the linker from ring 0 replaces some of these entries with new ones.

SUMMARY: Remove the entries from hcs.
A mechanism which gives privilege on a process-segment basis is required in order to avoid using the global segment privilege in processes (such as I/O drivers) which must skip AIM checking on a small number of Access Isolation Mechanism protected segments.

SUMMARY: Add a privileged entry to initiate which sets on a new bit in the KST entry. _seg_fault_ will call either _access_mode$raw_ (skip Access Isolation Mechanism) or _access_mode$security_ depending on the setting of this bit.

DETAILED PROPOSAL:

KSTE inferior count field will be decreased from 14 to 12 bits, to provide for a pad bit and a privileged initiate bit. The pad bit is for possible future use. The setting of KSTE.privilege will be done by a new procedure: set_kste_priv which will set the bit on and fault the SDW for the segment (and remove this process' trailer) if necessary.
TITLE: Fix bug 327 in daily_summary

AUTHOR: Janice B. Phillipps

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

CLASSIFICATION: Incompatible Change
JUSTIFICATION: Marketing Requirement

CLASSIFICATION: Extension
JUSTIFICATION: Conformance to Standard

CLASSIFICATION: Restriction
JUSTIFICATION: Increased Consistency

CLASSIFICATION: Performance Improvement
JUSTIFICATION: Simplification

CLASSIFICATION: Reliability Improvement
JUSTIFICATION: Generalization

CLASSIFICATION: Fix
JUSTIFICATION: Fix #327

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

REASONS: daily_summary currently produces a total revenue of several million dollars.

SUMMARY: initialize total to zero

IMPLICATIONS: none (fixed version is currently in /add>SysAdmin>lib)
TITLE: Rewrite ACL commands

AUTHOR: Steve Herbst

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

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

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

REASONS: Implementing the new matching strategy (MCR-720) affords a good opportunity to rewrite the module (aclCommands) that does the regular ACL commands. acl_commands contains some confusing code and is hard to understand.

SUMMARY: Replace acl_commands with the module set_acl, which performs the same functions as the old, with the addition of the new matching strategy.
TITLE: Fix Reloader Bugs

AUTHOR: R. Mullen

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

CLASSIFICATION | JUSTIFICATION | Replaced by proposal 'CP
---|---|---
Incorporated Change | Marketing Incompatible | Implemented in System
Extension | Performance to Standard | Objections/Corrections:
Restriction | Increased Consistency
Performance Improvement | Simplification
Reliability Improvement | Generalization

X Improvement Unreported

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

REASONS:

1. Fix backup_record types, incl. pl. so maps will be correct for upcoming new record types.

2. Fix bk_retrieve so it will not get OOB while searching control file. (Fix known and patched at MIT.)
**TITLE:** Fix bug in message_segment_gate

**AUTHOR:** Steve Herbst

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

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**REASONS:** The gate message_segment_ contains a typographical error causing a call to the entry own_incremental_read_index to be passed to a non-existent entry q_o_incremental_index.

**SUMMARY:** Change the latter to q_o_incremental_read_index.