Multics Technical Bulletin

To: Distribution

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Date: 03/18/82

Subject: Rewriting/Organizing the Multics Administrators’ Manuals

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INTRODUCTION

In a continuing effort to improve Multics documentation, the Multics documentation staff is redesigning the Multics Administrators' Manual set and the Multics Operators' Handbook (MOH). New plans for the MOH are discussed in detail in MTB-544. This MTB specifically addresses the first step in improving the MAM - System.

PROBLEM DEFINITION

Several shortcomings in the MAM and MOH have been identified. Among them are unclear audience identification, poor organization and presentation of material, and difficulty of use.

Audience Identification

An audience that the MAM - System (SAM) currently overburdens with reference material is the type of system administrator who serves as system manager, i.e., he "holds the purse strings" and sets site policy. He does not necessarily want to get his hands dirty. Those who DO get their hands dirty are the system maintainers. System maintainers are system programmers who run the operating system: they analyze dumps, solve user problems, deal with file system crashes, and perform system recovery when the standard procedures don't work. In addition, the system maintainer often serves as system administrator, doing the jobs of creating a Multics environment, controlling resource usage, and providing system security services, following the policies set forth by the system manager. Thus, the system maintainer may be registered on both a maintenance and an administrative project. Individual sites may also delegate specialized administrative tasks; they can designate separate, special identities for the security administrator and for the registration and accounting administrator. Additionally, sites generally have several project administrators whose experience and Multics expertise widely varies.

The MAM set attempts to address some of these different audiences already in its separate manuals for different types of administrators: system, project, registration and accounting, RCP, and communications. The SAM is probably the worst of these in terms of audience targeting and ease of use, partly because of its sheer volume of reference material and partly because of the myriad tasks involved with administering Multics efficiently.

To alleviate these problems, we are proposing a new system managers' manual that will contain some of the information from the SAM and new information aimed specifically at the system
managers. This new manual will concentrate on providing system managers with a concise guide to the options available on the Multics system and the practical information needed to set policies that will tailor their system to the needs of their users. It will describe the various concepts involved with Multics administration, and describe factors that must be considered in making informed decisions. Plans are for the current SAM to remain available for some time, until the complete restructuring described below is completed.

Organization and Presentation of Material

Current plans for the MOH are to develop three manuals from the existing one, in three phases. The first phase is to develop a cookbook manual for operators. The second phase will involve writing a separate cookbook on system operation for system maintainers. In the final phase, the present MOH will be reorganized into a reference for both operators and maintainers. Until that final phase the MOH will be available, essentially as is, for reference.

We also plan to develop three manuals from the SAM, in three phases as above. The first phase is the development of the system managers' manual. The second phase: maintainers (who are currently part of the SAM audience, together with system managers) will get a separate cookbook manual for system administration. In the final phase, the present SAM will be reorganized into a reference manual on system administration for administrators and maintainers. In the future, as resources permit, cookbooks for each presently defined administrative type, i.e., project, registration and accounting, security, RCP, and communications, will be provided. Depending on the size of these final cookbooks, they can either stand alone as separate manuals or be two-part manuals containing both the cookbook and reference material needed by their particular audiences.

Ease of Use

Ease of use is the expected result of the creation of the cookbooks. These cookbooks will describe the steps necessary to perform common, and some not-so-common, tasks. Each task will generally require the use of a number of commands, used in a particular order with certain arguments. Thus, users won't have to flip back and forth through the manual, or manuals, trying to locate all the command information necessary to perform some task, since it will be collected under the description of that task. Reference material will be consolidated, which should also save on manual-flipping. Additionally, we may also be able to produce pocket guides for those who prefer more portable reference manuals.
SUMMARY

Restructuring the MAM set and the MOH should correct several long-standing problems with these books. That restructuring includes a proliferation of new manuals, but those new manuals also fulfill needs previously unmet by Multics documentation.

The two manuals adjudged in most need of improvement are the SAM and MOH. Below is a chart of the proposed plan for each of them.

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<td>*System Managers' Guide</td>
<td>Maintainers' Cookbook - System Administration</td>
<td>Administrators' and Maintainers' Reference</td>
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The starred manuals above will be the first to be written. Two writers are currently assigned to the project, which will be carried out in several steps.
APPENDIX A

This appendix presents a tentative outline for the Multics System Managers' Guide (MSMG). The Guide will focus on system administrative options, but may also include other technical topics of interest to the system managers. Suggestions for other topics are welcome.

MULTICS SYSTEM MANAGERS' GUIDE

Introduction

How to use this guide

Definition of system manager and responsibilities

Definition of areas of the system requiring administration:
- system, security, accounting, projects, maintenance, machine operation,
- I/O daemon (bulk I/O), RCP, communications (with pointers to appropriate manuals)

Definitions of personnel to whom authority can be delegated:
- maintainers (system programmers) (SysAdmin and SysMaint), accounting and registration administrator (limited environment), security administrator

Configuration

Hardware - brief definitions:
- CPU, IOM, FNP, SCU, Main Memory
- Terminals
- Printers/punches/readers
- Disk/tape drives

Considerations:
- Number of operators needed
- Number of tapes/disks, etc.
- Paper and tape storage
- Power
- Wiring and communications lines
- Air conditioning
- Physical security and machine room access

Software - brief definitions:
- Physical volume, logical volume, organization of disk storage (e.g., root and public logical volumes, private logical volumes)
- Master directories
- Registration record of a logical volume
- Storage quota
Considerations:
  Volume management - logical volumes, paging volumes

Directory Structure and Daemons - System Hierarchy

SysDaemons - brief definitions:
  Backup, Dumper, GCOS, Initializer, IO, Repair, Retriever, Ring_1_Repair, Salvager, Utility

Daemons - brief definitions:
  Card_input, Metering, Volume_Dumper, Volume_Reloader, Volume_Retriever

Directories under the Root - illustration and very brief descriptions:
  >system_control_1 contains site parameters (installation parameters) used in defining:
    system shifts
    prices for use of system resources
    CPU/memory configurations
  contains message_of_the_day, Person Name Table
  contains system logs:
    system control log
    perm_syserr_log
    iolog
  contains Master Group Table
    load units and Load Control Group
    work class and percentages
  contains System Administration Table
    registered project entries
  contains Project Definition Tables
    project users and attributes
  >udd>SysAdmin
    >admin is working dir for accounting administrators, contains backup files, bills and statistical reports
  >lib contains administrative tools
  >daemon_did_dir
    >cards >gcos >io_daemon_dir >volume_retriever

Customizing the Environment - Installation Parameters

Installation Parameters: Purpose, Definition, Special Considerations
  Site identification

  Login and Logout: login_time, inactive_time, warning_time, acct_update, tries

  Pricing: CPU time, connect time, memory usage, terminal I/O operations
  other resource usage
  Suggestions for figuring cost
Absentee Parameters: number and default values of queues

Device Tables
Shifts and Shift Table
AIM Information
Error Logs
ARPANet
Configuration Table
RCP Flags
Other Parameters

Project and User Registration

Project Registration - What it entails
PDT and SAT - brief discussions
"Delegation" to Project Administrator
Information required for accounting purposes

User Registration - What it entails
URF and PNT - brief discussions
Information required for accounting purposes

Special User Identities

System Usage Load Control

Master Group Table - Definition and purpose
Load Control Groups
Definition
Primary and secondary users
Preemption and grace
Considerations for setting up load control groups

Work Classes
Definition
How to tune

Absentee Usage
Interactive vs. absentee usage
Absentee usage quotas

Queues
Shifts
Shift change exec_com

Unattended Service

Security

Physical Security

Internal Access Controls
Passwords

Terminal Identification Codes

Nondiscretionary Access Controls
AIM

Discretionary Access Controls
ACLs, ACSs

Intraprocess Access Controls
Rings

Auditing and Logging

Accounting Cross-checks

Accounting

Setting Rates - recap
Interactive - CPU time, real time, memory units

Absentee - CPU time, memory units

I/O Device Usage

Disk Storage

Registration Fee

Resource Prices

I/O Daemon Rates - resource price per queue/request pair

Terminal Connect Rates

Miscellaneous Charges

Accounting Update
Definition and Timing
Disk Report
   Definition and Timing Considerations

Crank
   Definition and Timing Considerations

Billing
   Description and Timing, Storage Requirements, User Load
   Reports - brief descriptions
      MSUM
      Short Bill and Long Bill
      Daily Sumry
      Cutrpt
      Black and White
      Disk Usage

Resource Management

RCP - Definition

Resource Registration
   RTMF, RTDT

Resource Acquisition

Communications

Multics CS - Brief definition
   FNP for Channel Management
   User-ring and Supervisor for Terminal Management

Channel Types
   CDT, CMF - Descriptions, defaults, and considerations

Terminal Types
   TTT, TTF - Descriptions

Metering

Purposes:
   How users are using system
   What actions are occurring most often
   Pinpoints areas requiring tuning and where performance gains can be made

Some Helpful Metering Commands - brief discussion of kinds of info available
   Answering Service (as_who)
   Disk Usage/Config Deck (disk_usage_report, print_config_deck)
   RCP (meter_rcc)
   System Performance (system_performance_graph)

03/18/82
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CPU Usage (total_time_meters)
Multics CS (system_comm_meters)
Tuning Parameters (change_tuning_parameters)
Work Classes (work_class_meters)

Backup, Repair, and Maintenance

System Backup and Reload - Description

Dumps
System Failure
Answering Service

Logs

Audits

Repair and Maintenance
On- and Offline T&Ds

HEALS

Scheduling Maintenance

Reconfiguration
For repair/maintenance
System splitting

Appendix A, Glossary

Appendix B, Initializing a New Multics Site

Creating Standard Multics Environment
Running the Accounting Startup
Creating Directory Hierarchy

Setting up for Printers and Punch

Registering Base Projects

Creating PNT and URF

Creating MGT and CMF

Starting up the Answering Service
Answering Service Functions

System Startup

Other Administrative Exec_com Segments
Using the Dump-printing and Metering Daemons

Modifying the System Message Table

Generating Alternative FNP Core Image