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SUBJECT: Activities of the System Change Request Testing Subgroup

Attached is a copy of the first draft document outlining the activities of the SMAG Testing Subgroup. Already some minor changes have been made in the planned procedure that are not documented here. The most important of these is:

There will be a set of archive files for the source of each accepted MTS, rather than a single set for all MTS's (see pages 5 and 7). The source will be archived under the CTSS library filename.

Further drafts will more fully document this and other changes.

*How about 316 changes?*

*altizer*  
*Good*

## TESTING

### The System Change Request Subgroup and the Multics Test System

Edwin W. Meyer, Jr.

#### I. Purpose

The activities of the System Change Request Testing Subgroup are intended to be the first line of defense in the maintenance of a stable and useful Multics Standard System. The Testing Subgroup tests submitted changes against a system consisting of the current standard system plus all previously accepted changes not yet updated onto a Multics Standard System. In this manner incompatible or disastrous changes to the standard system are prevented from becoming deeply embedded in the system installation machinery before being discovered. The submitter will benefit in that the period between tentative acceptance or rejection of his changes will be reduced to two or three days.

The key tool of the Change Request Testing Subgroup is a family of Multics Test Systems (MTS) linearly descended from the current MSS. Every few days a new MTS is created from the current batch of change requests and the latest accepted MTS, which consists of the current MSS and all unconsolidated accepted changes. If this MTS works, it becomes the system against which future changes must be gauged.

A string of accepted test systems is thusly generated, each a direct descendent of the previous accepted MTS. A new MSS can be selected by taking all of the changes represented by a certain MTS and creating a new set of tapes. This new MSS can be installed with few problems because it is structurally identical to an MTS which is known to have worked.

The Testing Subgroup may work asynchronously of the Installation Subgroup because it can generate new levels of MTS independently of MSS installation. Since the latest MTS is a direct descendent of any newly installed MSS (because of ancestor MTS and MSS identity) the base of the MTS can be shifted from the previous to current MSS with confidence.

## II. Overview

The Multics Test System (MTS) consists of the current Multics Standard System (MSS) modified to include those change requests previously accepted but not yet consolidated with the MSS. All new change requests submitted since the creation of the latest MTS (one or two days) are incorporated into a new MTS, and it is tested using the standard certifier procedures.

If the test executes without error these new changes are accepted for inclusion with the MSS, and the new MTS represents the system against which the next set of change requests must be gauged.

If the test fails, the change request(s) deemed responsible are rejected as incompatible with the currently accepted system. The remaining change requests must still pass the gauntlet of acceptance onto a new MTS.

In this manner a sequence of accepted Multics Test Systems are created, each guaranteed compatible with the previous MTS, and the earliest extant MTS compatible with the current MSS. A succeeding MSS is created by incorporating all changes to the current MSS up to certain MTS and none other. The new MSS should thus be identical to that MTS and have a high probability of problem free installation.

After the installation of a MSS, a consolidated MTS is created from that MSS and all outstanding accepted changes. If this MTS tests successfully, all previous MTS's are discarded.

### III. Procedures

#### A. Numbering

A Multics Test System number is a three character string consisting of:

- a) final digit of the current MSS number.
- b) a letter designating the MTS level.
- c) a digit starting at zero designating the attempt number to create the next accepted MTS.

*1.900 would be safer.*

Thus the fourth MTS to be created upon MSS 1.9 would be designated 9D0. If it failed the acceptance test, the next MTS would be labelled 9D1; if 9D0 were successful, 9E0. This particular numbering scheme is followed to prevent breaks in the accepted MTS letter sequence, avoiding confusion at MSS update and MTS consolidation time.

The letter "A" is reserved for the MTS created after MSS installation to change the MSS base to the new current system.

#### B. Steps to create a Multics Test System

1. Determine which submitted system change requests should be put onto the next MTS.
2. Check modified segments against current accepted change lists. If duplications exist, reject the change request.
3. Check to determine if the source and TLS files can be found

- for the submitted segments; if not, reject the change request.
4. Pick up all source and TLS files and place into T428 06 with unchanged primary names.
  5. Place the listings for the modified segments in a binder labeled with the MTS number.
  6. Prepare a change summary for the new MTS listing all modified segments and their T428 06 file names and all bound segments to be rebound.
  7. Place the submitted SSCR and segment update forms in a folder labeled with the MTS number.
  8. With the assistance of the change request submitters, edit the HEADER and GECOS files for the current accepted MTS to create those of the new MTS. File with MTS number as primary name.
  9. Assign \*MULT\* and \*WARM\* tape numbers for the new MTS. Run the merge\_edit to bind and generate the \*MULT\* tape from the current MSS \*MULT\*.
  10. Leave instructions with Operations to create \*WARM\* from \*MULT\* and to run the MST checker on the \*MULT\* tape. A certifier bootload is to be run on the MTS tapes, and a complete snap and a dump are to be taken if any abnormalities are noticed.
  11. Check to determine if the new MTS executed the certification procedures successfully. If it failed to do so proceed from step 20.
  12. Use the UPDATE QED macro to move the returned bound segments into T428 06, fix up the HEADER and GECOS files, and to extract and update the bind maps into the aarchv file NEWMAP MAP.

13. Remove the listings from the binder prepared in step 5. and merge them with the Accepted Modifications Listings binder(s) containing listings of accepted segments not yet updated onto the standard system.
14. Place into the just-vacated binder the MST checker output of the new \*MULT\* tape, the latest printout of NEWMAP MAP, the error file from the run that created \*MULT\*, listings of the HEADER and GECOS files, and a copy of the accepted change list.
15. Update the submitted source files into ascii archive files TEST EPL, TEST EPLBSA, and regular archive file TEST ARCHIV for pickup by Library Maintenance. Delete unarchived source.
16. Put the gecos and header files for the accepted MTS into archiv TEST GECOS and aarchv TEST HEADER.
17. Give a copy of the accepted change list<sup>tb</sup> the Standard System Installation Subgroup.
18. Place the folder containing the SSCR and library update forms into a special area with the folders for previously accepted test systems for easy access by the Standard System Installation Subgroup.
19. Notify change request submitters that these changes have been tentatively accepted and that they may delete their source and TLS. fini.
20. FAILED MTS Place the items mentioned in 14. into a binder labeled with the failed MTS number.
21. Notify the submitters of the failure and place the dump and console output, if any, at their disposal. fini.

C. Cleanup procedure following the installation of a new Multics Standard System and its associated library.

1. Edit copies of the latest MTS header and gecos files to delete those changes incorporated into the just-installed MSS. Rebind all bound segments not identical to the MSS versions. File them under the new MTS number (level A).
2. Perform steps 9. and 10. of the standard MTS acceptance procedure to create and test the new MTS.
3. If the MTS fails for trivial reasons, repeat steps 1. and 2. until it works. Otherwise follow the emergency backup procedure.
4. Replace NEWMAP MAP with the copy existing in CF STD.
5. Use the UPDATE QED macro to update the bound segments, maps, header, and gecos for the MTS.
6. Delete TEST GECOS and HEADER and create new versions containing only the gecos and header for this MTS.
7. Delete from TEST EPL, EPLBSA, and ARCHIV the source files of those segments which have been updated onto the MSS.
8. Delete from the Accepted Source binder(s) those segments which have been put onto the MSS.
9. Prepare a consolidated summary form of outstanding accepted segment changes and place in the segment summary binder.
10. Delete all files not used in the preceding week from T428 06.
11. Throw out all documentation pertaining to non-recent failed MTS's. Consolidate the contents of all MTS information binders whose changes have been updated onto the MSS into a single binder. fini.

D. Emergency Backup Procedures

At certain times highly dislocating events may occur that require urgent corrective action on the part of the Change Request Testing Subgroup.

Among those envisioned are:

- a) Because of emergency fixes to catastrophic bugs uncovered by the System Installation Subgroup the newly installed MSS is not a direct ancestor of the latest MTS, although the divergent components are known.
- b) During the testing of the level A MTS based on the newly installed MSS, it appears that because of until-now undiscovered divergence in the MSS previously accepted changes will not work on the new MTS.
- c) It may appear during MTS testing that a previously accepted system change is in error. The location of the bug may or may not be known.

It is necessary that the MTS be quickly brought in line with the MSS as it actually exists and that MTS bugs be deleted so that the next MSS installation will not be delayed or open to disaster. If it is possible to bring the MTS into line by a Testing Subgroup-originated change request, this should be done. Otherwise all previously accepted changes should be unwound, going all the way back to the supporting MSS if necessary to fix the problem. The backed-up changes can then be reprocessed in the regular manner, with the exception that the source and TLS already exist in T428 06.

*Handwritten notes:*  
 All MTS tapes should be held until after the MSS is installed, to permit "unwinding"

E. Data Bases and Documentation for the Change Request Testing Subgroup

Data Bases in T428 CMFL06

- 1. TEST EPL - aarchv } files of source segments accepted for updating onto the standard system.
- TEST EPLBSA - aarchv }
- TEST ARCHIV - archiv }
- 2. NEWMAP MAP - aarchv file of maps for all bound segments in the latest accepted MTS



- 3. TEST GECOS - archiv } files of header and gecos for all
  - TEST HEADER - aarchv } MTS's not updated onto the standard
- system.

Documentation

1. Source listing binders, containing listings of all segments accepted for consolidation with the MSS but not yet therein.
2. One MTS information binder containing checker output, bind maps, gecos and header listings for each accepted MTS not consolidated with the MSS, and also for each recent failed MTS.
3. One binder of source listings for each recent failed MTS.
4. A loose leaf binder containing a modified segments summary form for each extant MTS.