Administrative Tasks

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NOTES

Contents

Preface

Getting Started 1

Start-up and Shutdown 2

Initial Configuration 3

Normal Operations 4

Archive Operations 5

Troubleshoot 6

Index

Preface

NOTES

Purpose of This Book

This book describes the management tasks used to operate VolServ.

Who Should Read This Book

This book is written for the system administrator who is operating and troubleshooting VolServ.

It assumes the administrator has a strong familiarity with:

- UNIX operating systems
- Applications running in their site environment

How This Book is Organized

This book contains the following chapters:

Chapter 1: Getting Started — Introduces the document and it's conventions. Also contains general software installation information.

Chapter 2: Start-up and Shutdown — A discussion of VolServ system operation pertaining to equipment and software start-up and shutdown.

Chapter 3: Initial configuration — A discussion of VolServ system operations pertaining to initial software and site-dependant parameter definition.

Chapter 4: Normal Operations — A discussion of normal VolServ system operations including environment management, archive management, drive management, media management, system queries, and database maintenance.

Chapter 5: Archive Operations — A discussion of the VolServ Archive Operator and applicable capabilities.

Chapter 6: Troubleshoot — Troubleshooting tips for VolServ software problems.

Conventions

The conventions used throughout the VolServ technical books are listed below:

Convention	Example

Screen text, file names, program names, and commands are in `Courier` font.	`Request to add a new volume:`
	`Volume group will be “20”`
	`Volume position will be “A123”.`

The root prompt is shown as a number symbol.	`# su root`
What you should type in is shown in `Courier` **bold** font.	**`vsarchiveqry`**
Site-specific variables are in a *Times italics* font.	**tar -xvf *tapedevicename***
A backward slash (\ ) denotes the input is continued onto the next line; the printed page is just not wide enough to accommodate the line.	# **remsh** ***nodename*** **-n dd if=/dev ** **/*tapedevicename*/bs=20b | tar xvfb ** **- 20** (You should type the entire command without the backward slash.)
Pressing <Return> after each command is assumed.	
A menu name with an arrow refers to a sequence of menus.	Config-->MediaType-->Redefine

Books

The books described below are part of the technical documentation set, and are shipped on CD along with the VolServ software:

Overview
Provides an overview of VolServ. Contains a glossary.

Installing VolServ
Describes server requirements, installation instructions, troubleshooting procedures, and configuration parameters.

Using the VolServ GUI
Describes how to perform system administrative tasks using the graphical user interface.

API Guide
Provides a list of API functions.

Administrative Tasks
Describes how to perform system administrative tasks using VolServ commands.

Command Reference
Contains a list of VolServ commands

Error Messages
Provides corrective action for system log errors.

Quick Reference Card
Summarizes commands.

Online Books

The documentation CD contains VolServ book files and Adobe® Acrobat® Reader. The Reader allows you to view and navigate the online documentation files yet preserves the page design and graphics from the printed books.

Related Publications

The publications described in the table below are created and distributed on an as-needed basis.

Related Publications	Description
"Release Notes"	For each version of VolServ, the "Release Notes" contain: • Summary of enhancements • Describes: - Fixed problems - Known problems - Installation and configuration issues • Lists: - Operating system patches - System requirements
"Product Alerts"	Informs customers of technical problems and solutions.
"Product Bulletins"	Conveys technical information—not problems—to customers.

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To make corrections or to comment on VolServ publications, please contact Software Technical Publications at our e-mail address: techdocs@adic.com.

Secured Web Site

To receive access to the secured site on our home page containing technical product information (Release Notes, Product Alerts, Product Bulletins, FAQs), visit http://partners.adic.com/ and follow the password request procedure. In return, ADIC will send you instructions and a password.

1

Getting Started

Roadmap

Topic	Refer To Chapter
General software access information	1
Hardware and software start-up	2
Site-specific configuration of archives and drives	3
Daily operations	4
Archive operation and configuration	5
Troubleshooting tips and solutions	6

Command Access

After VolServ is installed, the VolServ System Administrator (SA) configures the VolServ environment to control Command Line Interface (CLI), Application Program Interface (API), and Graphical User Interface (GUI) access to the VolServ system. The following sections provide a recommended plan for controlling access to specific VolServ software commands.

CLI and API Access Control

The commands available to any application via CLI or API are controlled by the `command.config` file, which is located in the directory `$VS_DIR/config`. There are entries in the `command.config` file for each command available over the CLI or API. The SA can control access to individual commands by editing the `command.config` file and commenting out the command not authorized. Individual commands can also be disallowed by using the GUI **Client Commands** window. Refer to the *Using the VolServ GUI* or the appropriate VolServ software manual.

A client application is a hardware/software package performing data management service for the user or as an intermediary to other client programs. Although the CLI may be used, client applications primarily interact with VolServ through the API. Each client application generates volume server requests through the API for selected VolServ software commands.

The commands available to a client application are shown in the following table.

Capability	Description
Media Operations	
Import Media	Inserts media into the system and update the VolServ database with the new media identifiers.
Export Media	Removes media from the system and any knowledge of the media identifier from the VolServ database.
Check-in Media	Logically checks media into the VolServ system that were checked out.
Check-out Media	Checks media out of an archive.
Clear Eject	Removes the specified media from the archive's Eject list.
Mount Media	Mounts a medium into a drive.
Multimount Media	Allows multiple mount requests for multiple drives.
Dismount Media	Dismounts a medium from a drive.
Modify Media	Allows the addition of media statistics, manufacturer, and batch information to be associated with a medium or media.
Move Media	Moves media from one archive to another.
Reclassify Media	Changes the media class group name of a medium or media.
Administration	
Audit	Performs an archive inventory verification.
Connect	Allows request status to be routed to a different location using the enterprise identifier for location.
Disconnect	Removes the location established by the connect command.
Vary Archive	Changes the state of the archive from On-Line, Off-Line, or Diagnostic.

Capability	Description
Vary Drive	Changes the state of the archive from On-Line, Off-Line, Diagnostic, or On-Line/Clear.
Cancel Request	Cancels requests based on request identifier.
Reprioritize Request	Changes the priority level of a request.
Lock Drive	Obtains exclusive use of one or more drives.
Unlock Drive	Releases exclusive use of one or more drives.
Configure	
Create Drive Pool	Associates a group of drive types having the same characteristics with a logical group name.
Modify Drive Pool	Changes the parameters associated with a drive pool.
Delete Drive Pool	Removes a drive pool from the system.
Create Media Class	Creates a Media Class in the VolServ system.
Modify Media Class	Modifies a Media Class' parameters.
Delete Media Class	Removes a Media Class from the VolServ system.
Create Archive Media Class	Associates a Media Class with an archive.
Modify Archive Media Class	Modifies the parameters associated with an archive Media Class.
Delete Archive Media Class	Removes an archive Media Class from the VolServ system.
Queries	
Query Archive	Report showing information about an archive.
Query Drive	Report showing information about a drive or drives.
Query Drive Pool	Report showing information about a specified drive pool or all drive pools known to the VolServ system.
Query Mount	Report showing information about drives that could be used in a subsequent mount of a specified medium.

Capability	Description
Query Media	Report showing the attributes of one or more specified media.
Query Intransit Media	Report showing information about media that are in the `Intransit` state.
Query Media Class	Report showing the attributes of a specified Media Class or all Media Class known to the VolServ system.
Query Media Type	Report showing the attributes of one or more media types.
Query Request	Report showing information about a specified request.
Query Connect	Report showing enterprise connection information.

The client application permissions can be changed at any time. To make the changes effective, VolServ must be cycled.

GUI Access Control

The commands available via the GUI are controlled by the `operator.config` file, which is located in the `$VS_DIR/config` directory. There are entries in the `operator.config` file for each command available through the GUI. The SA can control access to individual GUI commands by editing the `operator.config` file and commenting out the command not authorized. Individual commands can also be disallowed by using the GUI **Operator Commands** window. Refer to *Using the VolServ GUI* or the appropriate VolServ software manual.

Although the CLI can be used, the System Operator (SO) primarily uses the GUI to access VolServ software commands.

The SO may have the same privileges as the SA or a subset of the privileges as determined by the SA.

Separate access for the SA and SO is maintained through the use of group permissions. If the SO's user ID is defined in the `vsadmin` group, the SO will have GUI access to the commands defined by the SA in the `operator.config` file and the SO will have CLI access to the commands defined by the SA in the `command.config` file.

The following table shows the commands available to the SA and the recommended commands for a SO.

Capability	Description	SA	SO
Media Operations			
Import Media	Inserts media into the system and updates the VolServ database with the new media identifiers.	X	X
Export Media	Removes media from the system and any knowledge of the media identifier from the VolServ database.	X	
Check-in Media	Logically checks media into the VolServ system that were checked out.	X	X
Check-out Media	Checks media out of the VolServ system.	X	X
Manual Eject	Updates the VolServ database for problem or jammed media physically removed from the VolServ system.	X	X
Clear Eject	Removes the specified media from the archive's Eject list.	X	X
Mount Media	Mounts a medium or media into a drive.	X	X

Capability	Description	SA	SO
Dismount Media	Dismounts a medium from a drive.	X	X
Modify Media	Allows the addition of media statistics, manufacturer, and batch information to be associated with a medium or media.	X	X
Move Media	Moves media from one archive to another.	X	X
Reclassify Media	Changes the Media Class name of a medium or media.	X	X
Administration			
Change Archive Parameters	Performs an archive inventory verification.	X	X
Vary Archive	Changes the state of the archive from On-Line, Off-Line, or Diagnostic.	X	X
Vary Archive Component	Changes the state of an archive component from On-Line, Off-Line, or Diagnostic.	X	X
Vary Drive	Changes the state of the archive from On-Line, Off-Line, Diagnostic, or On-Line/Clear.	X	X
Cancel Request	Cancels requests based on request identifier.	X	X
Reprioritize Request	Changes the priority level of a request.	X	X
Unlock Drive	Releases exclusive use of one or more drives.	X	X
Reprint Media Label	Reprints media label for a specific medium or media.	X	X

Capability	Description	SA	SO
Configure			
Configure Archive	Adds an archive to the VolServ system.	X	
Create Drive	Adds a drive to the VolServ system.	X	
Associate Drive	Associates a drive with an archive.	X	
Disassociate Drive	Disassociates a drive from an archive.	X	
Delete Drive	Removes drive from the VolServ system.	X	
Create Drive Pool	Associates a group of drives types having the same characteristics with a logical group name.	X	
Modify Drive Pool	Changes the parameters associated with a drive pool.	X	
Delete Drive Pool	Removes a drive pool from the system.	X	
Create Media Class	Creates a Media Class in the VolServ system.	X	
Modify Media Class	Modifies a Media Class' parameters.	X	
Delete Media Class	Removes a Media Class from the VolServ system.	X	
Create Archive Media Class	Associates a Media Class with an archive.	X	
Modify Archive Media Class	Modifies the parameters associated with an archive Media Class.	X	

Capability	Description	SA	SO
Delete Archive Media Class	Removes an archive Media Class from the VolServ system.	X	
Define Media Type	Defines a media type to be used within the VolServ system.	X	X
Define Label Pattern	Adds a label pattern to the VolServ system.	X	X
Queries			
Query Archive	Report showing information about an archive.	X	X
Query Drive	Report showing information about a drive or drives.	X	X
Query Drive Pool	Report showing information about a specified drive pool or all drive pools known to the VolServ system.	X	X
Query Mount	Report showing information about drives that could be used in a subsequent mount of a specified medium.	X	X
Query Media Location	Report showing where a specific medium or media are located in the VolServ system.	X	X
Query Media	Report showing the attributes of one or more specified media.	X	X
Query Intransit Media	Report showing information about media that are in the `Intransit` state.	X	X
Query Media Class	Report showing the attributes of a specified Media Class or all Media Classes known to the VolServ system.	X	X

Capability	Description	SA	SO
Query Media Type	Report showing the attributes of one or more media types.	X	X
Query Request	Report showing information about a specified request.	X	X
Query Connect	Report showing enterprise connection information.	X	X

Environment Management

VolServ uses global variables that help define the system environment. These variables are located in the `*.config` files located in the `$VS_DIR/config` directory. The `VS_DIR` environment variable contains VolServ home directory and is defined during installation. These files include:

- command.config
- operator.config
- console.config
- console_locations.config
- envvar.config
- label_printers.config
- printers.config
- process.config
- servers.config

The environment variables contained in the `*.config` files are edited by the SA to customize the software for a particular site using a text editor. Default values containing embedded spaces must be enclosed within double quotes. For example,

This value has embedded spaces: **“4 2 6”**

This value does not: **421**

VolServ must be cycled when `*.config` files are modified. Upon restart, a service utility is called by various processes/routines to establish the environment variable values within the VolServ environment.

To cycle VolServ, use `volserv -t`; for information, see "Gracefully Terminate VolServ" on page 2-9. Also use the **volserv** command; for information, see "Start Up VolServ" on page 2-3.

Control Access

These two files are used to control access to CLI, API, and GUI commands. For information about these files, see "CLI and API Access Control" on page 1-3 and see "GUI Access Control" on page 1-6.

console.config File

Messages are generated by VolServ to notify the user or SA of VolServ software's actions. Messages are displayed in response to a command or when certain events occur.

Note

This file does not affect the `envvar.config` file variable `SYSLOG_DISK_LEVEL`

The `console.config` file, located in the `$VS_DIR/config` directory, allows various system log messages to be saved to a particular file. The log messages that are saved are based on priority levels (i.e., trace, debug, error, etc.) set in the `console.config` file. By default, all log files are located in the `$VS_DIR/logs` directory. If the log file specified in the `console.config` file does not exist, it is automatically created.

The priority levels and formats used for system log messages are described in the VolServ *Error Messages* book.

console_locations.config File

The `console_locations.config` file located in the `$VS_DIR/config` directory is a reference file for console names; e.g., `Workstation:0` used in the VolServ system.

Workstation entries in this file are accessible when using the **Change Archive Parameters** command. Refer to the appropriate VolServ software manual. Clicking the right mouse button when using the **Change Archive Parameters** command displays the console names contained in this file, allowing one to be selected and automatically entered as the location for the archive **Console**.

Any console not in this file can still be accessed, but it does not appear when the right mouse button is clicked.

envvar.config File

The `envvar.config` file contains variables that control general VolServ activities. Refer to text contained in the `envvar.config` file for more detailed information. The variables in this file are grouped into the following categories:

Variable	Description
Software Protection	Established at the time of system installation.
System Logging	Modified as required for site logging levels.
Configuration Environment	Modified as required for deleting an archive.
Library Defaults	Default for query processing.
Archive Dispatcher	Modified as required for archive communications.
GUI Environment	Established at the time of system installation.
Process Server Default	Modified as required for software communications.
VolServ Defaults	Modified as required for software activation and termination.

CiReply Environment	Established at the time of system installation.
Archive Defaults	Modified as required for each archive (robotic and manual).
Configuration Logging	Modified as required for debugging of interfaces.
Installation	Established at the time of system installation.
VolServ Database	Established at the time of system installation.

Software Protection

The software protection variables contained in the following tables allow VolServ and associated archives to operate. These variables should not be modified unless directed by ADIC Technical Assistance Center (ATAC) personnel. VolServ must be cycled for the changes to become effective.

Variable Name	Default	Description
VOLSERV_LICENSE_STRING	Unique text string	Allows VolServ software to run.
<ARCTYPE>_LICENSE_STRING	Unique text string	Allows VolServ software to run with a specific archive type.

System Logging

The following table illustrates the variables that can be modified, as required, to choose logging levels for each site. VolServ must be cycled for the changes to become effective.

Variable Name	Default	Description
NUM_LOG_DAYS	3	The maximum number of days of log files that are saved by the `movelog.sh` script.
LOG_BACKUP_TIME	6	The number of hours between log backup attempts.
VS_LOG_SIZE	5120	The size, in kilobytes, above which the VolServ log files are saved and truncated by the `movelog.sh` script.
SYSLOG_DISK_LEVEL	7	Two purposes: All messages between this level and zero are automatically routed to the file `vslogfile`. All messages that are not routed elsewhere are sent to this file. Used to catch messages that are generated before routing has been established. This is the first filter of messages, it overrides the settings in `console.config`. No messages with a greater level value are able to be routed elsewhere. Used as an upper limit to reduce message traffic.
Upper limit for the level of syslog messages that are generated for each software function.		
LIB_SYSLOG_LEVEL	6	Library Scheduler
LIBMAN_SYSLOG_LEVEL	6	Library Manager
ARCDISP_SYSLOG_LEVEL	6	Archive Display
ARCMAN_SYSLOG_LEVEL	6	Archive Manager.
VSWIN_SYSLOG_LEVEL	6	VolServ Administration GUI
CONSOLE_SYSLOG_LEVEL	6	Archive Console
CIREPLY_SYSLOG_LEVEL	6	Client Interface Reply (CiReply)
CIREQUEST_SYSLOG_LEVEL	6	Client Interface Request (CiRequest)

Variable Name	Default	Description
PROCSERV_SYSLOG_LEVEL	6	Process Server
MONITOR_SYSLOG_LEVEL	6	Monitor
ARCMAN_CAPACITY_DELTA	10	The difference between this value and the full capacity of an archive is used as an alarm zone that notifies the operator that the archive is close to becoming full. (This parameter is based on type, not class). A syslog message is generated to indicate the absolute capacity of an archive is imminent. The message is a level critical message and is generated each time the fill level for the archive is incremented until the fill level is decreased.
QUERYCOMP_SYSLOG_LEVEL	6	QueryComp utility

Configuration Environment

The following table illustrates the variables that can be modified, as required, to delete archives. VolServ must be cycled for the changes to become effective..

Variable Name	Default	Description
DELETE_ARCHIVE_WITH_ MEDIA	N	This value is used when deleting an archive. The correct values are: **N** - Do not delete the archive if media are in it. **Y** - Delete the archive even if media is in it.

Variable Name	Default	Description
DELETE_ARCHIVE_MEDIA_ACTIONSTATE	INTRANSIT	This value is used when deleting an archive and when DELETE_ARCHIVE_WITH_MEDIA is **Y**. The correct values are: INTRANSIT - Place any media in the archive to be deleted into the intransit state. EXPORT - Export any media that remain in the archive to be deleted. If DELETE_ARCHIVE_WITH_MEDIA is **N**, then this environment variable is not used.

Library Defaults

The query process variables shown below can be modified, as required. These variables should not be modified unless directed by ATAC personnel. VolServ must be cycled for the changes to become effective.

Library Scheduler Variable Name	Default	Description
LIB_MAX_TASKS	5	The maximum number of query requests that may be spawned consecutively. Others are queued until this parameter value falls below this number. Adjust this parameter based on the number of queries normally used at one time.
LIB_ALARM_TIME	60	Number of seconds between each internal alarm. The alarm is for internal housekeeping. It checks for inactive processes. Each inactive process that is encountered is terminated.
LIB_INTERFACE_TIME	60	Number of seconds this process waits to receive expected status over IPC. Increase if IPC traffic is extremely heavy.

Library Scheduler Variable Name	Default	Description
LIB_IPC_WAIT_TIME	5	Number of seconds this process pauses between attempts to send information over IPC. Increase this parameter if IPC traffic is extremely heavy.
LIB_IPC_RETRIES	30	Maximum number of times this process attempts to send information over IPC. Increase if IPC traffic is extremely heavy.
Library Manager Variables		
LIBMAN_INTERFACE_TIME	60	Number of seconds this process waits to receive expected status over IPC. Increase if IPC traffic is extremely heavy.
LIBMAN_IPC_WAIT_TIME	5	Number of seconds this process pauses between attempts to send information over IPC. Increase this parameter if IPC traffic is extremely heavy.
LIBMAN_IPC_RETRIES	30	Maximum number of times this process attempts to send information over IPC. Increase if IPC traffic is extremely heavy.

Archive Dispatcher

The following table lists the variables that can be modified, as required, to modify archive communication times. VolServ must be cycled for the changes to become effective.

Variable Name	Default	Description
ARCDISP_IPC_RETRIES	10	The number of retries that the archive dispatcher tries to connect to the VolServ process before failing.

Variable Name	Default	Description
ARCDISP_IPC_WAIT_ TIME	1	The amount of time in seconds between each retry that the archive dispatcher waits before trying to connect to the VolServ process. Increase this value if syslog message V360 with an error of 9 is received.

GUI Environment

The GUI environment variables in the following table can be modified, as required, to define specific GUI parameters. These variables should not be modified unless directed by ATAC personnel. VolServ must be cycled for the changes to become effective.

Variable Name	Default	Description
VS_DEF_PRIORITY	15	The request priority for operations that do not have a variable priority scale for setting the priority.
VS_MAX_LIST_LENGTH	1000	The maximum number of items that can populate the media list for a media filter. If more than this number are selected, the filter search fails and asks for a more narrow description of the media IDs required.
VS_MAX_TEXT_LENGTH	20000	The maximum number of characters allowed to fill a status window. Once reached, the status messages are removed in FIFO order. If this number is too large, system performance is degraded.
VSWIN_IPC_RETRIES	3	The number of times `vsadm` attempts to connect over IPC.
VSWIN_IPC_RETRY_TIME	180	Number of seconds `vsadm` attempts to reconnect to processes over IPC after a connection to those processes is lost.

Variable Name	Default	Description
XAPPLRESDIR	default path (identified by $VS_DIR/defaults)	The path to the defaults for all of the GUI windows is defined by this variable. If this variable is not set, the defaults must be put in the /usr/lib/X11/app-defaults directory.
VSRPT_PAGE_LENGTH	0	The page length for the query report in vsadm. If set to 0, no page breaks and subsequent page headers are inserted. Typical page length is 66.

Process Server Defaults

The following table shows the variables that can be modified, as required, to change the software communications. VolServ must be cycled for the changes to become effective.

Variable Name	Default	Description
PROCSERV_TIMEOUT_VALUE	4	Number of seconds this process pauses between attempts to communicate with the processes initiated by bringing up or terminating VolServ. Increase if the processing speed of the system is extremely slow.

VolServ Defaults

The following table shows the variables that can be modified, as required, to change the time associated with activating and terminating VolServ. VolServ must be cycled for the changes to become effective.

Variable Name	Default	Description
VOLSERV_START_TIMEOUT	600	Timeout, in seconds, to wait for VolServ to start.
VOLSERV_QUIT_TIMEOUT	300	Timeout, in seconds, to wait for VolServ to terminate immediately.

Variable Name	Default	Description
VOLSERV_TERM_TIMEOUT	600	Timeout, in seconds, to wait for VolServ to terminate gracefully.

CiReply Environment

The following table shows the variables that can be modified, as required, to change the time associated client, status, and RPC commands. These variables should not be modified unless directed by ATAC personnel. VolServ must be cycled for the changes to become effective.

Variable Name	Default	Description
CIREPLY_RETRY_INTERVAL	120	Wait interval in seconds for trying to re-send status.
CIREPLY_MAX_RETRY	1	The number of times to retry before giving up on a client. An infinite number of retries can be commanded by setting this value to -1.
CIREPLY_RPC_TIMEOUT	5	The RPC timeout value.
CIREPLY_RPC_RETRY	1	The number of RPC retries allowed.
CIREPLY_COMMANDS_TO_ RETRY	4	The maximum number of commands to attempt within one try interval.
ENTERPRISE_ROUND_ SCHEDULING	Y	The type of scheduling for sending status/callbacks to enterprises. Answer **Y** or **N**. For round robin scheduling, answer **Y**. For first received first scheduled, answer **N**.

Archive Defaults

This table shows the variables associated with each type of archive supported by VolServ. Only those variables associated with the site's archive configuration should be modified. VolServ must be cycled for the changes to become effective.

Variable Name	Default	Description
AMTask Environment Variables		
ARCHIVE_CMD_WAIT_TIME	600	Maximum wait time in seconds to wait for queued primitives.
CLM_DISMOUNT_RETRIES	3	The maximum wait time in seconds for queued primitives.
CLM_DISMOUNT_RETRIES	3	The number of times a dismount is retried to allow the CLM to finish moving the medium from the recorder to the CLM bin. VolServ waits for the amount of time specified in CLM_DISMOUNT_WAIT_TIME before retrying. This is only valid for a DataTower archive.
CLM_DISMOUNT_WAIT_TIME	1	The number of seconds to wait on a dismount move retry to allow the CLM to finish moving the medium from the recorder to the CLM bin before retrying the dismount move. Recommended time is 0 seconds. This is valid for a Tower system.
TowerAMTask Environment Variables		
CAS_MEDIA_PAD_SIZE	0	Tower media ID pad. Used if VolServ is interfaced with a Cray tpdaemon and using media identifiers longer than 6 characters. The default value is based on the total number of characters in the medium identifier - 6. (e.g mediaID = LOT0008, 7 characters -6 = 1)
CRITICAL_PROCESSING	1	Determines whether or not to continue processing when tower hardware errors are received. 0-DO NOT 1-DO
TOWER_MAX_WAIT_TIME	15	Maximum wait time in seconds for nonqueued primitives.

Variable Name	Default	Description
SiloAMTask Environment Variables		
SILO_MAX_WAIT_TIME	10	Maximum time in seconds for non queued primitives.
DRIVE_MAX_ERROR_COUNT	1	Number of errors encountered by a drive before a message is logged.
AMLAMTask Environment Variables		
AML_MAX_WAIT_TIME	30	Maximum wait time in seconds to wait for nonqueued primitives.
AML_MOUNT_RETRIES	1	The number of retries that the archive tries to connect to the VolServ process before failing. Retries are only performed if the following are used: mount by drive pool, Media Class, media list, or multiple media.

Configuration Logging

The following table shows the variables that can be modified as required for debugging software interfaces. To enable these variables, remove the comment line indicators from the applicable variable. VolServ must be recycled for the changes to become effective.

Variable Name	Default	Description
CONFIG_SYSLOG_LEVEL	6	All messages between this level and zero are written to CONFIG_SYSLOG_FILE.
CONFIG_SYSLOG_FILE	MACRO/VS_DIR/logs/vsconfiglog	Syslog file of messages pertaining to mounts, dismounts, and varies.

Installation

This table shows the system variables that are to be established at the time of the system installation. Use the VolServ installation script for this purpose.

Tip

As a general rule, do not modify these variables unless the system is completely reinitialized and reinstalled.

Variable Name	Default	Description
VS_ADMIN	vsadm	VolServ administrator identifiers
VS_GROUP	vsadmin	Primary group files. Any user associated with this group will be able to perform operator functions.

VolServ Database

The following table shows the VolServ database variables that are to be established at the time of the system installation. Use the VolServ installation script for this purpose. As a general rule, do not modify these variables unless the system is completely reinitialized and reinstalled.

Variable Name	Default	Description
DatabaseName	voldb	The VolServ database name.
RetryLimit	3	Number of database retries.

TCP/IP Interface

This table shows the variables that control some aspects of the TCP/IP interface to VolServ. As a general rule, do not modify these variables.

Variable Name	Default	Description
TCPIP_CONNECT_WAIT_TIME	1	Number of times to try to connect to a socket over TCP/IP.
TCPIP_CONNECT_RETRIES	5	Amount of time in seconds to wait between retries to connect to a socket over TCP/IP.

printers.config Files

The label_printers.config file located in the `$VS_DIR/config` directory is used as a reference file for the label printers in the VolServ system. The printer name and type of printer are entered in this file; e.g., ps1 postscript.The label printers must be contained in this file to be accessed by VolServ.

The `printers.config` file located in the `$VS_DIR/config` directory is used as a reference file for all the printers used in the VolServ system; e.g., lp1, bc1, ps1, etc.

Maintaining this file ensures all printer names are accessible to the **Printer** pop-up window. Refer to the appropriate VolServ Software Manual. By placing the cursor in the **Printer Name** entry box and clicking the right mouse button, a pull-down menu containing all printer names will be displayed allowing one to be selected and automatically entered.

Any printer not entered in the `printers.config` file can still be accessed, but its name is not shown in the **Printer** pop-up window.

Other .config Files

Caution

Do not modify these files unless directed by ATAC personnel.

The `process.config` and `servers.config` files located in the `$VS_DIR/config` directory defines the resident VolServ processes and the arguments the processes use. These processes are necessary for VolServ operations.

NOTES

2

Start-up and Shutdown

Roadmap

Topic	Refer To Chapter
General software installation information	1
Hardware and software start-up	2
Site-specific configuration of archives/drive.	3
Daily operations	4
Archive operation and configuration	5
Troubleshooting tips and solutions	6

Start-Up Equipment

This chapter contains information to power-up the hardware components of a VolServ system and information and procedures to start-up and shutdown VolServ.

Perform start-up of all equipment in accordance with the appropriate host computer, archive, and tape drive manufacturer manuals.

There is no required sequence of power application for the hardware components of the VolServ system with one exception; power must be applied to the ER90 transport units before power is applied to the ER90 electronic units.

Start-Up VolServ

Archive configuration can be performed from the **Volume Server System Console** without VolServ running. Note, however, that VolServ software initialization terminates if an archive is being reconfigured when VolServ software initialization is begun.

The user initializing VolServ must have *root* or **vsadm** privileges.

Step 1. Login as **vsadm**, either remotely or locally, on the VolServ host computer.

> **Note**
>
> Remote login requires that the environment where the command is executed be properly set up as described in the *Installing VolServ* book for the appropriate host platform.

Step 2. Type **volserv** or **volserv -s** at the command line.

```
hostname% volserv
```

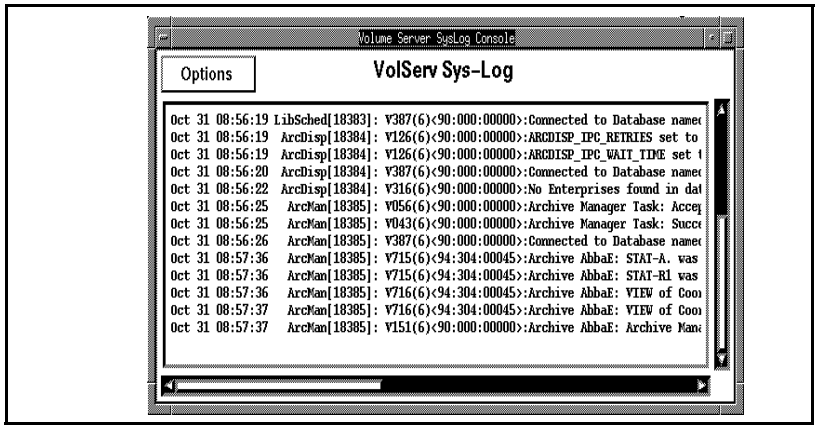
The **volserv** command starts VolServ in the multiuser mode. Client interface commands are accepted after initialization completes. Commands received prior to initialization completion are failed and the error, `ERR_SOFTWARE_NOT_READY`, is returned.

```
hostname% volserv -s
```

The **volserv -s** command starts VolServ in the single-user mode. Only commands from the vswin module are accepted. Client interface commands are refused and the error, `ERR_NOT_ACCEPTING_COMMANDS`, is returned.

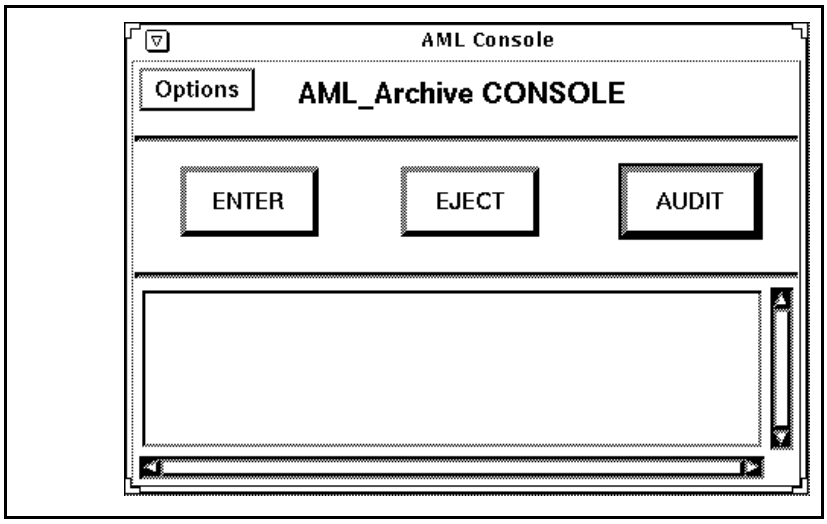
Successful VolServ software start-up is indicated by the display of the **Volume Server SysLog Console**.

The **Volume Server SysLog Console** displays on the location specified in the `console.config` file. The `console.config` file also specifies which logging levels are displayed on the **Volume Server Syslog Console.**



After an archive is configured, its archive **Console** displays at the location specified during the configuration process. If no archives are configured, no archive **Console** is displayed. Each VolServ Archive Operator position is indicated by the presence of this display.

The figure shown below is an example of an AML archive **Console**.



Start the System Console

This procedure is performed to allow the **Volume Server System** console window to display.

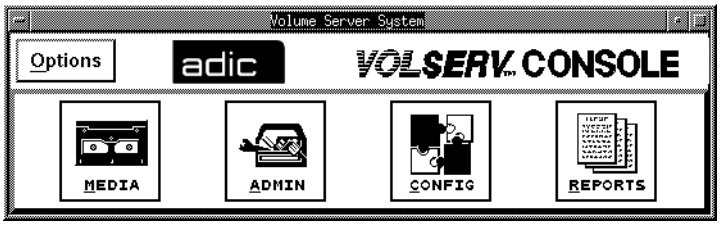
Step 1. Type **vswin &** and press <RETURN> to display the **Volume Server System** console:

```
hostname% vswin &
```

Or, use the **-d** option of the **vswin** command to display the **Volume Server System** console on a workstation other than that identified by the DISPLAY environment variable:

```
hostname% vswin -d consolename:0 &
```

After a moment, the **Volume Server System** console appears as shown in the following screen display:



Recovery Processing

Recovery processing is performed automatically during initialization. Recovery processing is initiated for any commands that were not complete when VolServ last terminated. Incomplete commands are not automatically reissued. These commands are failed and an error message (`ERR_COMMAND_IN_UNKNOWN_STATE`) is sent to the originating client process.

Backup VolServ

VolServ is backed up using standard UNIX backup procedures.

Shutdown Software

This section provides the proper sequence of procedures to perform when all or part of the software and equipment is to be shutdown.

Shutdown System Console

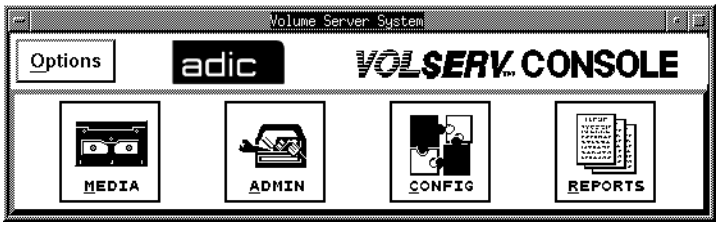
Note

To bring down all **Volume Server System** consoles, this procedure must be run for each console.

A **Volume Server System** console need not be brought down before shutting down VolServ. However, unless VolServ is active, the only operation available via the **Volume Server System** console is archive configuration.

This procedure must be performed from the workstation where the **Volume Server System** console is displayed.

Step 1. Select **Exit** from the **Options** pull-down menu in the upper left corner of the **Volume Server System** console window.



Step 2. A **Question** box appears that contains the question "`OK to exit vswin?`"..

Step 3. Click the **OK** button in the **Question** box. The **Question** box and the **Volume Server System** console windows close.

Shutdown VolServ

Two ways exist to bring down VolServ: gracefully and immediately.

A graceful shutdown terminates VolServ after all command processing ceases. Executing commands that are in a state that allows them to be cancelled are aborted. Executing commands that cannot be cancelled are allowed to process to completion. Client requests received after termination processing begins and all pending requests are failed.

An immediate shutdown results in the immediate termination of VolServ, without waiting for any command processing to complete and without cancelling any commands. Any commands executing at the time of termination must be cleaned up when VolServ software is restarted. VolServ software automatically performs recovery processing during the start-up processing as discussed in "Recovery Processing" on Page 2-6.

Note

Do not attempt to bring down VolServ while an archive is being configured or reconfigured.

Make sure that an archive is not being reconfigured before an attempt is made to bring down VolServ. VolServ aborts a termination request if an archive is being reconfigured.

The **Volume Server System** console is not brought down by this procedure. The console display can remain in place throughout a VolServ software termination and restart. When VolServ is terminated, the only operation available via the **Volume Server System** console is the configure/reconfigure archive operation.

Gracefully Terminate VolServ

Step 1. Login as `vsadm` or as `root`.

Step 2. Send a warning message to all users to inform them of an impending VolServ software shutdown.

It is recommended that the message specify the time when VolServ will be shutdown.

Step 3. Issue `volserv -t` from the command line at or later than the time specified in the earlier warning message.

Note

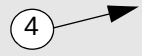
New client interface commands are not accepted after the termination sequence starts.

```
% volserv -t
```

Step 4. Enter **y** to continue with shutdown.

```
VolServ Version 5.0 for #### (#.#) --
Copyright (c) 1992 - 2001 - ADIC, Inc.
Initiating VolServ shutdown
Are you sure you wish to continue? (y/<n>) y
Setup environment variables ok

Shutting down VolServ system processes..Done
System processes shut down ok
Shutting down VolServ servers..........Done
Servers shut down ok
Shutting down VolServ process server.... Done
Process server shut down ok
VolServ shut down completed
```



The **Volume Server SysLog Console** and each archive **Console** disappear from the terminals on which they are displayed.

Step 5. Logout as `vsadm`.

NOTES

NOTES

3

Initial Configuration

Roadmap

Topic	Refer To Chapter
General software installation information	1
Hardware and software start-up	2
Site-specific configuration of archives and drives	3
Daily operations	4
Archive operation and configuration	5
Troubleshooting tips and solutions	6

Configure an Archive

A VolServ system includes VolServ, archives, drives, and media. After VolServ is installed, the site-specific configuration of archives, drives, and media must be input into VolServ before normal VolServ operations can begin.

The following list identifies the actions to perform that configure a VolServ system.

- Configure the archives to be supported.
- Define the necessary Media Classes.
- Associate the defined Media Classes with the appropriate configured archives.
- Define the drives to be used in the configured archives.
- Associate the drives with the appropriate archives.
- Define label patterns.
- Print media labels, if appropriate.
- Add media to the configured archives.

Note

VolServ does not have to be running to configure an archive.

Before VolServ software can manage archive operations, the software must have access to specific parameters pertaining to each managed archive. This is performed via the **Configure Archive** command.

Managed archives are either automated or manual. An automated archive uses a mechanical robot to perform media movement operations. A manual archive requires human intervention to perform media movement operations.

Automated archives supported by VolServ include the DataTower archive; the StorageTek ACS archive; the AML/2, AML/E, and AML/J archive; and the ADIC Scalar 100, Scalar 1000, and Scalar 10K archives.

The manual archives supported by VolServ include the DataShelf archive and the Stage archive.

Some of the configuration parameters required by VolServ are archive-type dependent and are identified in the appropriate section of the *Using the VolServ GUI* manual. The archive parameters common to multiple archive types are discussed in this chapter.

Except for the AML/E archive, configuration parameters can only be input to VolServ via the Graphical User Interface (GUI). An interactive script is executed to perform AML/E archive configuration.

Configure an Automated Archive

Basic automated archive parameters include the archive type, an archive name, the display host for the archive **Console**, the archive mode, and the media type supported.

Archive Type

The archive type parameter identifies the type of archive being configured and enables VolServ to execute appropriate archive-type specific logic. The valid archive types are displayed on the **Configure Archive** window. The user selects the appropriate type for the archive being configured.

Archive Name

The archive name parameter is a user-specified name by which the archive is known to the user. Valid archive names may contain up to 16 characters, including spaces. Leading and trailing spaces are not permitted.

Archive Console Display Host

This parameter determines where the archive **Console** displays. After an archive is configured and registered with VolServ, the archive **Console** displays at the specified location, refer to the Start-up and Shutdown chapter for an example of an archive **Console**. This archive **Console** example is for an AML/E archive. All archive **Console** displays are similar.

The archive **Console** alerts the VolServ Archive Operator (AO) when human intervention is required for media movement operations. For example, the *Check-out Media*, *Export Media*, and *Move Media* operations require that a medium or media be ejected (physically removed) from an archive. The *Move Media* operation further requires that the ejected medium or media be entered into another archive. Also, the *Mount Media* operation can require that a medium be ejected from one archive and entered into another archive for mounting on a specific drive.

Archive Mode

The archive mode parameter indicates whether a human is available to perform media eject and enter operations for the archive. There are two archive mode settings: attended and unattended.

Attended

The archive mode attended option indicates that a human is available to perform media eject and enter operations prompted by the archive **Console**.

Unattended

If the archive mode unattended option is selected, VolServ software fails commands that require human intervention to move media out of or into an archive. These commands are the *Check-out Media*, *Export Media*, *Move Media*, and (sometimes) *Mount Media* associated commands.

The *Move Media* and *Mount Media* associated commands provide an override parameter that allows the user to prevent the failing of the command when the Archive Mode unattended option is selected. When this override parameter is specified, media movement requiring human intervention is queued until a human completes the media movement request.

Media Type

VolServ supports both system-defined (default) and user-defined media types. The system-defined media types, and the archives supported by the system-defined media types, are discussed in the *VolServ Overview* book. User-defined media types are not supported in automated archives.

After the supported media type is specified, capacity is automatically calculated. Media type specific information is entered next. This information includes action mode, low mark, high mark, auto check-in, and auto import.

Capacity

The capacity of an automated archive is automatically calculated for each supported media type by VolServ.

Action Mode

The action mode parameter specifies what action, if any, VolServ initiates when the number of media of the specified media type reaches the calculated high mark threshold or drops to the calculated low mark threshold. There are three action mode settings: none, notify, and migrate.

None

When the action mode none option is specified, VolServ initiates no automatic action when the number of media of the specified media type reaches the calculated high mark threshold. However, when the number of media of the specified media type reaches the archive capacity minus the `ARCMAN_CAPACITY_DELTA` (default is 10) value, VolServ software generates notification to the **Volume Server SysLog Console**.

Notify

When the action mode notify option is specified, VolServ generates notification to both the **Volume Server SysLog Console** and archive **Console** when the number of media of the specified media type reaches the calculated high mark threshold or drops to the calculated low mark threshold.

It is the responsibility of the VolServ System Administrator (SA) or VolServ System Operator (SO) to take whatever action is appropriate in response to the notification.

If the number of media has reached the calculated media-type high threshold, the SA or SO selects media for removal from the archive.

If the number of media has dropped to the calculated media-type low threshold, the SA, SO, or AO may import additional media into the archive.

Migrate

When the action mode migrate option is specified, VolServ automatically initiates migration of media out of the archive when the number of media of the specified media type reaches the calculated high mark threshold.

VolServ continues to mark media for migration until the number of unmarked media reaches the calculated low mark threshold for the specified media type.

The selection of media for migration is dependent on both Media Classes and media types. Refer to VolServ: Introduction, 60023A for additional information on media class migration. Also refer to Media Type Migration on page 3-29.

Media type migration occurs only if the Media Class to which the media selected for migration belong is associated with both the source and destination archives. Archive media class association is covered in see "Create an Archive Media Class" on page 3-24.

Low Mark

The low mark parameter is a user-specified percentage. VolServ software applies the low mark percentage to the archive media-type capacity to calculate a media-type specific low mark threshold.

Any integer value between 0 and 100, inclusive, can be specified as the low mark percentage. The specified low mark percentage cannot be greater than the specified high mark percentage.

When the notify action mode option is specified, VolServ software generates a message to both the **Volume Server SysLog Console** and archive **Console** when the number of media of the specified media type drops to the calculated low mark threshold.

When the migrate action mode option is specified, VolServ software marks media for migration out of the archive until the number of unmarked media drops to the calculated low mark threshold.

High Mark

The high mark parameter is a user-specified percentage. VolServ software applies the high mark percentage to the archive media-type capacity to calculate a media-type specific high mark threshold.

Any integer value between 0 and 100, inclusive, can be specified as the high mark percentage. The specified high mark percentage cannot be less than the specified low mark percentage.

When the notify action mode option is specified, VolServ software generates a message to both the **Volume Server SysLog Console** and archive **Console** when the number of media of the specified media type reaches the calculated high mark threshold.

When the migrate action mode option is specified, VolServ software automatically begins marking media for migration out of the archive when the number of media of the specified media type reaches the calculated low mark threshold.

Auto Check-in

The VolServ system provides the capability to check media out of the system. This functionality is similar to checking a book out of a public library. Although checked-out media are physically located outside the control of the VolServ system, VolServ maintains information on these media and identifies them as checked-out.

If the VolServ system detects the physical presence of a medium that is identified as checked-out, VolServ either initiates the physical ejection of the medium from the VolServ system or automatically checks the medium into the VolServ system.

There are three operations that can detect the physical presence of checked-out media: audit, unsolicited media enter, and enter.

Auto Check-in During Audit

An archive audit is executed to synchronize the information in the VolServ database with the actual media contents of a specified archive.

When an archive audit is performed, the archive control software reports the media contents of the archive to VolServ.

When the archive audit detects the physical presence of media that are shown as checked-out by VolServ, the setting of the auto check-in parameter determines the action taken by VolServ.

- If the auto check-in option is enabled, VolServ automatically checks the located media into the VolServ system. These media remain in the Media Class to which they were associated when checked-out.
- If the auto check-in option is not enabled, VolServ initiates the ejection of the media from the VolServ system by placing the media on the archive eject list. In the DataTower, the media thus found are also moved to the eject port.

Auto Check-in During Unsolicited Media Enter

DataTower Archive Only

The DataTower archive supports the unsolicited media enter operation. An unsolicited media enter operation is performed without VolServ system GUI interaction.

During an unsolicited media enter operation, media are placed in the DataTower load port, followed by pushing a button above the load port. The archive robot reads the media labels and sends the media identifiers to VolServ. If any of the media in the load port are shown as checked-out by VolServ, the setting of the auto check-in parameter determines the action taken by VolServ.

- If the auto check-in option is enabled, checked-out media are automatically checked in to the VolServ system. The automatically checked-in media remain in the Media Class to which they were associated when they were checked-out.
- If the auto check-in option is not enabled, VolServ leaves the checked-out media in the load port.

Auto Check-in During Enter

All archives support the enter operation. An enter operation is performed via interaction of the AO with the appropriate archive **Console**. For more information about the enter operation, refer to see "Enter Media" on page 5-4.

When the AO performs an enter operation on automated archives, the archive robot reads the media labels and sends the media identifiers to VolServ. If any of the media in the load port are shown as checked-out by VolServ, the setting of the auto check-in parameter determines the action taken by VolServ.

- If the auto check-in option is enabled, checked-out media are automatically checked in to the VolServ system. The automatically checked-in media remain in the Media Class to which they were associated when they were checked-out.
- If the auto check-in option is not enabled, VolServ performs actions that depend on the archive type. VolServ software:
  - leaves the check-out media in the load port without placing them on the eject list (DataTower archive)
  - moves the media into the archive and places them on the eject list (AML/E, AML/2, AML/J, or StorageTek ACS Product Family archives)

Auto Import

During either an archive audit, unsolicited media enter, or enter operation, the VolServ system may detect the physical presence of media that are unknown to the VolServ system.

The auto import parameter specifies what action VolServ initiates when an unknown medium is detected within a controlled archive.

When the auto import option is enabled, the target Media Class, manufacturer name, and batch identifier to be assigned to the automatically imported media must be specified.

Auto Import During Audit

An archive audit is executed to synchronize the information in the VolServ database with the actual media contents of a specified archive.

When an archive audit is performed, the archive control software reports the media contents of the archive to VolServ.

When the archive audit detects the physical presence of media that are unknown by VolServ or are in the intransit state, the setting of the auto import parameter determines the action taken by VolServ. Refer to the Glossary for a definition of intransit state.

- If the auto import option is enabled, VolServ automatically imports unknown media into the VolServ system. The automatically imported media are assigned the auto import target Media Class, manufacturer name, and batch identifier specified during archive configuration or reconfiguration.

- If the auto import option is enabled, VolServ automatically enters intransit media (refer to the glossary).

> **Note**
>
> Unknown media located in the DataTower archive during an audit operation are moved to the eject port.

- If the auto import option is not enabled, VolServ initiates the ejection of the unknown media from the VolServ system by placing the media on the archive eject list. In the DataTower, the media thus found are also moved to the eject port.

Auto Import During Unsolicited Media Enter

The DataTower archive supports the unsolicited enter of media into DataTower archive. An unsolicited media enter operation is performed without VolServ system GUI interaction.

During an unsolicited media enter operation, media are placed in the DataTower load port, followed by pushing a button above the load port. The archive robot reads the media labels and sends the media identifiers to VolServ. If any of the media in the entry port are unknown to VolServ or are in the intransit state, the setting of the auto import parameter determines the action taken by VolServ.

- If the auto import option is enabled, VolServ automatically imports the unknown or intransit media into the VolServ system. The automatically imported media are assigned the target Media Class, manufacturer name, and batch identifier specified during archive configuration or reconfiguration.
- If the auto import option is enabled, VolServ automatically enters intransit media (refer to the glossary) if the subject DataTower archive contains the target media class.

- If the auto import option is not enabled, VolServ leaves the unknown media in the load port.

When an intransit medium (due to an incomplete mount command) is imported or entered, VolServ software attempts to complete the mount.

Auto Import During Enter

All archives support the enter operation. An enter operation is performed via interaction of the AO with the appropriate archive **Console**. For more information about the enter operation, refer to "Enter Media" on Page 5-4.

When the AO performs an enter operation on automated archives, the archive robot reads the media labels and sends the media identifiers to VolServ. If any of the media in the entry port are unknown to VolServ or are in the intransit state, the setting of the auto import parameter determines the action taken by VolServ.

- If the auto import option is enabled, unknown media are automatically imported in to the VolServ system. The automatically imported media are assigned the target Media Class, manufacturer name, and batch identifier specified during archive configuration or reconfiguration.
- If the auto import option is enabled, VolServ automatically enters intransit media (refer to the glossary) if the subject archive contains the target media class.
- If the auto import option is not enabled, VolServ performs actions that depend on the archive type. VolServ software:
    - Leaves the subject media in the load port without placing them on the eject list (DataTower archive)

- moves the subject media into the archive and places them on the eject list (AML/E, AML/2, AML/J, or StorageTek ACS Product Family archives)

When an intransit medium (due to an incomplete mount command) is imported or entered, VolServ software attempts to complete the mount.

Configure a Manual Archive

VolServ supports two manual archives: the DataShelf archive and the Stage archive.

Configuring a manual archive is identical to configuring an automated archive with the following exceptions.

Fill Mode

When media are added to a DataShelf archive, VolServ must assign an empty storage bin for each new media.

To minimize database access activity, VolServ software caches information about an entire shelf of bins in memory. As long as an available bin exists in the cached shelf, VolServ software assigns storage bins from the cached shelf to new media.

When no additional bins are available in the cached shelf, VolServ software writes the cached information about the shelf to the database and scans the shelves in the DataShelf archive sequentially until another shelf with an available storage bin is located.

Two algorithms are available to determine where VolServ begins its scan for a shelf with an available storage bin. These algorithms, called fill modes, are wrap and first fill.

Shelves within a DataShelf archive are numbered within Row. For example, if a DataShelf archive has three rows with four shelves per row, the shelves are labeled sequentially as follows: Row 1 Shelf 1, …, Row 1 Shelf4, Row 2 Shelf 1, … Row 2 Shelf 4, Row 3 Shelf 1, …, Row 3 Shelf 4.

First Fill

When the first fill mode option is specified, VolServ always begins its scan for a shelf with available storage bins with the first shelf in the archive, i.e. Row 1 Shelf 1.

Wrap

When the wrap fill mode is specified, VolServ software begins its scan for a shelf with an available storage bin with the shelf immediately after the shelf just filled. For example, if the last assigned bin was in Row 2 Shelf 3, the next shelf scanned is Row 2 Shelf 4.

If VolServ does not find an available storage bin by the time it has scanned the last physical shelf in the archive (Row 3 Shelf 4), the search for an available storage bin wraps to the first physical shelf in the archive (Row 1 Shelf 1). VolServ software continues scanning the shelves sequentially until a shelf with an available storage bin is found.

Media Type

The manual archives support up to 16 user-defined media types in addition to the system-defined media types that are supported by the automated archives.

A user-defined media type must be defined to the VolServ system (refer to “Define a Media Type” on page 3-18) before it can be specified as a supported media type for a manual archive.

Capacity

The capacity of a Stage archive is entered during the configuration of the archive. The capacity of a Shelf archive can be modified by reconfiguring the archive.

DataShelf archive capacity is a calculated value based on the number of shelves configured.

Auto Check-in

The auto check-in functionality is not supported for manual archives.

Auto Import

The auto import functionality is not supported for manual archives.

Register Archive with VolServ

After an archive is successfully configured, it must be registered with VolServ. This is done via two methods:

Cycle VolServ; for information see "Gracefully Terminate VolServ" on page 2-9 and see "Start Up VolServ" on page 2-3.

Perform an archive reconfiguration without changing any archive parameters. Refer to the *Using the VolServ GUI* manual for specific information concerning this method.

Define a Media Type

When the default media types supported by VolServ software are not sufficient, a new media type may be defined and registered with VolServ using the **Media Type**…/**Define** GUI window.

VolServ software acquires media type parameters via the GUI. Basic media type parameters consist of the media type name, number of sides, and capacity in megabytes.

Note

Media types cannot be deleted. They may be defined or redefined.

Once specified, newly defined media types may be selected during configuration of a manual archive. The list of media types allowed for automated archive configuration is controlled by VolServ software.

Create a Media Class

After an archive is successfully configured and registered with VolServ, at least one Media Class must be created. Media Classes are created using the **Create Media Class** command.

Media Classes provide logical organization of media into smaller groups. For more information about Media Classes, refer to the *VolServ Overview* manual.

Media Classes are central building blocks to media class and media type migration processes. They are also used by one of the optional forms of the **Mount Media** command.

Note

VolServ has to be running to create a Media Class.

- VolServ software acquires media class parameters via the GUI and API. Basic Media Class parameters consist of the class name, media type used, class capacity, mountable by class option, high mark, notification comment, use callbacks option, and callback information.
- Media Classes have several important characteristics:
- When a medium is entered into an archive, it is also entered into a Media Class. The medium can be in one, and only one, Media Class.
- Once a medium in entered into a group, it can only be moved into another group by the **Reclassify Media** command or a **Mount Media** command with the reclassify option selected.
- Only one media type can exist within a group.
- Media Classes can be associated with more than one archive.

- A Media Class is an integral part of the media migration philosophy. When media type migration or media class migration occur, media must stay within the same media class.

Basic Media Class parameters include the Media Class name, media type, class capacity, mountable by class, high mark, notification comment, and use callbacks and callback information.

Media Class Name

The Media Class name parameter is a user-specified name by which the Media Class is known to the user. Valid Media Class names may contain up to 16 characters, including spaces. Leading and trailing spaces are not permitted.

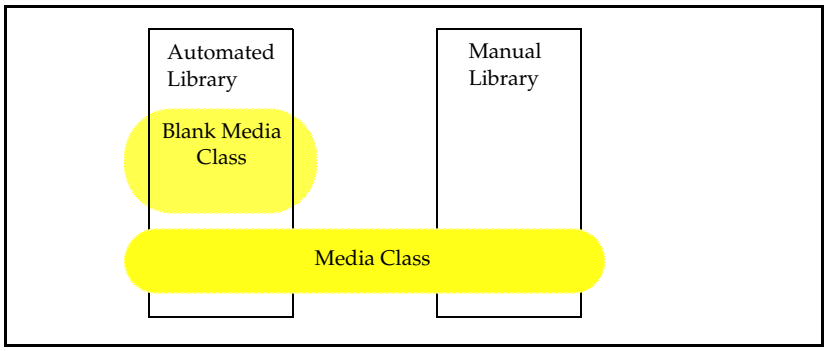
Media Type

The media type parameter identifies the type of media used in the Media Class. As noted before, only one media type can be specified for a Media Class.

Class Capacity

Media Classes are designed to be associated with multiple archives. Media migration cannot occur unless a media class spans at least two archives. However, a media class can be wholly associated with one archive.

Therefore, plan Media Class capacities to cover the expected size of the archives configured earlier. See the following page for an example of two media classes associated with two archives.



No software restriction is placed on the media class capacity. Class capacity can exceed the total combined capacity of all archives, or can be as small as one.

Although not necessary, there are two restrictions that should be applied to Media Class capacities when media migration is planned:

- Total capacity should equal the amount of bins in the archives
- There should be no Media Class overlap

As an example, refer to the illustration shown above. Suppose the Automated Archive and Manual Archive have 100 and 1000 bins, respectively. The Blank Media Class and the Media Class capacities should total 1100.

Also, the Blank Media Classes should have a capacity less than the Automated Archive capacity. The remaining Automated Archive bins can then be associated with the Media Class capacity.

Mountable By Class

Selecting the mountable by class option sets a flag for the subject Media Class. This flag is used by the **Mount Media** command.

The **Mount Media** command provides four ways in which media may be selected for mounting. These are:

- Mount by media identifier
- Mount by media list
- Mount by media class
- Mount by criteria

VolServ software supports the mount by media class method for the subject Media Class only if the mountable by class option is selected. When not selected, the **Mount Media** command cannot use the mount by media class option for the subject Media Class. Refer to "Mount Media on a Drive" on page 4-18 for more information.

High Mark Notification

The media class high mark indicates a capacity break point that is calculated as a percentage of class capacity. After the high mark capacity is reached, a notification is logged and displayed on the **Volume Server SysLog Console**.

Note

The notification is displayed at the "alert" level in the system log.

When entered, a notification comment accompanies the syslog message. The syslog message occurs each time media are added to the media class. No more media may be entered into the media class when class capacity is reached, regardless of which archive it is associated with.

Syslog notification messages stop whenever the amount of media drops below the high mark. This can be achieved by ejecting media, using the **Reclassify Media** command to move media into another media class, or raising the class capacity using the **Modify Media Class** command.

Use Callbacks and Callback Information

VolServ can generate unsolicited status messages called media class callbacks. When enabled during media class configuration, media class callbacks are returned to client software after certain commands affect any medium within the media class. These commands are:

- Import Media
- Export Media
- Check-in Media
- Check-out Media
- Mount Media
- Dismount Media
- Reclassify Media
- ENTER (from the archive **Console**)
- EJECT (from the archive **Console**)

When the use callbacks option is enabled, the destination of media class callbacks can be directed to either a specific RPC address or to an Internet address associated with a specific client at its Enterprise ID location. No Enterprise ID location exists until a client establishes an enterprise using the **Connect** command. Refer to "Connect" on page 4-61.

For further information refer to the **VSCMD_Connect** commands in the *MSTM-V21-010-API Programmer's Guide*.

Create an Archive Media Class

After a media class is successfully configured and registered with VolServ, it must be associated with one or more archives. This association is referred to as an archive media class. Archive media classes are created using the **Create Archive Media Class** command.

VolServ software acquires archive media class parameters via the GUI and API. Basic archive media class parameters consist of archive name, media class name, archive class percentage, action mode, high mark, low mark, migration priority, migration archive, and preferred media placement.

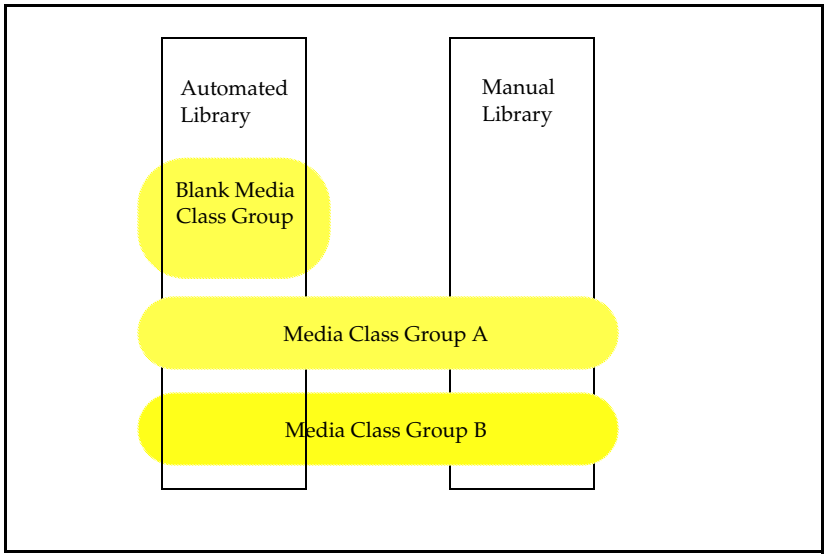
See the following subsections for detailed discussions concerning the archive class percentage, action mode, high mark, low mark, migration priority, migration archive, and preferred media placement.

Archive Class Percentage

A percentage of the media class capacity can be associated with an archive based on this parameter. Refer to the *Using the VolServ GUI* book and note that the entry method uses a slide bar. As the slide is moved, the actual quantity of media to be associated with the archive is displayed in a text area just above the slide bar. Note that the quantity will not exceed the lesser of:

- The amount of bins in the archive
- The amount of unassociated media remaining in the Media Class

Use the figure shown below. Assume that the Automated Archive has a capacity of 100 bins and Media Class Group A has a capacity of 200. Also assume that Media Class Group A is associated with the Automated Archive and Manual Archive. When the Media Class Group A archive class percentage slide bar is moved from 0 percent to 100 percent, the actual quantity displayed above the slide bar increases. When the 50 percent level is reached, the quantity remains at 100, regardless of the other 100 media remaining in the Media Class Group A.



As a further example, assume that the Manual Archive has a capacity of 1000. When the Media Class Group A archive class percentage slide is moved from 0percent toward 100 percent, the actual quantity displayed above the slide bar will increase. When the 10 percent level is reached, the quantity will stop incrementing and remain at 100, regardless of the other 900 slots remaining in the Manual Archive.

Although not enforced by VolServ software, there is one restriction that should be applied to archive class percentage when media migration is planned. This restriction is there should be no Media Class overlap. Using the figure in "Archive Class Percentage" on page 3-24, the capacity of the Automated Archive should equal the total capacity of the Blank Media Class Group and portions of Media Class Groups A and B that are associated with the Automated Archive.

Action Mode, Low Mark, High Mark

The specification of action mode, low mark, and high mark is made for each archive media class, as well as for each media type in a configured archive. As suggested by low mark and high mark, action may or may not be triggered when the amount of media in an archive media class reaches a calculated low mark or high mark threshold.

The SA can choose action modes of none, notify, or migrate. Depending on the action mode option selected, either no notification, or migration of media from one archive to another occurs when the archive media class high mark threshold is reached.

During some operations, media are removed from an archive. When this occurs, the media removed from an archive may cause an archive media class fill level to reach its low mark threshold. If the notify action mode is selected, a notification is sent to the **Volume Server SysLog Console** and appropriate archive **Console**.

A few operations result in adding media to an archive and result in exceeding the high mark threshold for the archive media class fill level. When the fill level reaches the high mark threshold and:

- The notify action mode is selected, a notification is sent to the **Volume Server SysLog Console**.

- The migrate action mode is selected, media within an archive media class are subject to migration to another archive associated with the same media class. Migration continues until the low mark is reached, provided that enough space exists in the destination archive media class to accept the migrated media. Notification is also sent to the **Volume Server SysLog Console.**

At this point, it is important to describe the media class migration and media type migration processes.

Media Class Migration

Media class migration is a process directed by VolServ software. The process begins if a media class migrate action mode was selected during archive media class creation and the media class fill level reaches the media class high mark threshold.

Several operations can cause a Media Class fill level to exceed its high mark threshold. Some of these are import, reclassify, or bulk loading operations.

When media class migration starts, VolServ software places media from the source media class on its archive eject list. The quantity of eject list entries equals the difference between the actual fill level that triggered the process minus the media class low mark threshold. The archive **Console** display **EJECT** button of the source archive is then highlighted.

The media selected for ejection are those with the oldest access date. This value correlates to the last time the medium was entered, mounted, or dismounted.

When a medium is ejected by the AO, the migration archive enter list is appended with that same medium. The archive **Console** display **ENTER** button of the migrations archive is highlighted.

After media class migration starts, migration continues until one of the following occur:

- The media class fill level reaches the media class low mark.
- The AO removes the media from the Eject list. Such media enter the intransit state.

Note

No media are accepted by the destination archive when its absolute capacity is reached.

There are two reasons for removing such media from the source archive Eject list. One is that the destination archive media fill level may reach the destination archive high mark when media are entered as a result of migration. If media are entered into the destination archive and its high mark is exceeded, media type migration begins for that archive (unless the destination archive's action mode migrate option is not selected).

Note

No media are accepted by the destination archive when the destination media class capacity is reached.

Another reason to remove media from the source archive eject list is when the destination archive media class fill level reaches the destination archive media class high mark. Otherwise, media class migration from the destination archive to some other archive may be triggered. No media are accepted by the destination archive media class when its absolute capacity is reached.

Note that the archive media class high mark and low mark are used to determine when to start and halt media class migration. These marks apply only to an archive media class fill level and is designated during archive media class creation.

During archive configuration, a different set of high and low marks are entered. These marks are used to determine when to start and stop media type migration. Refer to "High Mark" on page 3-9 and "Low Mark" on page 3-8. Both sets of marks are independent from each other.

Media Type Migration

As described earlier (Refer to "Migrate" on page 3-7), media are migrated to another archive once a media type fill level reaches the media type high mark because of media entry. The media type high mark is distinct from the media class high mark.

Each medium selected for media type migration must conserve its media class. Although media type migration causes media to be migrated to another archive, each selected medium must also remain in its present media class. Furthermore, a medium is not migrated unless its media class migrate action mode is selected. When these two preconditions exist, that medium can be migrated via the media type migration process.

After media type migration starts, the number of media required to reach the media type low mark is calculated. This value is equal to the difference between the media type fill level threshold minus the media type low mark threshold. The amount of media of that media type present on the Eject list is also subtracted from the media type fill level.

Next, the archive media class with the highest migration priority is first selected for migration. Refer to "Migration Priority and Archive" on page 3-31. If the selected archive media class fill level is below its low mark threshold, the archive media class with the next highest priority is selected. VolServ software then places media from the source archive media class on the archive eject list. The source archive **Console** display **EJECT** button is then highlighted.

If the media type low mark threshold is not reached after the first iteration, the process continues by selecting the next eligible archive media class and testing its fill level. If the subject archive media class fill level is above its low mark, some of its media is placed on the source archive eject list.

When the AO ejects a medium from the source archive, the destination archive enter list is appended with that same medium. Then the destination archive **Console** display **ENTER** button is highlighted.

Media type migration continues until one of the following occurs:

- The media type fill level reaches the media type low mark threshold.
- All archive media classes are exhausted of their supply of eligible media (that is, all of their low marks are reached).
- The AO removes the media from the eject list.

The reasons for discontinuing media type migration are the same as for media class migration.

Intransit Media (Migrate)

During migration, media that are ejected from the source archive but not entered in the target archive are placed in the intransit state. This state indicates that media are known by VolServ software but are not actually resident in an archive.

Migration Priority and Archive

When the archive media class action mode migrate option is selected, a migration priority is assigned to the archive media class. This value is used only during media type migration. When media type migration begins, media from the highest priority archive media class are first moved to the source archive Eject list. If additional media must be ejected to meet the media type low mark, the media class with the next highest migration priority is chosen for processing.

The migration archive is the target archive for all media ejected because media class migration or media type migration. As a medium or media are removed from the source archive for the purpose of migration, the destination archive (or migration archive) **Console ENTER** button is highlighted.

Preferred Media Placement

When preferred media placement entries (DataShelf archive only) are defined for a Media Class, VolServ directs placement of media entered into that media class to a particular area in an archive.

When a medium is entered into an archive for any reason (import, checkin, move, migrate) or dismounted from a drive, VolServ software checks if its media class is configured for preferred placement. If it is, VolServ software directs placement to a specific area in the archive. Note that preferred placement values override the archive fill mode made during archive configuration.

Entries in this field are four integers, separated by commas. Its form is #,#,#,#. The entries stand for row, column, shelf, and bin.

The primary use of preferred placement is to ensure that media in a particular media class are placed near a system resource, such as drives.

Create a Drive

After all archives at a site are successfully configured and registered with VolServ, at least one drive must be defined and associated with an archive.

Note

VolServ has to be running to define a drive.

The **Create Drive** command is used to define a drive; four drive statistics are associated with it. These are the usage count, current usage time, total usage time, and error count. These built-in statistics are provided by VolServ software, but only the usage count is automatically updated by VolServ software. Usage count indicates the number of times that media are mounted to a drive.

VolServ clients are responsible for keeping the other three statistics values updated. It is recommended that they be defined as follows:

- Current usage time indicates read/write operation time in seconds since the latest preventive maintenance
- Total usage time indicates the read/write operation time in seconds since the drive definition
- Error count indicates the number of read/write errors

All statistics are initialized to zero when a drive is defined. Two of these statistics are cleared when a drive is varied to an on-line state. Refer to “Vary Drive” on page 4-22.

Drive definition is performed via the GUI. Its parameters consist of the drive ID and media type that the drive supports. After a drive is defined, it cannot be changed. It must be deleted and defined again.

Drives can be defined before the creation of media classes. However, they ultimately must be associated with an archive before they can be used to mount media.

Associate a Drive with an Archive

After all drives are successfully defined, they must be associated with an archive before they can be used to mount media. The **Associate Drive** command is used to associate a drive with an archive.

Drive association parameters are acquired by VolServ software via the GUI. Basic association parameters consist of associate drive, associate with archive, and CLM/DriveSlot (automated archive only). The associate drive entry must match a drive ID entered during drive definition. The associate with archive entry must match an archive name entered during archive configuration.

When a drive is associated with an automated archive, the physical location of the drive must also be specified. This information is contained in the CLM/DriveSlot entry and describes the media hand-off location between the robot and the drive. Entries in this field are four integers, separated by commas, with the form #,#,#,# for the following archives:

- DataShelf archive
- DataTower archive
- StorageTek ACS product family archives

Entries have the form Dc##010101 for the AML archives. The “c” character relates to the media type used by the drive. The “##” characters refer to a logical mapping of the drive slot XYZ position and is used by the AML archives.

Entries have the form d#t#l0 for the SCSI drives. The first # indicates the element address of the drive in the library and the second # indicates the SCSI target id of the drive.

Entries match the drive names that are configured for the Scalar DLC drives, for example, PDR256.

When the CLM/Drive Slot entry is made, only those drive slots that interface to installed drives and are not associated are available for selection.

After a drive is associated with an archive, its parameters cannot be changed. It must be disassociated and associated again to change any parameter. Drive parameters can be viewed using the **Query Drive** command.

Define a Label Pattern

The **Import Media** command has an option that allows barcode labels to be printed. Using previously-defined label patterns allow generation of unique, sequential media identifiers to be used during import and also to be directed to a barcode label printer.

VolServ software acquires label pattern information only via the GUI **Define Label Pattern** window. Basic parameters consist of label pattern name and label pattern definition. After a label pattern is defined, its cannot be changed. It must be deleted and defined again.

Label patterns can be defined at any time that VolServ is running. However, a label pattern must be unique and must be defined before printing a label with that particular pattern.

Add Media to an Archive

After at least one archive media class is successfully configured, media can be entered into an archive. In fact, normal operations cannot begin until media are entered into an archive.

Note

VolServ has to be running to add media to an archive.

Four basic methods are used to add media to most automated archives. These methods use the **Import Media** command (refer to "Import Media into an Archive" on page 4-24),the bulk load operation (refer to "Bulk Load Media" on page 4-27), the unsolicited enter operation (refer to "Unsolicited Entry of Known Media" on page 4-30), and the enter operation (refer to "Enter Media" on page 5-4).

To enter media into a DataShelf or Stage archive, only the **Import Media** command can be used.

When importing media into an archive, media labels must be affixed to them. Refer to "Reprint a Media Label" on page 4-37 for more information. Also refer to "Import Media into an Archive" on page 4-24.

The **Import Media** command is the preferred method to use when entering relatively few media into an automated archive. The bulk loading method is preferred if there are a relatively large amounts of media to be entered. For specific automated archives, the enter or unsolicited enter operations are allowed by VolServ.

NOTES

4

Normal Operations

Roadmap

Topic	Refer To Chapter
General software installation information	1
Hardware and software start-up	2
Site-specific configuration of archives and drive.	3
Daily operations	4
Archive operation and configuration	5
Troubleshooting tips and solutions	6

Overview

Normal operations are functions performed on a daily basis. Some of functions are routine while others may require making modifications to the existing site configuration, changing privileges for a client application or VolServ System Operator (SO), or responding to a client application request. This chapter describes these and other operations that are performed on a daily basis.

Backup

VolServ is backed up using standard UNIX backup procedures.

Command Priorities

All VolServ commands are executed as they are sent. However, a command queue keeps track of commands that arrive when VolServ resources are busy.

Note that each command is associated with an execution priority that ranges from 0 to 32 (high to low). The default priority for each command is 15. Unless changed by a client, all commands have a priority of 15. Commands with equal priority are executed in a first-come first-served order.

To expedite a particular command in the queue when VolServ resources are busy, the reprioritize request command is used. When a command priority is changed to a higher value (that is, numerically smaller), its position in the queue is moved closer to first place.

Commands can be reprioritized via the GUI and API. The reprioritize request parameters are the reprioritize request identifier and new priority. The new priority replaces the previous command priority in VolServ execution queue.

Command Cancellation

Any command in VolServ command queue, except the dismount command, can be cancelled. Commands can be cancelled via the GUI and API. The only cancel request parameter is the cancel request identifier. When executed, the command is removed from VolServ command queue.

Archive Management

All archive management operations can be performed via the GUI except where noted.

Configure/ Reconfigure an Archive

An archive can be configured or reconfigured at any time. The Configure Archive command is used to create an archive definition and is covered in the initial configuration section of this manual. Refer to "Configure an Archive" on page 3-3 for a description of archive configuration.

The Reconfigure Archive command allows modification of most parameters entered during archive configuration. One exception is the media type entry that is input when an archive is configured. Modifying the media type could affect the archive media classes associated with an archive.

Delete an Archive

If a specific archive is no longer needed, the Delete Archive command permits removal of an archive from a VolServ system. An archive can be deleted easily because it contains no media, but it can also be removed if media are contained in it.

The ability to delete an archive with media in it depends on the value of the `DELETE_ARCHIVE_WITH_MEDIA` environment variable. When set to **N**, any archive containing media can be deleted. When set to **Y**, the value of the `DELETE_ARCHIVE_MEDIA_ACTIONSTATE` environment variable determines how media are to be handled when a populated archive is deleted.

Refer to the table in "Configuration Environment" on page 1-17 for information about these environment variables.

Change Archive Parameters

The change archive parameters command allows changing two archive parameters without requiring that the archive become unavailable. These parameters are the archive mode and archive console display host.

The archive mode attended option is usually selected. When the AO or any other attendant is not available to perform media handling, the archive mode can be changed to unattended. However, this change can affect the behavior of the move media, mount media, checkin media, checkout media, import media, and export media associated commands, as well as the media migration process.

Whenever necessary, the archive console display host can be changed without requiring archive reconfiguration.

The change archive parameters include the change archive, new mode, new console display host, and priority. The priority is used to determine the command location in VolServ command queue.

Vary Archive

During maintenance operations, it is necessary to make equipment unavailable for use. The vary archive command is used to disable or enable an entire archive. It can also be used to enable local manual control of an archive.

Archives can be in one of four states: `on-line`, `off-line`, `diagnostic`, and `unavailable`. The `on-line`, `off-line`, and `diagnostic` states are entered by human intervention. The `on-line` state is the normal operational state. All archive equipment is inoperable and usually awaiting maintenance during the `off-line` state. The `diagnostic` state is used to allow local manual control of an archive. This mode is generally used during archive troubleshooting.

The `unavailable` state is a derived state. It is reserved for lower level equipment and is automatically entered when higher level equipment goes into the `off-line` state or is moved into the `diagnostic` state. That is, this state applies to archive components when the archive is moved to the `off-line` or `diagnostic` states.

The `vary archive` command is available via the GUI, CLI, and API. The vary archive parameters are the vary archive, new state, and priority. The priority is used to determine the command location in VolServ command queue.

Vary Archive Component

At times during maintenance operations, it is necessary to make specific components unavailable for use. The vary archive component command is used to disable portions of an archive.

Like an archive, archive components can be in one of four states: `on-line`, `off-line`, `diagnostic`, and `unavailable`. The definition of these states are the same as for the vary archive command.

The vary archive component parameters are the `vary archive`, `new state`, and `priority`. The `priority` is used to determine the command location in VolServ command queue.

Redefine a Media Type

All parameters of an existing media type can be modified using the redefine media type command. For more information, refer to "Define a Media Type" on page 3-18 for a description of media type definition.

Create/Modify/ Delete a Media Class

Media classes can be created, modified, or deleted at any time. media class creation is covered in the initial configuration section of this manual. Refer to "Create a Media Class" on page 3-19 for a description of the create media class command.

Using the modify media class command, all media class parameters defined during media class creation can be modified, except for the media type used. No mixed media types are allowed within a media class.

At some time, a media class may no longer be necessary based on its usage within the context of the VolServ system. When this happens, it can be deleted using the delete media class command. However, the archive media class with which the media class is associated must first be deleted.

The create, modify, and delete media class associated commands are available via the GUI and API.

Create/Modify an Archive Media Class

An archive media class can be added or modified at any time. The create archive media class command is covered in the initial configuration section of this manual. Refer to "Create an Archive Media Class" on page 3-24.

After a new archive media class is created, media can be explicitly moved into it using the import media, move media, and reclassify media associated commands.

Media can also be implicitly moved into a new archive media class via the audit and unsolicited enter operations. Population via these two operations occurs only if the new archive media class is named as the target class for auto import. The reconfigure archive command can be used to name the new class as the auto import target.

Using the Modify Archive Media Class command, all archive media class parameters defined during archive media class creation may be modified.

The Create and Modify Archive Media Class associated commands are available via the GUI and API.

Delete an Archive Media Class

When an archive media class is no longer needed, the Delete Archive Media Class command permits disassociation of a Media Class from an archive. It may also be necessary to reassign a Media Class to a different archive. When this occurs, an archive media class association can be deleted using the Delete Archive Media Class command. However, all media must first be moved out of the archive media class. The Reclassify Media and Move Media associated commands can be used to move media. The Export Media command can also be used, but the media and its media information is totally removed from the VolServ system.

The Delete Archive Media Class command is available via the GUI and API.

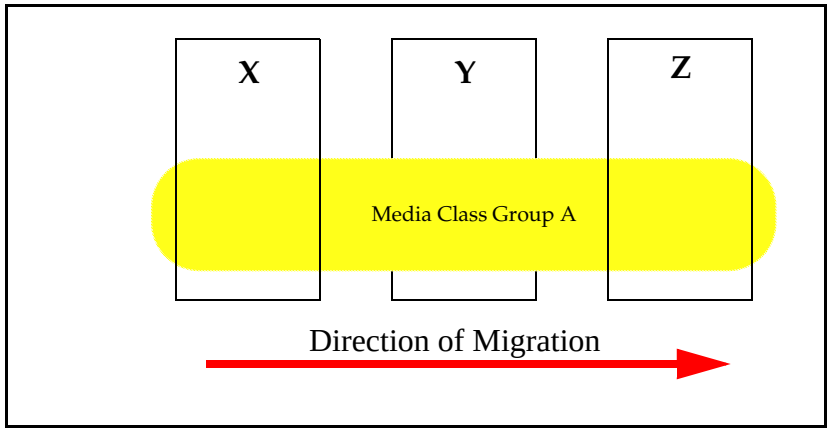
Define Media Migration Policy

Media migration policy is the combined effect of media class and media type migration. Refer to "Media Class Migration" on page 3-27 and "Media Class Migration" on page 3-27 for a description of the two varieties of media migration.

Refer to the figure on the following page to see an example of migration class migration, suppose Media Class Group A is associated with Archive X, Archive Y, and Archive Z. Assume that the following parameters were defined during archive configuration, media class creation, and archive media class association:

- Media Class Group A has a capacity of 200

- 40 percent of Media Class Group A is associated with Archive X
- 40 percent of Media Class Group A is associated with Archive Y
- 20 percent of Media Class Group A is associated with archive Z
- High mark and low mark for Archive Media Class AX is 80percent and 60 percent, respectively
- High mark and low mark for Archive Media Class AY is 70 percent and 60 percent, respectively
- Migration archives are defined such that migration proceeds from left to right(i.e., from AX to AY to AZ).



When the Archive Media Class AX fill level reaches the high mark threshold of 64 media (= 200 * 0.40 * 0.80 = Media Class Group A capacity * Archive Media Class AX % * Archive Media Class AX high mark %), migration begins. Media are migrated from Archive X into Archive Y. Migration continues

until the Archive Media Class AX fill level reaches the low mark threshold of 48 media (= 200 * 0.40 * 0.60 = Media Class Group A capacity * Archive Media Class AX % * Archive Media Class AX low mark %). In this case, 16 media are migrated to Archive Media Class AY.

Now assume that the Archive Media Class AY fill level was at the low mark threshold of 48 media (= 200 * 0.40 * 0.60). Note that the Archive Media Class AY high mark threshold is 56 media (= 200 * 0.40 * 0.70). When migration from Archive X occurs, at least 16 media are transferred. Therefore, migration from AX to AY causes the Archive Media Class AY fill level to reach its high mark sleuthed. Migration between Archive Media Class AY and Archive Media Class AZ begins. In this example, all 16 media migrated from Archive Media Class AX to Archive Media Class AY is also migrated to Archive Media Class AZ, provided enough space is available in Archive Media Class AZ.

Archive Media Class AZ can contain a maximum of 40 media (= 200 * 0.20). For media migration to complete, the Archive Media Class AZ fill level must contain 24 or fewer media. Otherwise, migration fails for those media that cannot be transferred.

Modify Media Migration Policy

Media migration descriptions in “Media Type Migration” on page 3-29 and “Media Class Migration” on page 3-27 address initial media migration planning. However, it may be necessary to periodically modify parameters that control migration. Such parameters are the media type high mark and low mark and the media class percentage, high mark and low mark.

The Reconfigure Archive command can be used to change the media type high mark and low mark. Changing these two factors affect media type migration parameters only (media type high mark threshold and media type low mark threshold). For example, if the high mark is raised or lowered, the media type fill level that triggers media type migration is also raised or lowered.

Media class migration parameters (media class percentage, high mark, and low mark) can be changed using the Modify Media Class or Modify Archive Media Class associated commands. Note that the media class high mark threshold is equal to the product of media class capacity, archive media class percentage, and archive media class high mark. Therefore, changing any one of these three parameters affects the media class high mark threshold.

Media migration can be disabled when desired. To disable media type migration only, use the Reconfigure Archive command to change the archive action mode to none or notify. To disable both media class and media type migration, use the Modify Archive Media Class command to change the archive media class action mode to none or notify.

Add Archive to Existing Installation

When a site requires the addition of another archive, the operations are almost identical to the operations outlined in the initial configuration section of this chapter.

However, only certain archives may be configured. When VolServ software is installed, license strings are input that allow only specific archives to be configured. To add a new archive type, call ATAC to obtain a license string for that type of archive.

- In the USA and Canada, call 1-800-827-3822.
- Outside the USA and Canada, call 303-874-0188 or toll-free 00800-9999-3822.
- support@adic.com

ATAC support personnel will request the host identifier or CPU identifier when a new license string is required. Use the **cpuid** or **hostid** commands to obtain the necessary identifier.

Execute the *mk_license* utility to enter the license string using the following command line:

$VS_DIR/utilities/mk_license

Read the instructions provided on the terminal, exit the utility, and execute the command line using the proper arguments. Any additional steps are provided by ATAC.

Audit an Archive

An audit command is used for two reasons. One is to input relatively large amounts of media into an archive at one time. Refer to “Bulk Load Media” on page 4-27. It can also be used to verify consistency between an actual archive’s contents and the VolServ database inventory. Refer to “Audit” on page 5-7 for more information about automated archive audits. Manual archive audits are detailed in “Audit” on page 5-12.

In general, a comparison is made between the VolServ database and the actual media inventory when an Audit command is executed. The automated archive robot or the manual archive AO inventories the media. The result of this audit is sent to VolServ, which compares the actual and logical inventory.

No action is taken when the inventory matches the VolServ database. However, human intervention is necessary to resolve some archive discrepancies. For example, an AO may find a medium during an manual archive audit that is not contained in the VolServ database listing. The SA must determine whether this medium belongs in the manual archive. If it does, the Import command is executed by the SA, followed by an enter action by the AO.

The Audit command is available via the CLI and API, and also using the **AUDIT** option of an archive **Console**.

Drive Management

All Drive Management operations can be performed via the GUI and API, except where noted.

Create and Associate a Drive

A drive can be created and associated with an archive at any time. The Create Drive command is used to create a drive definition and is covered in the initial configuration section of this manual. Refer to "Create a Drive" on page 3-32 for a description of drive creation.

All created drives must be associated with an archive before it can be used to mount media. The Associate Drive command is used to associate a created drive with a specific archive. This command is also covered in the initial configuration section of this manual. Refer to "Associate a Drive with an Archive" on page 3-33.

The Create Drive and Associate Drive associated commands are available via the GUI only.

Disassociate and Delete a Drive

At times, it is necessary to move a drive to another position in an archive or to another archive. When a drive is moved, it must be disassociated from an archive using the Disassociate Drive command before it can be used in its new location. After the drive is relocated, the drive must be associated with its new archive.

If a drive is to be temporarily removed from service, it can be moved to the off-line or diagnostic state using the Vary Drive command. Refer to "Vary Drive" on page 4-22. A drive can be completely removed from a VolServ system using a combination of the Disassociate Drive and Delete Drive associated commands. An in-use drive cannot be disassociated from an archive.

The only parameter necessary for the Disassociate Drive and Delete Drive associated commands is the drive identifier.

The Disassociate Drive and Delete Drive associated commands are available via the GUI only.

Create or Modify a Drive Pool

When an SA, SO, or client uses a Mount Media command and the specified drive is busy, the command is placed in a command queue or failed. To increase the likelihood of an available drive, the Mount Media command may specify a collection of drives on which to perform the mount. This collection can be a list of specific drives or a named collection of drives. Such a named collection is defined as a drive pool and is created using the Create Drive Pool command.

Features of a drive pool are:

- All defined drives are available for inclusion in a drive pool
- A drive does not need to be associated with an archive to be a drive pool member
- A drive can be a member of multiple drive pools
- Any mix of drive types can be included in a drive pool as long as the subject media types are supported by the VolServ system
- A drive pool may contain zero or more drives

Besides increasing the likelihood of a successful mount, drive pools can also be used to segregate specific drives to particular user groups. This can reduce the possibility of drive contention between such groups.

It is also possible that some drives' data paths at a site may be connected to computers not associated with one network. In this case, drive pools can be created to segregate between the drives connected to different networks.

The Modify Drive Pool command allows drives to be added to or deleted from an existing drive pool.

Parameters for Create and Modify Drive Pool commands are drive pool name and a list of drive identifiers to be added to or removed from a drive pool.

Delete a Drive Pool

The Delete Drive Pool command removes a drive pool from the VolServ database. Parameters for the Delete Drive Pool command are drive pool name and priority. The priority is used to determine the command location in VolServ command queue.

Mount Media on a Drive

In its simplest form, the Mount Media command is issued to mount a specific medium on a specific drive. However, a Mount Media command can be specified several different ways:

- Mount by (media identifier or media list or media class) and (drive identifier or drive pool)
- Mount by criteria and (drive identifier or drive pool)

The simplest method is to *mount by media identifier and drive identifier.* When the specified medium or drive is busy, the Mount Media command waits in a queue until both are available. When both are available, the Mount Media command allocates both the drive and media and begins processing of the physical mount. Mounting by media identifier and drive identifier allows selection of a drive in another archive, unless prevented by a Mount Media command option.

The *mount by media identifier and drive pool* method is used when a higher likelihood of mounting a specific medium without waiting is desired. It is possible that the specific medium could be mounted on any one of the drives listed in the drive pool. Therefore, a user should not use a drive pool if it contains a drive to which the user does not have access.

A drive selection algorithm is used to select the best drive to satisfy the command. The algorithm attempts to use a drive in the same archive as the medium. However, a drive in another archive can be selected unless prevented by a Mount Media command option. The resulting medium/drive pair is chosen to satisfy the command.

The *mount by media list and drive identifier* method is used when the specific medium to be mounted is unimportant except for a specific list of candidates. A medium selection algorithm is used to first select media that are in the same archive as the drive. The second criterion is the medium with the lowest mount count. The resulting medium/drive pair is chosen to satisfy the command.

The *mount by media list and drive pool* method can be used when a specific medium or drive used to satisfy the mount is not important. A special set of criteria are used to select the best medium/drive pair from these candidates. The archive containing the most available drives from the specified drive pool is selected first. A tie is broken by using the archive with the largest number of applicable media from the media list. The media from the media list that are in the selected archive are then candidates. Other criteria can reduce the selection to one medium/drive pair but are beyond the scope of this book. However, a list of all possible medium/drive pairs is eventually developed and reduced to the most likely candidate. The resulting medium/drive pair is chosen to satisfy the command.

Like the *mount by media list and drive identifier* method, the *mount by media class and drive identifier* method is used when the specific medium to be mounted is unimportant except that it be chosen from a specific Media Class. The medium selection algorithm used is similar to that of the *mount by media list and drive identifier* method.

The *mount by media class and drive pool* method uses the same selection criteria as the *mount by media list and drive pool* method.

Mount by criteria and drive identifier can be used to mount the best medium based on client-defined criteria fields. Each medium can specify up to eight criteria for each medium in a VolServ system. Refer to "Modify Media Criteria" on page 4-34. The utility of this method depends on how well these optional fields are controlled/updated by the user.

The *mount by criteria and drive pool* method uses the same selection criteria as the *mount by media list and drive pool* method.

A Mount Media command fails for any of the following reasons:

- If the specified drive or bin is (are) not in the on-line state. Refer to "Vary Drive" on page 4-22.
- If the *mount by media class and drive identifier* of the *mount by media class and drive pool* method is used and all candidate media are in a different archive than all candidate drives (i.e., no cross-archive move is allowed).
- If the reclassify option is selected and the destination media class capacity is reached or if the destination class is an incompatible media type.
- If a media list contains media with different media types.

- If an improper lock identifier is specified.

The Mount Media command is available over the GUI, CLI, and API. There is a subset of these capabilities available to the AO using the **MOUNT** option of an archive **Console.** Basic mount parameters are drive identifier or media class or media criteria, drive identifier or drive pool, and priority. The priority is used to determine the command location in VolServ command queue.

Optional parameters include a lock identifier (to allow allocation of a locked drive), what archive-to-archive mount option to use, and whether to reclassify the selected medium to another media class.

A Multimount Media command can be used to select a parallel mount action that mounts all media specified or is failed. This command is available only to clients via the API. Refer to "Multimount Media" on page 4-61.

Dismount Media from a Drive

A medium is dismounted from a drive using the Dismount Media command.

When the Dismount Media command is executed, VolServ software updates only the usage count drive statistic. The current usage time, total usage time, and error count statistics can be updated by the client during dismount via the API and CLI only.

The Dismount Media command is available over the GUI, CLI, and API, and also using the **DISMOUNT** option of an archive **Console**. Dismount parameters are the dismount media identifier and priority. The priority is used to determine the command location in VolServ command queue.

Intransit Media (Mount)

In some cases, a medium may be moved to another archive because of a Mount Media command. Any medium that is ejected from the source archive by the AO, but not entered into the target archive, is placed in the intransit state. This state indicates that media are known by VolServ software and are destined for entry into an archive, but are not actually resident in an archive.

Lock a Drive

The Lock Drive command is used to reserve a drive, a list of drives, or a drive pool for exclusive use. Locking a drive prevents its allocation by any Mount Media command that does not provide a lock identifier. The lock identifier is contained in the return status for a Lock Drive command.

When reserved drives are no longer needed, the client issues an Unlock Drive command. The SA or SO may also issue an Unlock Drive command to free the drive.

For detailed information about this command, refer to the **VSCMD_Lock** command in the *MSTM-V21-010 API Programmer's Guide*.

Unlock a Drive

Only a client can issue a Lock Drive command via the API. Refer to "Lock a Drive" on page 4-22. The Unlock Drive command is used to clear a locked drive so that it can be allocated to another mount.

The unlock drive parameters are the unlock drive identifier and priority. The priority is used to determine the command location in VolServ command queue.

Vary Drive

At times it is necessary to make a drive unavailable for use. The Vary Drive command is used to disable a drive.

The **vary drive** command also allows a drive to be moved to the on-line state and clear two of four drive statistics. These statistics are the current usage time and error count. Refer to "Create a Drive" on page 3-32 for more information about drive statistics.

A drive can be in one of four states: `on-line`, `off-line`, `diagnostic`, and `unavailable`. The first three states are entered by human intervention. The `unavailable` state is determined by VolServ software.

The `on-line` state is the normal operational state. A drive is inoperable when in the `off-line` state. The `diagnostic` state is used to allow local manual control. This mode is generally used during troubleshooting.

The `unavailable` state is a logical state entered when certain critical equipment is moved to the `off-line` state. For example, a drive is in the `unavailable` state when the cassette load mechanism (CLM) is `off-line`.

The vary drive command is available over the GUI, CLI, and API. The vary drive state parameters are the vary drive, new state, and priority. The priority is used to determine the command location in VolServ command queue.

Media Management

All media management operations may be performed via the GUI, CLI, and API except where noted.

Enter Unknown Media into an Archive

All media can be classified as known or unknown to the VolServ system. Unknown media are those that were never introduced into a VolServ system or were removed using the Export Media command. Known media are contained in an archive, checked out using the Check-out Media command, or being transferred to another archive as a result of a Move Media command, Mount Media command, or media migration.

Specific ways exist to enter unknown media or reenter known media into an archive. Entry of unknown media into an archive is covered is this subsection.

Three basic ways exist to enter unknown media into an archive. One way is to use the Import Media command. Another is to load a large number of media at one time using the bulk load method. Finally, VolServ software allows some automated archives to use an unsolicited enter and AutoEnter methods.

Import Media into an Archive

The Import Media command allows the most direct way to place unknown media into an archive. When executed, the media are placed on the Enter list for that archive.

Note

Media migration can occur if an Import command and ensuing Enter operation results in fill levels exceeding the media type or archive media class high marks.

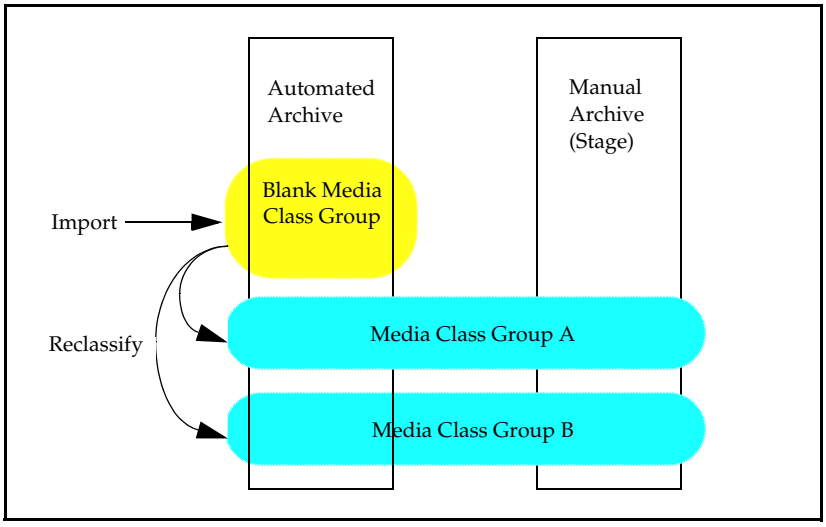
Appropriate labels must be affixed to all media to be imported. A GUI option imbedded in the **Import** window allows the SA or SO to print multiple barcode media labels or human-readable paper labels at one time. The Reprint Media Label command can also be used to print individual barcode labels. See "Reprint a Media Label" on page 4-37 for more information.

Basic import parameters consist of import media identifier, destination archive, destination media class, and priority. The priority is used to determine the command location in VolServ command queue.

Optional parameters are manufacturer and batch text entries. No format requirement exists, other than length. If one is specified, the other also must be specified.

A media identifier can be any pattern of characters or integers. Each one should be unique. Previously-defined label patterns can be used during an Import operation to generate unique, sequential media identifiers. Refer to "Define a Label Pattern" on page 3-34 for more information. These identifiers can also be directed to a barcode label printer.

An example of loading blank media is to import the media into a blank archive media class. When necessary, the Reclassify Media command can be used to move blank media into another archive media class. Using the Reclassify Media command in this way does not require additional handling of the media. Refer following figure. Of course, media can be imported directly into any archive media class unless the archive, media class, or archive media class capacities are reached.



The fill level of the destination archive media class must be low enough to allow addition of more media.

Archive media class capacity - Fill level = Amount of media that can be entered

Excess media are placed on the Eject list after the audit.

Intransit Media (Import)

After media are identified for entry by the Import Media command, but before entry by the AO, the subject media are placed in the `intransit` state. This state indicates that media are known by VolServ software but are not physically resident in an archive.

Bulk Load Media

The bulk load method is the best way to place a relatively large quantity of media into an automated archive. The media are installed by hand into an automated archive and followed by an audit operation. The audit is performed to logically enter the media into the VolServ database. This is an AO or client operation only and cannot be entered using the **Volume Server System** console.

Note

If media action modes are set for migrate, media migration can occur if a bulk load results in fill levels exceeding the media type or archive media class high marks.

Four prerequisites for using this method include:

- Each medium must have a barcode label affixed to it. The Reprint Media Label command can be used to print individual barcode labels. Refer to "Reprint a Media Label" on page 4-37 for more information.
- The archive must be configured with the auto check-in and auto import options selected. If not, all the subject media are placed on the Eject list after the audit (except for the DataTower archive; refer to "Unsolicited Enter of Unknown Media" on page 4-28).
- The auto import destination media class (set up during archive configuration) must have a capacity low enough to allow addition of more media. Excess media are placed on the Eject list after the audit.

Destination media class capacity - Fill level = Amount of media that can be entered

- The receiving archive media class fill level must be low enough to allow addition of more media. Excess media are placed on the Eject list after the audit.

Receiving archive media class capacity - Fill level = Amount of media that can be entered

In the last three cases, the DataTower moves excess media to its Eject port.

Unsolicited Enter of Unknown Media

The DataTower archive supports the unsolicited media enter operation. An unsolicited media enter operation is performed without VolServ system GUI interaction.

Note

If media action modes are set for migrate, media migration can occur if an unsolicited enter results in fill levels exceeding the media type or archive media class high marks.

During an unsolicited media enter operation, media are placed in the DataTower load port, followed by pushing a button above the load port. The archive robot reads the media labels and sends the media identifiers to VolServ. If any of the media in the load port are shown as checked-out by VolServ, the setting of the auto check-in parameter determines the action taken by VolServ.

If media to be entered are not labeled, the Reprint Media Label command can be used to print individual barcode labels or smaller, human-readable-only paper labels. Refer to “Reprint a Media Label” on page 4-37 for more information.

There are four prerequisites for using this method:

- Each medium must have a barcode label affixed to it. The Reprint Media Label command can be used to print individual barcode labels. Refer to “Reprint a Media Label” on page 4-37 for more information.

- The target archive must be configured with the auto check-in and auto import options selected. If not, all the subject media are left in the load port and a failure message is logged and displayed at the **Volume Server System** console.
- The auto import destination media class (set up during archive configuration) must have a capacity low enough to allow addition of more media. Excess media are left in the load port and a failure message is logged and displayed at the **Volume Server System** console.

Destination media class capacity - Fill level = Amount of media that can be entered

- The receiving archive media class fill level must be low enough to allow addition of more media. Excess media are left in the load port and a failure message is logged and displayed at the **Volume Server System** console.

Archive media class capacity - Fill level = Amount of media that can be entered

Enter Known Media into an Archive

All media can be classified as known or unknown. Unknown media were never introduced into a VolServ system or were removed using the Export Media command. Known media are contained in an archive, are checked out using the Check-out Media command, or are intransit to another archive as a result of a Move Media command, Mount Media command, or media migration.

Two basic ways to reenter known media into an archive are: the Check-in Media command and the unsolicited enter and AutoEnter methods.

Check-in Media into an Archive

The Check-in Media command enters checked out media into an archive. These media are placed on the Enter list. If media to be checked in are not labeled, labels must be provided. Refer to "Reprint a Media Label" on page 4-37 or use the Print Label option of the Import Media command.

Note

If media action modes are set for migrate, media migration can occur if a check-in command results in fill levels exceeding the media type or archive media class high marks.

Basic check-in parameters are the checkin media identifier, destination archive, and priority. The priority determines the command location in VolServ command queue.

Unsolicited Entry of Known Media

The DataTower archive supports the unsolicited media enter operation. An unsolicited media enter operation is performed without VolServ system GUI interaction.

Note

If media action modes are set for migrate, media migration can occur if an unsolicited Enter operation results in fill levels exceeding the media type or archive media class high marks.

After media are loaded into the DataTower load port, the AO pushes the LOAD button on the archive. The archive robot barcode reader scans the media label, retrieves the media from the load port, and places the media into bins.

Three prerequisites for using this method include:

- Each medium must have a barcode label affixed to it. The Reprint Media Label command can be used to print individual barcode labels. Refer to "Reprint a Media Label" on page 4-37 for more information.
- If the target archive is not configured with the auto check-in option selected, all media that are checked out are left in the load port and a failure message is logged and displayed at the **Volume Server System** console.
- The medium is returned to its previous archive media class. The fill level of its archive media class must be low enough to allow addition of more media. Excess media are left in the load port and a failure message is logged and displayed at the **Volume Server System** console.

Archive media class capacity - Fill level = Amount of media that can be entered

Remove Media from an Archive

Three basic ways to remove media from an archive include: the Export Media command, Check-out Media command, and Manual Eject command.

Export Media from an Archive

The Export Media command identifies media for removal from an archive. These media are placed on the Eject list. When the AO ejects the media, all information about those media is removed from the VolServ database. These media are then classified as unknown media.

Basic export parameters are the export media identifier, export comment, and priority. The export comment is optional and appears on the Eject list. This comment can be used to convey additional information, such as the source of the command. No format requirements exist, other than length. The priority is used to determine the command location in VolServ command queue.

Check-out Media from an Archive

The check-out media command is used to temporarily remove media from an archive. These media are placed on the eject list. unlike the export media command, media information is retained in the VolServ database after the AO ejects the media. These media remain classified as known media.

Basic check out parameters are the `checkout media identifier`, `checkout comment`, and `priority`. The `checkout comment` is optional and appears on the Eject list. This comment can be used to convey additional information, such as the source of the command. No format requirements exist, other than length. The priority is used to determine the command location in VolServ command queue.

Manual Eject Media from an Archive

The manual eject command is generally used when media in an automated archive cannot be retrieved by the robot. However, the manual eject command can be used for any reason. A medium cannot be retrieved when:

- A medium label cannot be read by a robot barcode reader.
- A medium has fallen on the archive floor.
- A medium becomes jammed in a tape drive.
- A medium is unavailable for any reason, such as the nonoperational robot or archive equipment.

In this operational scenario, the AO varies the archive to the off-line or maintenance state, opens the archive door, and removes the media. Then VolServ software is notified that the media were physically removed by the operator.

Unlike the export media command, media information is retained in the VolServ database after the Manual Eject command is executed. These media remain classified as known media.

The manual eject command is available over the GUI only. The manual eject parameters are manual eject media identifier and priority. The priority determines the command location in VolServ command queue.

The move media command is recommended for reentering media that were manually ejected. The unsolicited enter of a known media and bulk load methods can also be used.

Intransit Media (Manual Eject)

After media are identified using the manual eject command, the subject media are placed in the intransit state. This state indicates that media are known by VolServ software but are not actually physically in an archive.

Clear Eject List Entries

When media are placed on the eject list, one or more media on the list can be removed by the SA or SO using the clear eject command. Clear eject parameters are the clear eject media identifier and priority. The priority determines the command location in VolServ command queue.

Move Media to Another Archive

Sometimes media located in one archive must be moved to another archive. For example, it may be advantageous to move infrequently accessed media from an automated archive to a manual archive. Also, media that are in the `intransit` state can be reentered into an archive using the move media command.

Basic move parameters are the `move media identifier`, `destination archive`, and `priority`. The `priority` determines the command location in VolServ command queue.

Optional parameters are a wait for status on completed move option and move media only if both archives are attended option.

Before media can be moved, the destination archive must be associated with the same media class as the media.

Intransit Media (Move)

Media that are ejected from the source archive by the AO but not entered into the target archive are placed in the `intransit` state. This state indicates that media are known by VolServ software but are not physically resident in an archive.

Modify Media Criteria

Optional media criteria can be associated with each media using the modify media command. These are also referred to as user or client statistics. Examples of user or client statistics are: amount of usable space left on a medium, the most recent mount date, and a user name.

These user statistics are generally created and modified by client applications. However, the SA or SO can also create and change any user statistic. The primary use of user statistics is for the **Mount Media** command's mount by criteria option. This option allows media to be selected for mounting based on logical expressions that define a range of acceptable statistics values.

Implicit in this capability is the need for a client or SA to establish a policy to maintain a consistent set of criteria. After a statistic is defined, it should be consistently applied to each medium. It is the responsibility of each client or SA to establish such a policy and to update them during operations.

A total of eight user statistics can be specified for each medium. Four are character-based statistics and four are integer-based.

The **Modify Media** command is available over the GUI and API only. Modify media parameters are the media identifier, field index, and value. The field index entry specifies the target statistic to create or replace. The value entry is then associated with this field index number.

Define a Media Type

When the default media types supported by VolServ software are not sufficient, a new media type may be defined and registered with VolServ.

The **Define Media Type** command is used along with manual archives. Refer to "Define a Media Type" on page 3-18 for more information.

Reclassify Media

The **Reclassify Media** command moves media from one Media Class to another. A list of possible reasons for reclassification include the following:

- It can move blank media into any media class without requiring physical handling of the media.
- It can remove media from an archive media class before deleting the archive media class.
- A large Media Class can be split into smaller groups.
- Older media can be moved into a long-term storage media class.

Several restrictions apply to the use of the **Reclassify Media** command. Refer to the API reference manual for more information, but a few of the more important ones are repeated here:

- Media must be reclassified into another media class that uses the same media type.
- When reclassified media are resident in an archive, they are not moved to another archive. However, reclassified media do not have to be in an archive.
- A target archive media class capacity can be exceeded up to the point where the media class capacity is reached. However, media class migration results if the media class migrate option is selected.

Reclassify parameters consist of the reclassify media identifier, destination media class, and priority. The priority determines the command location in VolServ command queue.

Define or Delete a Label Pattern

A label pattern can be created at any time. The define label pattern command creates a label pattern and is covered in the initial configuration section of this manual. Refer to "Define a Label Pattern" on page 3-34.

Previously-defined label patterns can be deleted using the **Delete Label Pattern** command. Note that a label pattern definition cannot be changed. It must be deleted and defined again.

This command is available only via the GUI. The only command parameter is a label pattern name.

Reprint a Media Label

VolServ software allows media labels to be printed using the **Reprint Media Label** command. Both shelf labels and barcode labels can be printed using this command that is available only via the GUI.

DataShelf or Stage Archive Labels

The import media command can be used to print human-readable, paper media labels for the manual archives. The **Import** window print labels option is selected to print a label for each medium to be imported. These labels are intended for use in a manual archive environment.

The preformatted output is targeted to the Seiko smart label printer pro printer. The printer must be attached to the VolServ host computer or on the network to use VolServ to print barcode labels.

Barcode Labels

The **Reprint Media Label** command can be used to print labels for media that can be read by a barcode reader. These labels are primarily intended for use in labeling D2 media.

The **Import Media** command can be used to print barcode labels for use in automated archives. The **Import** window print labels option is selected to print a label for each medium to be imported.

The preformatted output is sent to the Intermec 4100 label printer. It must be attached to the VolServ host computer or the network to use VolServ to print barcode labels. The label stock is highly resistant to tear and wear.

System Reports

The system queries and reports provides information about the VolServ configured system. These reports provide configuration specific information to help manage the VolServ system for optimal performance.

All system queries and report operations can be performed via the GUI, CLI, or API, except where noted.

Query Archive

The **Query Archive** command queries VolServ to obtain information about an archive and associated parameters. A report is generated and can be sent to the screen, a specified file, or printer. See the screen under "Query Archive" on page 4-39. The default report produces the following information:

Field	Description
Archive	Name of archive
Archive Type	What type of archive the report was generated for; i.e., *AML/E*, *DataShelf*, *Stage*.
Current State	The state of the archive; whether it is *Online*, *Offline*, or *Diagnostic* state.
Archive Mode	Whether an operator is present (*Attended*) or not present (*Unattended*).
Console Display Location	What workstation the archive **Console** is displayed on.
Fill Mode	How the media is placed in the archive. *First fill*, *Wrap* or *None*.
Configure State	If the archive is configured or not being configured.
Drive ID	The drive names associated with the archive.

Field	Description
Media ID	The media located in the archive.
Media Class	Media Class associated with the archive
Media Type	The default type of media associated with the Media Class. Valid values are AIT, CTIII (DLT), CTIV (DLT), D2s, D2M, D2L, D3, DTF, DTF-2, LTO, MO5.25, NCTP, RF5.25, ST-120, 3480, 3490, 3490E, 8590, 9840, 8MM, 4MM, and USERTYPE.
Class Capacity %	The percent of the Media Class located in the archive.
Class Capacity	The maximum number of media associated with the Media Class that can be stored in the archive.
Current Fill Level	The actual number of media associated with the Media Class located in the archive.
Archive Capacity	The maximum number of media associated with the Media Class the archive stores.
Current Fill Level	The actual number of media associated with the Media Class located in the archive.
Assigned Locations	The number of media associated with the Media Class that are physically in the archive.
Auto Check-in	Whether or not auto check-in is enabled or disabled. Valid values are *on* or *off*.
Auto Import	Whether or not the auto import option is enabled or disabled. Valid values are *on* or *off*. If *Auto Import* is on, the following additional information is shown:

Field	Description
Media Class	The Media Class associated with the Media Class.
Manufacturer	The media manufacture name.
Batch	The lot or reference number associated with a group of media from a supplier.
Action	The action associated with the archive when the archive meets or exceeds the *Low Mark* or *High Mark* parameters. Valid values are *None*, *Notify*, or *Migrate*.

The **Query Archive** command can be tailored to show detailed information for drives, media, Media Classes and/or media type information associated with the archive. An example showing only a Media Class and media types is shown in the following screen display.

```
------------------------------------------------------------------------
    Archive Query Report    May 24 12:43:18 1999    1
------------------------------------------------------------------------
    Archive:          shelf1
------------------------------------------------------------------------
       Archive Type:                  DataShelf
       Current State:                 On-Line
       Archive Mode:                  Attended
       Console Display Location:      Columbia:0
       Fill Mode:                     None
       Configure State:               Not Being Configured

    MediaClass:       MC-D2M
       MediaType:                     D2M
       Class Capacity %:              50%
       Class Capacity:                40
       Current Fill Level:            2
       Action:                        None
```

```
MediaType:        D2M
   Archive Capacity:              40
   Current Fill Level:            2
   Assigned Locations:            2
   Auto Checkin:                  Off
   Auto Import:                   Off
   Action:                        None
```

Query Drive

The **Query Drive** command obtains information about one or more drives and associated parameters used in the VolServ system. A report is generated and can be sent to the screen, a specified file, or printer as shown in the following screen display. The default report produces the following information:

Field	Description
Drive ID	The drive identifier number for the drive being shown.
Drive Type	The type of drive; i.e. Magnetic, Optical, etc.
Associated Archive	Archive with which the drive is associated.
Current State	The state of the archive whether it is *Online*, *Offline, Diagnostic,* or *Unavailable*.
Assignment	If the drive is *Allocated* for a request or *Free* with no request pending.
Usage Count	Refer to “Create a Drive” on page 3-32 for a definition of this statistic.
Current Usage Time	Refer to “Create a Drive” on page 3-32 for a definition of this statistic.
Total Usage Time	Refer to “Create a Drive” on page 3-32 for a definition of this statistic.

Field	Description
Error Count	Refer to "Create a Drive" on page 3-32 for a definition of this statistic.
Mount State	Whether a medium is mounted or not mounted in the drive when the query was executed. Valid values are *Mounted* or *Unmounted*.
Mounted Media ID	Shows which medium is mounted in the drive.
Media Type Supported	The default type of media associated with the Media Class. Valid values are CTIII (DLT), CTIV (DLT), D2s, D2M, D2L, D3, DTF, DTF-2, LTO, MO5.25, NCTP, RF5.25, ST-120, 3480, 3490, 3490E, 8590, 9840, 8MM, 4MM, and USERTYPE.

```
-------------------------------------------------------
Drive Query Report            Mar 10 11:00:32 1999
-------------------------------------------------------
Drive ID:   1
-------------------------------------------------------

     Drive Type:                    Magnetic
     Associated Archive:            Stage1
     Current State:                 On-line
     Assignment:                    Free
     Usage Count:                   0
     Current Usage Time:            0
     Total Usage Time:              0
     Error Count:                   0
     Mount State:                   Unmounted
     Mounted Media ID:
     Media Type(s) Supported:       D2M
```

Query Drive Pool

The **Query Drive Pool** command obtains information about one or all drive pools. A report is generated and can be sent to the screen, a specified file, or printer.

The report can be tailored to include only the drive identifiers associated with the drive pool or a detailed report showing each drives' parameters associated with the drive pool. An example of each report is shown in the following screen display, drive pool query report. The default report produces the following information:

Field	Description
Drive Pool	The name of the drive pool.
Drive ID	The drives identifiers associated with the drive pool. For detailed reports, the drive identifier for the drive being shown.
Drive Type	The type of drive, such as Magnetic, Optical, etc.
Associated Archive	Archive with which the drive is associated.
Current State	The state of the archive whether it is *Online*, *Offline*, *Diagnostic, or Unavailable*.
Assignment	If the drive is *Allocated* for a request or *Free* with no request pending.
Usage Count	Number of times the drive is accessed.
Mount State	Whether a medium is mounted or not mounted in the drive when the query was executed. Valid values are *Mounted* or *Unmounted*.
Mounted Media ID	Shows which medium is mounted in the drive.

```
-------------------------------------------------------------------------------
Drive Pool Query Report      May 26 15:45:52 1999   1
-------------------------------------------------------------------------------
Drive Pool: drvpoolsml
-------------------------------------------------------------------------------
      Drive ID(s):  2    4    6    7
                    9    11   13   14
      •

Drive Pool: drvpooltwr
-------------------------------------------------------------------------------
      Drive ID(s):  7    11
      •
      •
Drive Pool: drvpoolstg
-------------------------------------------------------------------------------
      Drive ID(s):  1    3    9

-------------------------------------------------------------------------------
Drive Pool Query Report    May 25 15:03:52 1999    1
-------------------------------------------------------------------------------
Drive Pool: drvpoolsml
-------------------------------------------------------------------------------

Drive ID: 4
      Drive Type:                Magnetic
      Associated Archive:        Shelf2
      Current State:             Off-line
      Assignment:                Free
      Usage Count:               1
      Mount State:               Unmounted
      Mounted Media ID:

Drive ID: 7
      Drive Type:                Magnetic
      Associated Archive:        tower1
      Current State:             On-line
      Assignment:                Allocated
      Usage Count:               1
      Mount State:               Mounted
      Mounted Media ID:          MED041
```

Query Mount

The **Query Mount** command queries drives that can be used in a subsequent mount of a specified medium.

Upon receipt of the query request, VolServ determines which archive contains the specified medium. If the medium is in an archive, VolServ determines which drives in that archive (and only that archive) are suitable (based on the medium's type) for mounting the medium.The drives are listed in order of preference, based (in order of relative importance) upon their availability, proximity to the medium, and usage time. If the medium is not in an archive, no drive list is returned.

The report is sent only to the screen showing the status of the query request. An example of the query mount report is shown in the screen display below.

```
Medium [MED024] can be mounted on the following drives:
        1     Drive [14]
        2     Drive [12]
```

Query Media

The **Query Media** command obtains information about one or more media and associated parameters used in the VolServ system.

Note

A report for all media may take some time to run if there are many media controlled within the VolServ system.

A report is generated and can be sent to the screen, a specified file, or printer as shown in the following screen display, media query report.

A query media request can query any media in the VolServ system. The media specified in a single media query request are not required to be located in the same archive. The default report produces the following information:

Field	Description
Media ID	The media identifier number for the medium being shown.
Media Type	The default type of media associated with the Media Class. Valid values are AIT, CTIII (DLT), CTIV (DLT), D2s, D2M, D2L, D3, DTF, DTF-2, LTO, MO5.25, NCTP, RF5.25, ST-120, 3480, 3490, 3490E, 8590, 9840, 8MM, 4MM, and USERTYPE.
Media Class	The Media Class with which the medium is associated.
Assignment	If the medium is *Allocated* to be mounted or *Free* from pending mount requests.
Location State	Where the medium is physically located. Valid values are *Archive*, *Checkout*, or *Intransit*.
Current Archive	The name of the archive if the medium is physically located in an archive.
Pending Archive	The destination archive of an *intransit* medium.
Action State	The Action associated with the archive when the archive meets or exceeds the *Low Mark* or *High Mark* parameters. Valid values are *None*, *Notify*, or *Migrate*.
Import Date	The date and time the medium was entered into the VolServ system.

Field	Description
Last Access	The date and time the medium was last mounted.
Mount Count	The number of times the medium is mounted in a drive.
Move Count	The number of times the media is moved in and out of its bin location.
Manufacturer	The media manufacturer's name.
Batch	The lot or reference number associated with a group of media from a supplier.

```
-------------------------------------------------------------------------------------------------------------
Media Query Report     May 14 10:34:30 1999      1
-------------------------------------------------------------------------------------------------------------
Media ID:   MED001
-------------------------------------------------------------------------------------------------------------
   Media Type:                    SRTYPE
   Media Class:                   edclassstgusr
   Assignment:                    Free
   Location State:                Archive
   Current Archive:               stage1
   Pending Archive:
   Action State:                  None
   Import Date:                   May 13 12:06:15 1993
   Last Access:                   May 13 13:12:09 1993
   Mount Count:                   1
   Move Count:                    2
   Manufacturer:
   Batch:
```

```
Media ID:   MED015
-------------------------------------------------------------------------------------------------------------------
   Media Type:                    D2M
   Media Class:                   medclassmed
   Assignment:                    Free
   Location State:                Intransit
   Current Archive:
   Pending Archive:               shelf1
   Action State:                  Move
   Import Date:                   May 13 16:25:39 1993
   Last Access:                   May 13 16:40:53 1993
   Mount Count:                   0
   Move Count:                    0
   Manufacturer:                  MediaMaker ABC
   Batch:                         1001
```

Query Media Location

The **Query Media Location** command obtains information about a specified medium or multiple media used in the VolServ system. A report is generated and can be sent to the screen, a specified file, or printer. This query is only available though the GUI.

The report shows the medium's location state, current archive, and bin location. If an AML/E archive is shown, an additional field *Location Type*, is added to the report as shown in the screen display on "Query Media Location" on page 4-49. The default report produces the following information:

Field	Description
Media ID	The medium's identifier number.
Location State	Where the medium is physically located. Valid values are *Archive*, *Checkout*, or *Intransit*.
Current Archive	The name of the archive if the medium is physically located in an archive.

Field	Description
Bin Location	The location of the medium in the archive. If the medium is in the *intransit* state, the *Bin Location* shows all zeros.

```
-------------------------------------------------------------------------------------------------------------
Media Location Query Report   May 25 15:03:52 1999   1
-------------------------------------------------------------------------------------------------------------
Media ID: 0000082
-------------------------------------------------------------------------------------------------------------

      Location State:            Intransit
      Current Archive:
      Bin Location:              0,0,0,0
      2

Media ID: 0000083
-------------------------------------------------------------------------------------------------------------
      Location State:            Archive
      Current Archive:           DataStage
      Bin Location:              0,3,1,0


Media ID: 0000086
-------------------------------------------------------------------------------------------------------------
      Location State:            Archive
      Current Archive:           AMLE
      Location Type:             Storage Unit
      Bin Location:              T501010101
```

Query Intransit Media

The **Query Intransit Media** command obtains information about media in the `Intransit` state.

A medium is considered to be `Intransit` if it meets any of the following conditions:

- The medium is waiting to be entered into an archive because of an Import, Mount, Move, Check-out, or migration activity processing.
- It was removed using a **Manual Eject** command or the Enter operations failed by the AO.

The report is sent only to the screen showing the status of the query request. An example of the query intransit media report is shown in the screen display page 4-51.

```
---------------------------------------------------------------------------------------------------------------------
Intransit Query Report           May 14 09:45:57 1999
---------------------------------------------------------------------------------------------------------------------

Media ID(s):MED007   MED025   MED040
```

Query Media Class

The **Query Media Class** command obtains information about a specified Media Class or all Media Classes used in the VolServ system. A report is generated and can be sent to the screen, a specified file, or printer as shown in the media class query screen display. The report may vary if a Media Class name is specified or not specified.

- If a Media Class name is specified, the following reports are available:
  - A report showing the Media Class name and associated parameters.
  - A report showing the Media Class name and a list of media associated with the Media Class.
  - A report showing the Media Class name and a detailed listing of all media associated with the Media Class.
- If no Media Classes specified, the following reports are available:
  - A report showing all Media Class names and associated parameters.
  - A report showing all Media Class names and a listing of all media associated with each Media Class.

- A report showing all Media Class names and a detailed listing of all media associated with each Media Class.

Note

A report showing Media Classes with a detailed listing of all media may take some time to run if there are many media controlled within the VolServ system.

The default report produces the following information:

Field	Description
Media Class	The Media Class name.
Media Type	The default type of media associated with the Media Class. Valid values are AIT, CTIII (DLT), CTIV (DLT), D2s, D2M, D2L, D3, DTF, DTF-2, LTO, MO5.25, NCTP, RF5.25, ST-120, 3480, 3490, 3490E, 8590, 9840, 8MM, 4MM, and USERTYPE.
Capacity	The maximum number of media defined for the Media Class.
Current Fill Level	How many Media Class media currently exist.
High Mark %	A defined Media Class value when met or exceeded results in a priority level 1 message being sent to the **Volume Server SysLog Console**.
Mountable by Class	A mount option allowing the Media Class to be mounted by Media Class. Valid values are *Yes* or *No*.
Notify Comment	Media Class specific message to be sent if Media Class *High Mark %* is met or exceeded.

Field	Description
RPC Option	The RPC option used by the Media Class for status. Depending on the option, additional fields are displayed.
No Callback	When the enterprise callback option is enabled, media class callbacks are not returned. Additional fields: None
Enterprise Callback	When the enterprise callback option is enabled, the destination of media class callbacks is directed to an Internet address associated with an enterprise identifier. Additional fields: *Enterprise ID*.
Standard Callback	When the standard callback option is enabled, the destination of media class callbacks are directed to a specific RPC address. Additional fields: *HostName*, *Program Number*, *Version Number*, *Procedure Number*, and *Protocol*.
Media ID	The media identifier number for the medium being shown.
Media Type	The type of media.
Media Class	The Media Class with which the medium is associated.
Assignment	If the medium is *Allocated* to be mounted or *Free* from pending mount requests.
Location State	Where the medium is physically located. Valid values are *Archive*, *Checkout*, or *Intransit*.
Current Archive	The name of the archive if the medium is physically located in an archive.

Field	Description
Pending Archive	The archive to where the medium is migrated if migrate was selected under the **Action** option of the archive configuration.
Action State	The Action associated with the archive when the archive meets or exceeds the *Low Mark* or *High Mark* parameters. Valid values are *None*, *Notify*, or *Migrate*.
Import Date	The date and time the medium was entered into the VolServ system.
Last Access	The date and time the medium was mounted.
Mount Count	The number of times the medium is mounted in a drive.
Move Count	The number of times the media is moved in and out of its bin location.
Manufacturer	The media manufacture name.
Batch	The lot or reference number associated with a group of media from a supplier.

```
-------------------------------------------------------------------------------
Media Class Query Report         May 14 10:09:11 1999    1
-------------------------------------------------------------------------------
Media Class: medclassstgusr
-------------------------------------------------------------------------------
      Media Type:                USRTYPE
      Capacity:                  20
      Current Fill Level:        2
      High Mark %:               80%
      Mountable by Class:        Yes
      Notify Comment:            Media exceed high mark
      RPC Option:                No Callback

Media Class: medclasssh2med
-------------------------------------------------------------------------------
      Media Type:                D2M
      Capacity:                  20
      Current Fill Level:        3
      High Mark %:               80%
      Mountable by Class:        Yes
      Notify Comment:            Media exceed high mark
      RPC Option:                Enterprise Callback
      Enterprise ID:             3

Media Class: medclasssh2sml
-------------------------------------------------------------------------------
      Media Type:                D2S
      Capacity:                  20
      Current Fill Level:        2
      High Mark %:               80%
      Mountable by Class:        Yes
      Notify Comment:            Media exceed high mark
      RPC Option:                Standard Callback
      HostName:                  copper
      Program Number:            1
      Version Number:            1
      Procedure Number:          1
      Protocol:                  TCP
```

Query Media Type

The **Query Media Type** command is used to obtain information about one or more media types used in the VolServ system. A report is generated and can be sent to the screen, a specified file, or printer as shown in the screen display below.

The default report produces the following information:

Field	Description
MediaType	The default type of media associated with the Media Class. Valid values are AIT, CTIII (DLT), CTIV (DLT), D2s, D2M, D2L, D3, DTF, DTF-2, LTO, MO5.25, NCTP, RF5.25, ST-120, 3480, 3490, 3490E, 8590, 9840, 8MM, 4MM, and USERTYPE.
Capacity	The amount of memory in megabytes in the medium.
Number of Sides	The number of writable surfaces on the media.

```
------------------------------------------------------------------------------
Media Type Query Report        May 24 12:43:18 1999
------------------------------------------------------------------------------
MediaType:                     D2S
------------------------------------------------------------------------------
         Capacity:             25000.00 megabytes
         Number of Sides:      1
         •
         •
         •
MediaType:                     3480
------------------------------------------------------------------------------
         Capacity:             200.00 megabytes
         Number of Sides:      1
```

Query Request

The **Query Request** command is used to obtain information about a specific request. The request identifier assigned by VolServ software must be used.

Upon receipt of a request query request, VolServ searches its request queue for the specified request identifier. If the specified request is not found, status is returned to the requestor indicating a non-existent request. If the request is found, the attribute values associated with the request are returned to the requestor as shown in the screen display on page 4-59.

After a request completes, the request shows a state of *complete* for a short time. Afterwards, all knowledge of the request is removed from the VolServ system and any subsequent queries for the command fails.

The report can be sent to the screen, a specified file, or printer. The default report produces the following information:

Field	Description
Request ID	The request identifier associated with the report. The format of the request identifier is DDD:nnnn • DDD = Numeric, three digit day (range: 001-365) • nnnn = Numeric, computer generated four-digit number
Request Type	The type of action the request executes.
Priority	The execution priority level of the command. Valid values are 0 to 35.
Time	The date, time, and year the request query was submitted for the specified request.

Field	Description
Current State	The present state of the request at the time of the query. Valid values are: *Executing*, *Waiting*, and *Complete*.

```
-------------------------------------------------------------------------------------------------------------
Request Query Report   May 24 12:43:18 1999    1
-------------------------------------------------------------------------------------------------------------
Request ID:   93:144:02136
-------------------------------------------------------------------------------------------------------------
     Request Type:                Move
     Priority:                    15
     Time:                        May 24 12:41:54 1999
     Current State:               Executing
```

Query Connect

The **Query Connect** command provides a list of all client internet addresses currently associated with a specified enterprise identifier. A report is generated and can be sent to the screen, a specified file, or printer as shown in following screen display.

The **Query Connect** command can be executed from either the CLI or GUI and from the client API. However, only the GUI allows for all enterprise identifiers to be queried for. From the client interface, only one enterprise identifier can be specified within a single command. This restriction prevents any single client from listing the clients of other enterprises being serviced by VolServ.

The default report produces the following information:

Field	Description
Enterprise ID	The enterprise identifier number associated with the report.
Client #	The associated Client's number.
Socket Family	The socket domain.
Socket Port	A 16-bit port number.
Internet Address	A 32-bit network identifier with host identifier.
Program Number	Number associated to application.
Version Number	Version of application number.
Procedure Number	Internal handling of system calls.

```
-------------------------------------------------------------------------------------------------------------------
Connect Query Report   May 24 12:43:18 1999    1
-------------------------------------------------------------------------------------------------------------------
Enterprise ID:   3
-------------------------------------------------------------------------------------------------------------------
Client #: 1
      Socket Family:            10
      Socket Port:              1
      Internet Address:         300
      Program Number:           3300016
      Version Number:           2
      Procedure Number:         11
```

Client Operations

Three commands are exclusively available via the API. These are the **Connect**, **Disconnect**, and **Multimount Media** associate commands.

Connect

When a client issues a **Connect** command, the sending host becomes a member of an Enterprise. An Enterprise is a group of clients that communicate with the VolServ host computer.

When a client establishes an Enterprise connection, a unique address is associated with it. This address is associated with a parameter called the Enterprise ID. The Enterprise ID may then be used as a target location for all media class callbacks. Refer to the `VSCMD_Connect` command in the *MSTM-V21-010 API Programmer's Guide* and "Use Callbacks and Callback Information" on page 3-23 for more information.

Disconnect

The **Disconnect** command destroys a specific Enterprise that was established with the Connect command. For more detailed information about this command, refer to the `VSCMD_Disconnect` command in the *MSTM-V21-010 API Programmer's Guide*.

Multimount Media

Clients use the **Multimount Media** command to mount one medium or more at one time. This frees the client from the requirement of finding available drives, locking the drives, finding applicable media, mounting the media on the locked drives, and unlocking those drives.

All functionality of the mount command is retained in this command. Refer to "Mount Media on a Drive" on page 4-18.

The **Multimount Media** command fails for the same reasons that any single **Mount Media** command fails. In addition, a **Multimount Media** command fails for any of the following conditions:

- If the number of mount requests exceeds the number of on-line drives.
- If improper syntax is detected.
- If deadlock is detected.
- If another multimount command is presently executing.

For more detailed information about this command, refer to the **VSCMD_MultiMount** command in the *API Guide*.

NOTES

NOTES

5 Archive Operations

Roadmap

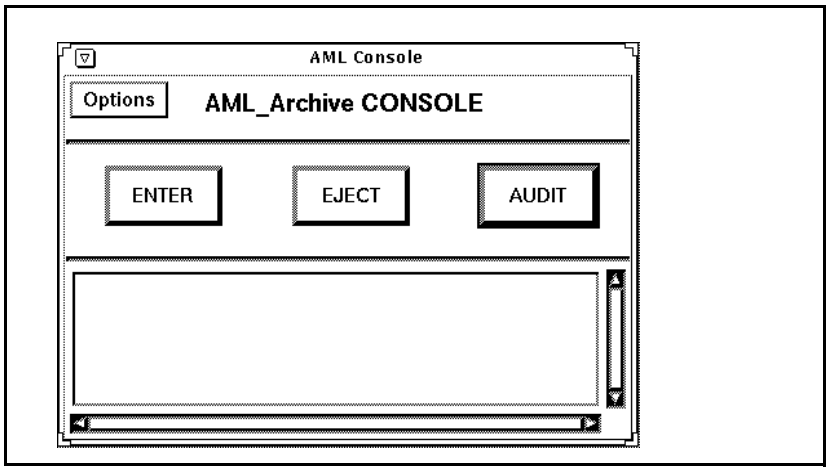
Topic	Refer To Chapter
General software installation information	1
Hardware and software start-up	2
Site-specific configuration of archives and drives	3
Daily operation.	4
Archive operation and configuration	5
Troubleshooting tips and solutions	6

Automated Archive Operations

This chapter describes the operations performed by the VolServ Archive Operator (AO) during normal operations. An archive **Console** prompts most AO operations. Each configured archive displays an archive **Console**. The display location of each is determined when an archive is configured.

The set of archive **Console** operations depend on whether the configured archive is automated or manual. An automated archive **Console** contains three operation options: **ENTER**, **EJECT**, and **AUDIT**. Both manual archive consoles contain these three plus the **MOUNT** and **DISMOUNT** options (and **OTHER** for the Shelf archive)

All operations are initiated through the archive **Console**. Each automated archive **Console** has three operation options. See the following screen display.



Many situations require the AO to perform media handling operations. Most media handling is required because of VolServ command execution, such as Import, Export, Check-in, Check-out, Move, or Mount Media commands. Media movement triggered by the media migration policy also requires that an AO perform media handling. Refer to "Define Media Migration Policy" on page 4-10. With some exceptions, the audit operation does not require media handling.

Enter Media

An AO is alerted that a medium or media must be entered into an archive when the **ENTER** button on the archive **Console** is highlighted. When the AO selects the highlighted option, an Enter window is displayed. Selecting the **View/Fail** button from this window displays the Enter list. The media on this list identifies each medium to be entered into the archive. Media are identified by media identifier, reason for the enter, previous archive location (if applicable), and priority.

The AO then locates the media in the Enter list, places them in the automated archive load port, and completes the command. Refer to *Using the VolServ GU*I for specific procedures.

It is best to think of the **ENTER** button on an archive **Console** as an indicator that media are on the Enter list. Five reasons exist that place media on the list: import, checkin, move, mount, and migrate.

Media are placed on the Enter list as a direct result of the **Import** and **Check-in Media** commands. As soon as an Import and Check-in Media commands are executed, the identified media are placed on the Enter list and the **ENTER** button becomes highlighted.

Media are placed on the Enter list as an indirect result of **Move** and **Mount Media** commands and media migration movement. Before a medium is contained in an archive Enter list for the reasons of move, mount, or migrate, it must first be ejected from another archive. The **ENTER** button on the destination archive **Console** is highlighted only after these media are ejected from the source archive.

The previous archive location listed for each medium on the Enter list is not applicable to imported media. Such media are unknown to VolServ software.

The Enter list priority entry for each medium indicates a command priority that is specified by the client. This entry is not applicable to media that are migrated.

Media on the Enter list can be removed by the AO. Selecting the **View/Fail** button of the **Enter** window allows the AO to remove some or all media on the Enter list.

To enter media without direction from VolServ software, the AO selects the **ENTER** button. The **Enter** window is then displayed. The AO inputs the Enter Port ID and Media Type into the **Enter** window. Media must be placed in the load port. The exact method of placing media in this port varies according to the type of archive being accessed. Refer to the *Using the VolServ GUI* book for the appropriate procedures.

When the **Enter** window **ENTER** button is selected, the archive robot reads the labels of the media in the load port and reports them to VolServ software. If a medium is unknown to VolServ software, it is imported into the target Media Class specified when the automatic import option is selected. If a medium is checked out, the medium is checked in to its default media class if the automatic checkin option is selected.

All media that are entered or checked in are moved to bins inside the archive. When either auto check-in or auto import options are not selected, intransit or checked -out media is left in the port and/or identified on the Eject list.

Eject Media

An AO is alerted that a medium or media must be removed from an archive when the **EJECT** button on the archive **Console** is highlighted. When the AO selects the highlighted option, a list of media is displayed. This Eject list identifies each medium to be removed from the archive. Media are identified by media identifier, reason for the eject, destination archive (if applicable), priority, and comment (if supplied by client).

The AO selects eject candidates from the Eject list, selects the eject port identifier, and then executes the command. Then the AO removes the media from the automated archive unload port and completes the command. Refer to the *Using the VolServ GUI* book for specific procedures.

The **EJECT** button on an archive **Console** is considered an indicator of media on the Eject list. Media are placed on the Eject list as a direct result of the Export, Check-out, Move, and Mount Media commands or because of media migration movement. As soon as media are placed on the Eject list, the **EJECT** button highlights.

The destination archive listed for each medium on the Eject list is not applicable to exported or checked-out media. After media are ejected, exported media become unknown to VolServ software. Checked-out media are placed in a checkout state.

The Eject list priority entry for each medium indicates a command priority that is specified by the client. This entry is not applicable to media that are migrated.

A comment field lists an optional comment for each medium. The client defines these comments when the **Export** or **Check-out Media** commands are executed. This field is not applicable for Move or Mount Media commands.

Media on the Eject list can be removed by the AO. When the highlighted **EJECT** button is selected, an **Eject** window is displayed. Some or all of the media listed in the **Eject** window can be selected. Selecting the **Fail** button removes the media on the Eject list.

Commands can also be removed from the Eject list by the VolServ System Administrator (SA) or VolServ System Operator (SO). Refer to "Clear Eject List Entries" on page 4-33.

Audit

Select the **AUDIT** button when a suspected discrepancy occurs between the actual inventory of media in an archive and the inventory contained in the VolServ database.

Two types of audit operations for automated archives include: a Standard Audit and a Remap Audit. All automated archives have a Standard Audit capability. The Remap Audit capability is supported only by archives with their own internal databases (DataTower, StorageTek ACS product family, and AML archives).

When either type of audit completes, VolServ displays the audit report on the archive **Console**. If errors are reported during the audit, the SA or SO performs necessary cleanup actions and performs a second audit. Refer to "Auto Check-in During Audit" on page 3-10, "Auto Import During Audit" on page 3-12, and "Audit an Archive" on page 4-14 for more detailed information about audit.

Standard Audit

During a Standard Audit, VolServ commands the robot to look into each specified bin and to read the external label on any medium present. Thus, the actual content of each bin is compared against the VolServ database. Depending on the number of bins to audit, a Standard Audit can take a long time to complete.

There are archive-dependent differences that exist in the way a Standard Audit is performed.

The DataTower archive provides the most autonomous Standard Audit capability of all supported archives. When a Standard Audit command is sent, the archive commands a robot to scan each bin for media, builds a list of media found, and performs a set of synchronizing operations to update its own database.

Note

When audited, the entire DataTower archive is scanned.

The archives send the list of media found with the results of their own database synchronization actions to the VolServ host computer. For the DataTower archive, a list of mounted media is also appended to the list of media found. VolServ software then performs its own set of synchronizing operations.

VolServ software performs two operations whenever a StorageTek ACS product family Standard Audit is requested. The archives send the cumulative discrepancy report that is used by VolServ software to update its database. VolServ then sends a request for a total inventory list (for example, a remap operation). This information is used to update the VolServ database, if necessary. That is, a Standard Audit command results in a discrepancy report and a map list for use by VolServ software.

When an AML archive Standard Audit is performed, the archives require that no media be mounted before executing an audit. If any media are mounted, the audit fails. If a mount request is issued while an audit is in progress, the mount will fail.

Under normal conditions, VolServ software begins the audit by directing the archive to perform a physical audit and report the results. A mounted medium is not scanned by any automated archive robot, but the AML AMU does not report the medium present in the drive. Therefore, VolServ logic assumes the medium is not present in the archive and logically ejects it from the VolServ database. However, the medium is still present in the AML archive and database.

To prevent an audit from occurring when media are mounted, VolServ uses information from the AML AMU. The AML database shows mounted media in two tables: one for being in the archive, another for being mounted. VolServ first retrieves the mount table information. If any media are in the table, the audit fails.

Remap Audit

During a Remap Audit, automated archives with their own internal databases report the contents of their databases. These archives include the DataTower, StorageTek ACS product family, and AML archives.

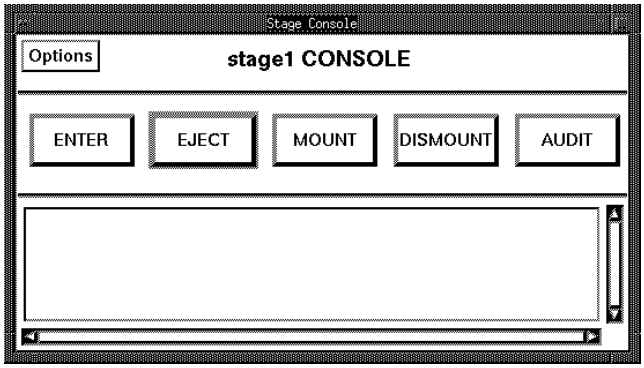
VolServ database is updated to reflect the reported information. No robotic movement is required when performing a Remap Audit. This process takes considerably less time to perform than a Standard Audit. It should be performed when the VolServ database is suspect but the archive database is intact.

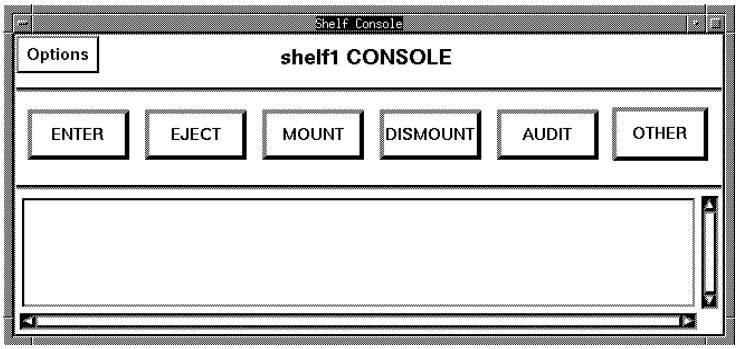
Unsolicited Enter Operation

This subject is covered in detail in "Unsolicited Enter of Unknown Media" on page 4-28 and "Unsolicited Entry of Known Media" on page 4-30.

Manual Archive Operations

All operations are initiated through the archive **console,** see the following two screen displays. The **Stage console** has five operation options. The **DataShelf console** has six operation options.





Enter Media

The Manual Archive Enter operation is analogous to the Automatic Archive Enter operation with one exception. The VolServ AO does not enter media into a load port for either manual archive type.

For a DataShelf archive, the AO places each medium into a specific bin. The Stage archive is unstructured and requires that the AO locate the media to be entered and acknowledge the command.

Eject Media

The Manual Archive Eject operation is analogous to the Automatic Archive Eject operation with one exception. The AO does not remove media from an unload port for either manual archive type.

For a DataShelf archive, the AO removes each medium from a specific bin. The Stage archive is unstructured and requires that the AO locate the media to be ejected and acknowledge the command.

Mount Media

All manual archive media mounts are performed by the AO. Refer to the *Using the VolServ GUI* book for a detailed procedure.

Dismount Media

All manual archive media dismounts are performed by the AO. Refer to the *Using the VolServ GUI* book for a detailed procedure.

Audit

As with an automated archive, the **AUDIT** button is selected whenever a suspected discrepancy occurs between the actual inventory of media and the inventory contained in the VolServ database.

Unlike the automated archive, VolServ software generates an inventory list of media contained in its database for that archive. The AO then visually verifies the audit list. Any discrepancies found must be resolved by the AO.

Reprint Label

DataShelf only: It presently contains only one command. This is the **reprint shelf label** command.

This command prints human-readable shelf labels one at a time on the Seiko Smart Label Pro printer.

NOTES

6

Troubleshoot

Roadmap

Topic	Refer To Chapter
General software installation information	1
Hardware and software start-up	2
Site-specific configuration of archives and drives	3
Daily operations	4
Archive operation and configuration	5
Troubleshooting tips and solutions	6

Troubleshoot Resources

This chapter contains troubleshooting tips for problems that VolServ users have actually experienced. However, before reviewing this chapter for a solution to a problem, take a moment to read about some time-saving VolServ resources that are available.

These resources are:

- The VolServ logs—usually located in the `$VS_DIR/logs` directory, provide many solutions to software problems. These logs are easy to access and are usually configured to be readable by the VolServ System Administrator (SA) and VolServ System Operator (SO). Consult these logs if the nature or the source of the problem is unclear.
- The VolServ documentation—is useful when difficulties occur. For example, each ADIC software product is capable of generating user messages. The VolServ *Error Messages* book provides the added information on the meaning of the message and what action, if any, is required. The *Administrative Tasks* book also contains helpful information about the ADIC product family, administration, and operations of the VolServ product.

If these resources cannot help identify and resolve the problem, contact the ADIC technical assistance center (ATAC). ATAC provides technical assistance and maintenance for all ADIC hardware and software products.

Tip

When contacting ADIC technical support, the site license string may be requested. Please be sure to have it available.

ATAC support is available 24 hours a day, 7 days a week at the following numbers:

- In the USA and Canada, call 1-800-827-3822.
- Outside the USA and Canada, call 303-874-0188 or toll-free 00800-9999-3822.
- Send e-mail to: support@adic.com.

User Environment

	Problem	Solution
Display Features	Does a display feature exist that alerts the user each time a status or a message is received?	On all consoles, an **Options** button is located in the upper left corner. If selected, a pull-down menu displays with **Status Beeps**. If **Status Beeps** is selected, a beep is heard each time status or a message is received**.**
Label Patterns	How should the NEXTID for label patterns be redefined so some media numbers can be skipped?	To redefine the NEXTID of the label patterns for the skip feature, run `$VS _DIR/utilities/updatepattern`. Note, however, it is important to enter a NEXTID that matches the defined pattern.
List Selections	How can sweep (i.e., highlighting items from list boxes by sweeping across the items) of multiple items in an archive **Console** list be done?	A feature on all of the archive **Consoles** is a **Sweep Select List** toggle under the **Options** button in the upper left corner. When activated, all of the lists in the archive **Console** allow sweep selection instead of the usual one-at-a-time selection. Toggle this feature again to return to the one-at-a-time selection mode

	Problem	Solution
Log Files	How can VolServ log files be backed up on a regular basis?	VolServ automatically backs up log files. The time between backups can be set by changing the `LOG_BACKUP_TIME` environment variable in the `$VS DIR/config/envvar.config` file. This variable is the amount of time in hours between backup attempts. Thus, if VolServ is to back up the logs every day, the variable is set to 24. The number of days of logs can be controlled by modifying the `NUM_LOG_DAYS` environment variable in the `$VS_DIR/config/envarr.config` file. This variable tells VolServ how many days of logs to track. Any logs older than the number of days are deleted
	How can the size of the VolServ log files be controlled so they do not get too big?	VolServ's automatic backup ensures the manageability of the log files by truncating the old ones. However, the size of the new logs can be controlled by modifying the `VSCLEAN_LOG_SIZE` environment variable in the `$VS_DIR/config/envarr.config` file. This variable tells VolServ how large a log file can become before it is backed up.
	Can the VolServ log files be backed up at any time?	**Caution:** Never move or delete log files using UNIX commands while VolServ software is running. Yes. Run the `movelogs` utility. Enter **`$VS_DIR/utilities/movelogs`**. This performs the same process as the automated backup. When running the utility, choose the option that ignores the size of the logfiles and specifies logfile backup and old logfile truncation.

	Problem	Solution
Status Window Scrolling	The status window displays all of the messages when scrolling is performed. When attempting to scroll up to read them, as more messages come in, the scroll reverts to the bottom.	If the right mouse button is pressed with the cursor in the status window, a menu of options displays. Select the **Auto Scroll** toggle button. When the toggle is off, the status window does not scroll automatically. When the toggle is on, this window always scrolls to the bottom when it receives status.
Volume Server SysLog Consoles	The status window displays all of the messages when scrolling is performed. When attempting to scroll up to read them, as more messages come in, the scroll reverts to the bottom.	If the right mouse button is pressed with the cursor in the status window, a menu of options displays. Select the **Auto Scroll** toggle button. When the toggle is off, the status window does not scroll automatically. When the toggle is on, this window always scrolls to the bottom when it receives status.
	How can the width of the Volume Server SysLog Console be changed to ensure that it stays the same each time VolServ software starts?	To ensure a consistent console width, perform the following procedure: Step 1: Change to the `$VS_ DIR/gui` directory. Step 2: Edit the `Sys_ console` file. Step 3: Search for the line that starts with `sys_console.\ consoleForm.width`. Step 4: Change the integer value in the line to the appropriate width. Step 5: Save the file, then exit. Step 6: Run **`volserv -d`** to redisplay the **Volume Server SysLog Console** with the configuration changes.

	Problem	Solution
Volume Server SysLog Consoles (continued)	How can the height of a Volume Server SysLog Console be changed to ensure that it stays the same each time VolServ software starts?	To ensure a consistent Sys-Log height, perform the following procedure: Step 1: Change to the `$VS _DIR/gui` directory. Step 2: Edit the `Sys_ console` file. Step 3: Search for the line that starts with `sys_console.\ consoleForm.height`. Step 4: Change the integer value in the line to the appropriate height. Step 5: Save the file, then exit. Step 6: Run **`volserv -d`** to redisplay the **Volume Server SysLog Console** with the configuration changes.

Initialization/ Configuration

Note

The `cleanconfig` utility can be run for an archive configure/reconfigure process that has terminated abnormally.

	Problem	Solution
Clear Configuration in Progress Flags	During reconfiguration, configuration in progress flags are received even though none is actually configuring. How can these flags be cleared?	To clear the Configuration in Progress flags, run the **cleanconfig** script in the `$VS DIR/utilities` directory. When the message **Are you sure you want to do this?** is displayed, enter **y**. All of the Configuration in Progress flags are cleared.
Initialize vswin Software	Why is the **vswin** software not always able to initialize on a remote terminal?	The **vswin** software does not initialize if executed without running the **xhost** command. This command enables the remote computer to act as host for the local workstation. To initialize the **vswin** software, perform the following procedure: Step 1: Change to the *$*`VS DIR/logs` directory. Check the `vslogfile` file for clues. Step 2: Enable access to the remote host. Login to the local workstation. Issue the **xhost remote_host_name** command. Step 3: Set the environment DISPLAY variable to ensure that the **vswin** software appears to initialize when executed on a remote host. Login to the remote host computer. Issue the **setenv DISPLAY local_workstation_name:0** command.

	Problem	Solution
(continued)		Step 4: Verify ownership and protection owned by root. Check the binary file to ensure that the **vswin** software initializes when executed on an IBM. Ensure that **vswin** in the `$VS_DIR/bin` directory has set the correct ownership and protection. The ownership should be root and the protection should be 755.
Invalid Archive Error Message	Why does VolServ software display an invalid archive error message when a user tries to assign a media class (using the Create Archive Media Class) to a successfully configured archive.	VolServ must be cycled to recognize the newly-configured archive.
Software Connection	What should be done if VolServ cannot connect to the archive?	If VolServ cannot connect to the archive, issue a **ping** for the host name of that archive. If the ping is unable to communicate, a network problem exists that needs correction.
Software Initialization	What should be done if VolServ does not initialize?	If VolServ does not initialize, perform the following procedure: Step 1: Verify that the login is correct. Step 2: Ensure the VolServ license string is correct. Step 3: Ensure access to the database. Step 4: Verify the system environment variables. Step 5: Verify the path. Step 6: Verify the vslogfile file ownership and protection. Step 7: Verify that no subprocesses are active.

	Problem	Solution
(continued)		Step 8: Verify the availability of all executables. Step 9: Enable access to the remote host. Step 10: Verify ownership and protection. Note that the vswin software may not initialize when executed on an IBM if the binary file is not owned by root.
Workstation Shutdown	What is the graceful way to shutdown a workstation?	Perform the following procedure. This procedure assumes that the user is logged in as `vsadm`, and VolServ and `vswin` are running. Step 1: From a `vsadm` shell window, gracefully shutdown VolServ by entering: **`volserv -t.`** When VolServ completes its termination procedures, a **VolServ shut down completed** message is displayed and the vsadm prompt reappears. The **Volume Server SysLog Console** window and archives **Console** windows disappear during VolServ termination procedures Step 2: On the **Volume Server System** console, select the **Options** window in the upper left and select **Exit** from the pull-down menu. Step 3: Verify that it is OK to quit. Step 4: The VolServ host can now be gracefully shut down.

	Problem	Solution
Newly Created Archives	Why doe VolServ not keep a record of newly created archives?	Newly created archives remain unknown to VolServ until the software is cycled after the archive is created. If, after creating an archive, further operations involving the archive result in error messages (for example, **This archive does not exist**.), cycle VolServ by issuing the **volserv -t** command then the **volserv** command. After cycling the software, continue operating as usual.
Unnecessary Core File	What should be done if a core file exists in the `$VS_DIR/bin` directory	A core file usually exists when a VolServ software process terminates for an unknown reason. This termination indicates that a problem exists in VolServ. Report the problem to ATAC. To assist ATAC in solving the problem, perform the following procedure: Step 1: Save the core file. Step 2: Record the time of process termination. Step 31: Save all of the logs for the time period in which the problem occurred. Step 4: If possible, record the steps followed to produce the core. Step 5: Identify which VolServ software process terminated by reviewing the logs. Step 6: If the information is unavailable in the logs, issue the following command in the directory containing the core: **`adb -core.`** Save any information shown. Step 7: Run **`$q`** to exit out of the `adb`.

Archive Specific Issues

	Problem	Solution
Audit a DataTower Archive	What steps should be taken when auditing an entire DataTower archive and discovering that a duplicate media identifier (ID) exists, but the status and the Media Location query only list one location?	To bring the duplicate into the tower database and to provide a location, remove the medium from the location indicated in the status window and the Media Location query. Then repeat the audit on the tower archive. This action brings the duplicate into the tower database and provides a location.
Mount Media Command	A Mount Media command was issued, but a hardware error occurred. After the problem was corrected, the command was reissued and failed, but the medium was found in the drive.	Mount Media commands are suspended until executed if a hardware failure occurs. The second request fails and causes the Cassette Load Mechanism (CLM) to be varied *OffLine* and the drive is unavailable for other mounts. Use the Manual Eject command to remove the medium, physically remove the medium, and vary the CLM to the *OnLine* state. Reenter the medium using the Unsolicited Enter operation.
Support of Priority and Optional CAP Audit of StorageTek ACS Product Family Archives	Why does Release 2.0 not support the priority and optional CAPs of a StorageTek ACS product family archive?	It does. However, as media are entered into the StorageTek ACS product family archive with either of these CAPs, the media is not recognized as entered until a remap audit is performed.

	Problem	Solution
Erratic Behavior	Erratic behavior occurs in the archive, but the VolServ logs do not indicate any problems.	The ACS workstation, which is part of all StorageTek archive systems, receives unsolicited status directly from its associated StorageTek ACS product family archives. Check the logs at the ACS workstation for any component status changes. Refer to the StorageTek equipment books.
Audit Disaster Recovery	An audit operation is interrupted because of loss of power or triggering safety interlocks.	The audit operation l fails until VolServ is cycled. Cycle VolServ by issuing the **`volserv -t`** command, then the **`volserv`** command. After recycling the software, execute the Audit command again.

General Database Issues

For any database questions or general concerns please contact ADIC technical support.

	Problem	Solution
Utility Programs	What is `dbtest`?	The executable `dbtest` is a utility program that is delivered with VolServ. It gives ATAC personnel easy access to VolServ database when tracking problems. This utility should **NOT** be run unless instructed to by ATAC personnel.

Printer Issues

	Problem	Solution
Add a Label Printer to the `/etc/printcap` File	How can a label printer be added to the `/etc/printcap` file?	If using a Seiko Label Printer (shelf labels) attached to the VolServ host, the following example entry in the `/etc/printcap` file can be tried. The **lp** and **sd** entries may have to be modified: **#** **shelflabel:** **:lp=/dev/ttya:sd=/var/spool/lpd:** **:br#9600:ms=litout,-cstopb,-icrnl:** **#** If using an Intermec Label Printer (barcode labels) attached to the VolServ host, the following example entry in the `/etc/printcap` file can be tried. The **lp** and **sd** entries may have to be modified: **#** **barcodelabel:** **:lp=/dev/ttyb:sd=/var/spool/lpd:** **:br#9600:ms=evenp:** **#**
Enable Printers to Pop Up	How can additional printers be added to the GUI pop-up window? This pop-up window appears when the right mouse button is pressed while the prompt cursor is in the printer text line.	If using a label printer, modify the `$VS_DIR/config/label_printers.config` file and add the appropriate printer name. If using other printers, modify the `$VS_ DIR/config/printers.config` file and add the appropriate printer name. Cycle **`vswin`** to make all changes effective.

	Problem	Solution
Enable Console Names to Pop Up	What modifications must be made to add console names to the GUI pop-up window? This pop-up window appears when the right mouse button is pressed while the prompt cursor is in the **New Console Display Host** text line of the **Change Archive Parameters** window.	Modify the `$VS_DIR/config/console_locations.config` file and add the appropriate console names. Cycle **`vswin`** to make all changes effective.
Remove a Request	How can a request that keeps trying to send status to a terminated client be removed? `CiReply` is set to infinite retries.	To remove the request from the system, turn off the infinite retry mechanism by performing the following procedure: Step 1: Modify the `$VS_DIR/config/envvar.config` file and reset the environmental variable, `CIREPLY_MAX_RETRY`, to a small value, for example, 3. Step 2: Cycle VolServ. When the system restarts, the request tries to resend its status. After the resend fails, it is removed from the system when its retry count exceeds the new value of `CIREPLY_MAX_RETRY`. Step 3: Change the `CIREPLY_MAX_RETRY` variable back to signal infinite retries and recycle VolServ.

NOTES

Index

F