

IBM Software

Update on z/VM Systems and Storage Management Products from IBM

SHARE Session 9147

Tracy Dean, IBM

August 17, 2006

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Agenda

Overview

What's new

- Backup and Restore Manager for z/VM
- Operations Manager for z/VM
- Tape Manager for z/VM



Backup and Restore Manager for z/VM

V1.1.0 PTFs

- "New day" exit
- CMS RESERVEd minidisks
- Enhanced response to STATUS request
- V1.2.0
 - Announce: August 15, 2006
 - GA: August 25, 2006
 - Improved performance
 - Compression and encryption exits
 - FBA and VFB-512 support
 - Worker assignment
 - Miscellaneous enhancements



Operations Manager for z/VM

- V1.2.0
 - Announce: February 21, 2006
 - GA: February 24, 2006
- Support for RACF or other External Security Manager
- Monitor logon status of specified user IDs
- Support for SET OBSERVER
- Flexible data space configuration
- Assign an action to a specific action processing server
- Enhanced viewing of monitored consoles
- New scheduling options
- New functions for HMF customers



Tape Manager for z/VM

- V1.2.0
 - Announce: February 21, 2006
 - GA: February 24, 2006
- NL and BLP support
- Generic scratch requests
- Data Security Erase utility
- Catalog verification utility
- ATL content verification utility
- Miscellaneous enhancements



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IBM Backup and Restore Manager for z/VM

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Backup and Restore Manager for z/VM

V1.1.0 PTFs

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New Functions in V1.1

New Day processing exit

- New exit called after first WAKEUP interrupt after midnight
 - WAKEUPs set every 15 minutes to keep server active
- Flexible behavior based on return codes:
 - 0 Normal completion, don't call again today
 - 4 Call again later
 - 8 Error occurred, call again later
 - 12 Error occurred, don't call again today
 - 16 Disable the exit, don't call again until server is restarted
 - 20 Fatal error, shut down Backup server



New Functions in V1.1

- Support for minidisks processed by CMS RESERVE
 - New job-level option to process RESERVEd disks as image or file level
 - CONFIG BKR_JOB_BACKUP_RESERVED_AS_IMAGE = NO|YES
 - NO: process as file level backup
 - YES: process as image level backup
 - Backup and Restore Manager automatically detects RESERVE status
- Enhanced response to STATUS command now includes information on each worker service machine
 - Current job name and instance
 - Total count of backup or restore tasks in the current job
 - Current of total tasks (for example, "2 of 8")
 - If idle, name and instance number of last job



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IBM Backup and Restore Manager for z/VM New Functions in V1.2

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Improved Performance

INCLUDE/EXCLUDE processing

- Reduced processing time for both REVIEW and SUBMIT
- Incremental backups of CMS files
- Backing up data to tape (and twin tapes)
 - Reblocking performed by default to reduce the number of tape I/O's
 - Reduction in CPU overhead due to reduced number of calls to TAPEIO
 - Modest increase in virtual CPU time
 - Overall decrease in total CPU time
 - Reblocking also used for disk I/O if compression or encryption exits are specified
 - Minimal reduction in number of disk I/O's due to minidisk cache, etc.
 - Additional metadata written as part of the backup
 - Highly compressible



Compression and Encryption Exits

- Two general purpose User Data Processing Exits (UDPE)
- Intended for compression and encryption
- Each called with a block of data
 - Accepts more, less, or no data in return
 - Output of exit 1 (compression) is input to exit 2 (encryption)
 - Output of exit 2 is appended to current block of data ready to write to tape, twin tapes, or disk
 - Based on reblocking code added for performance improvement of backing up to tape.

Name of exit(s) specified at the job level

- TEXT deck loaded dynamically when initially required

Compression routines provided

- Sample routine using basic run-length encoding provided as source code
- Supported routine using CMS compression services provided Object Code Only
 - · Can replace supplied dictionaries with ones you create using VM-supplied routines and your data
- Compression recommended for disk only
 - Use hardware features of tape devices for compression on tape
- Be aware of increased CPU consumption

Requirement for supported encryption routine understood



Configuring Compression and Encryption

In Backup job template:

CONFIG BKR_OUT_EDF_UDPE1 = BKREXT3A CONFIG BKR_OUT_EDF_UDPE2 = MYCRYPT CONFIG BKR_OUT_EDF_UDPE2_PARM = MONTHLY CONFIG BKR_OUT_EDF_UDPE2_PLEN = 7

> •Call the first exit to compress data when backing up to CMS minidisk. BKREXT3A is a shipped sample that uses CMS compression services and includes default dictionaries.

•Call the second exit to encrypt data when backing up to CMS minidisk. Compiled code is provided by the customer in MYCRYPT TEXT.

In Backup job template: CONFIG TAPE_EXIT1_NAME = MYCRYPT CONFIG TAPE_EXIT1_PARM = WEEKLY CONFIG TAPE_EXIT1_PLEN = 6

Call the first exit to encrypt data when backing up to tape or twin tapes. The compression exit is not called, so encryption must be defined as the first exit.

August 2006



Improved DASD Support

FBA and VFB-512

- Image backups now supported
- In addition to previous support of CMS minidisks and SFS data on these DASD types

Restore to reader without temporary disk space

- Data restored directly from source (tape or disk) to virtual reader
- No need for "staging" disk



Worker Assignment

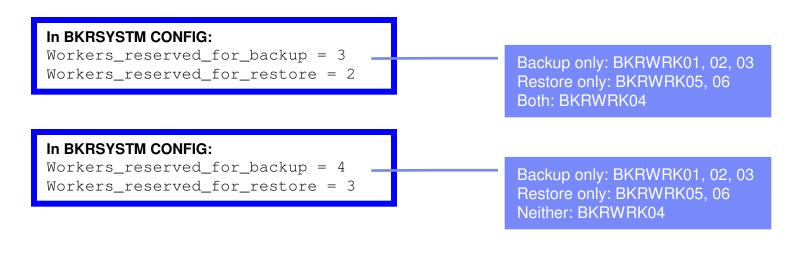
- Reserve worker service machines for
 - Backup only
 - Restore only
 - Both

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- (Neither)
- Master server still performs include/exclude processing and worker assignment

In BKRUSERS NAMES:

:nick.WORKERS :list.BKRWRK01 BKRWRK02 BKRWRK03 BKRWRK04 BKRWRK05 BRKWRK06 :COMMENT.Worker virtual machines





Miscellaneous Enhancements

Specify DASD by real device address in a backup job

| In a job template, after VDEV include/exclude statements: | | | | |
|---|--------------------|-------------------|--|--|
| FUNCTION | MEDIATYPE | RDEV SPEC | | |
| INCLUDE EXCLUDE | RDEVICE RDEVICE | 0800-090F 081* | | |

Specify DASD by volser in a backup job

| In a job temp | late, after VDEV | include/exclude statements: |
|---------------|------------------|-----------------------------|
| FUNCTION | MEDIATYPE | RDEV SPEC |
| | | - |
| INCLUDE | RDEVVOL | 510* |
| EXCLUDE | RDEVVOL | 510PAG |
| EXCLUDE | RDEVVOL | 510SPL |

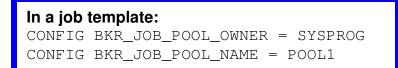
- Include default or customer specified DSN in the tape label of backup tapes
 - Useful in RMM mode

In a job template: CONFIG BKR_JOB_TAPE_DSN = BKR.VMSYS1.BACKUP



Miscellaneous Enhancements

- Include tape pool name as part of backup job when using Tape Manager for z/VM
 - Pull scratch tapes from a specific tape pool
 - Can be unique to each backup job
 - Default specified at system level



- Verification of scratch tape mounts
- Shipped source for examples provided in the book



Backup and Restore Manager Summary

Flexibility

- Backup only what is needed via include, exclude, and masking statements
- Mix and match source and target types

Productivity

- Review of backup job before submission
- User driven restores with no administrator interaction

Control

- Each user can only access restore data owned by him/her
- Automatic aging and pruning of backup catalog
- Consistent backups using the object directory (not source)

V1.2.0 available August 25, 2006

Focus on

- Performance
- Compression and encryption exits
- Enhancements based on requirements
- Continuing to gather and prioritize requirements



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IBM Operations Manager for z/VM

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Operations Manager for z/VM

• V1.2.0

- Announce: February 21, 2006
- GA: February 24, 2006
- Support for RACF or other External Security Manager
- Monitor logon status of specified user IDs
- Support for SET OBSERVER
- Flexible data space configuration
- Assign an action to a specific action processing server
- Enhanced viewing of monitored consoles
- New scheduling options
- New functions for HMF customers



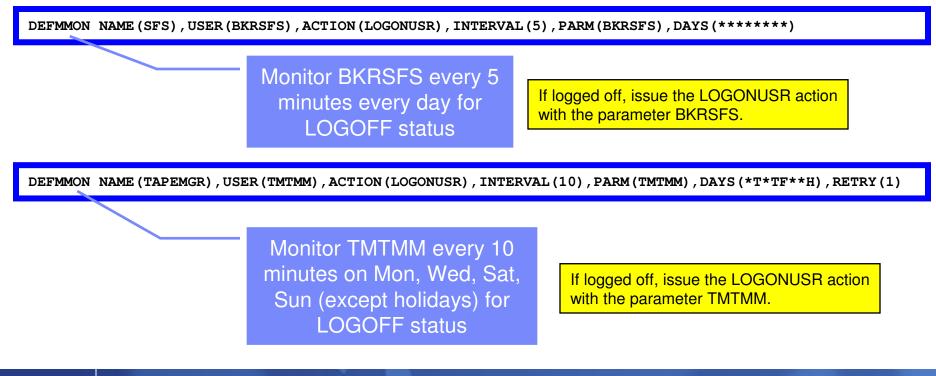
Access Control

- Users defined with access to one or more:
 - Control commands
 - Manage the Operations Manager infrastructure
 - Define additional service machines to execute actions
 - Authorize users
 - Display status
 - Issue CP and CMS commands on an Operations Manager service machine
 - Define data space sizes
 - Configuration commands
 - · Define rules, schedules, actions
 - Define holidays
 - Define user IDs to monitor for logoff status
 - Define groups
 - Consoles
 - Define user access to monitored consoles
- Security
 - Internal to Operations Manager (as in V1.1.0)
 - RACF or other External Security Manager
 - Uses RACROUTE and new Facility classes for Control, Configuration, and Console access
 - Additional access based on access to modules
 - GOMCMD: issue commands on GOMMAIN and return output
 Must be authorized to the commands issued
 - GOMTDM: terminal device management



Monitor logon status of specified user IDs

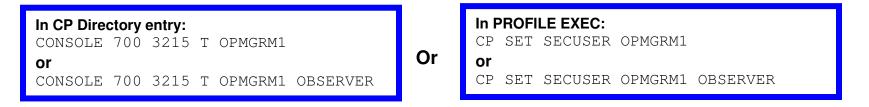
- Take action if logged off to bring it to logged on status
- Maximum number of retries can be specified





Capture console messages

- Must SECUSER or OBSERVER to Operations Manager GOMMAIN server
 - Functional differences based on CP support of SECUSER vs. OBSERVER
- Data spaces used to hold the log of captured messages/consoles
 - Console data passed from data space to the user when view is requested
 - One data space per monitored console
 - Customizable data space sizes: per monitored console and/or per system
- Daily log includes captured message and meta data
 - Text, length, IUCV class, source



In Operations Manager configuration file: DEFDSPS USER(*SFS*),SIZE(2097152) DEFDSPS USER(*),SIZE(1048576)



Define rules to

- Scan console messages for text matching
 - Includes column, wildcard, and exclusion support
- Take actions based on matches

Multiple rules can apply to one message

FINAL option available to indicate no additional rules should be evaluated

In Operations Manager configuration file: DEFRULE NAME(CPREAD), MATCH(*HCP*150A*CP*), MCOL(001:020), ACTION(CPREAD)



Predefined actions

- Suppress message from data space
 - Always sent to the log
- Highlight message with color, blinking, etc.
- Hold and change the display attributes of a specific messages when viewing a console
 - Message won't scroll off the top of the screen automatically if auto scroll is on

Customer defined actions

- CP or CMS command, or EXEC to be executed
- Run on GOMMAIN, any available action processing server, or a specific action processing server

In Operations Manager configuration file:

DEFACTN NAME(CPREAD), COMMAND(CP SEND &2 BEGIN), OUTPUT(LOG, CRE), ENV(GOMSVM02)

Define an action called CPREAD that will:

- Execute a CP SEND
- Pass second word of the matching message (the user ID)
- Pass "BEGIN"
- Add matching message to monitored console in data space
- Set message to red in console (data space)
- Place output of command in Operations Manager log
- •Execute the command on GOMSVM02, an Operations Manager worker server



View consoles

- Authorize users to view individual consoles or a set of consoles
- View console with
 - Message text only
 - Message text with the time stamp
 - Message text with the date and time stamp
- "Full screen mode"
 - Scroll up and down
 - Auto scroll (on or off) as new output is displayed on the console
 - Access a console image before any output is available
 - Issue commands back to the monitored console via CP SEND
- One console view for a group of users

In Operations Manager configuration file:

DEFVIEW NAME(SFS), USER(*SFS) DEFVIEW NAME(TAPEMGR), USER(TM%%%) AUTH USER(USER1), CONSOLE(TAPEMGR) AUTH USER(USER1), CONSOLE(TCPIP) AUTH USER(USER2), CONSOLE(SFS)

From USER1:

GOMCMD OPMGRM1 VIEWCON USER(TCPIP) Or GOMCMD OPMGRM1 VIEWCON USER(TAPEMGR)

| _ | |
|---|--|
| | |
| _ | |
| | |
| _ | |
| | |
| | |

Define schedules to execute

- At a specific time
 - Hourly at a specified number of minutes past the hour
 - Daily at a specified time
 - · Weekly on a specified day of the week and at a specified time
 - · Monthly on a specified day of the month and at a specified time
 - Yearly on a specified month and day and at a specified time
 - · Once on specified month, day, year, and time
- At regular intervals
 - Every x hours and y minutes
- Within a specified window of time
 - Specify start time
 - Specify conflicting schedules
 - Specify maximum time to defer this schedule, waiting for conflicts/dependencies to complete
 - No execution for this occurrence of the schedule if maximum time is reached
- Within limits
 - Restrict to specific days of the week: Monday through Sunday plus holidays
 - Restrict to certain hours of the day
- Only future schedules are activated on startup
 - Won't execute a schedule defined for earlier today that has reached its maximum deferral
 - Will execute it at its next occurrence

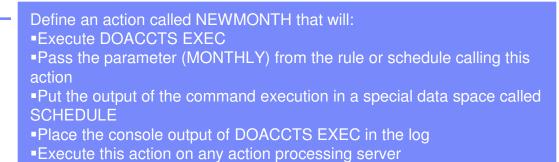




Define a schedule called FIRSTM that will execute the NEWMONTH action every 1st day of the month at midnight, passing the parameter "MONTHLY".

In Operations Manager configuration file:

DEFACTN NAME (NEWMONTH), COMMAND (EXEC DOACCTS &P), OUTPUT (LOG), ENV (SVM)





In Operations Manager configuration file: DEFSCHD NAME (HEALTH), ACTION (CHECKSYS), EVERY (03:00), DAYS (MTWTF**H)

Define a schedule called HEALTH that will execute the CHECKSYS action every 3 hours, starting at server startup, on Saturdays and Sundays, except holidays.

In Operations Manager configuration file:

DEFACTN NAME (CHECKSYS), COMMAND (EXEC SYSTATUS), OUTPUT (LOG), ENV (GOMSVM02)

Define an action called CHECKSYS that will: •Execute SYSTATUS EXEC

•Put the output of the command execution in a special data space called SCHEDULE

Place the console output of SYSTATUS EXEC in the log

•Execute this action on a specific action processing server: GOMSVM02



In Operations Manager configuration file:

DEFSCHD NAME (BACKUP), ACTION (INCRBACK), WHEN (01:30), CONFLICT (HEALTH), MAXDEFER (30)

Define a schedule called BACKUP that will execute the INCRBACK action every day at 1:30AM, unless HEALTH is running. Retry every one minute, and wait a maximum of 30 minutes for HEALTH to finish.

In Operations Manager configuration file:

DEFACTN NAME (INCRBACK), COMMAND (CP SMSG BKR00 SUBMIT INCRJOB1), OUTPUT (LOG), ENV (GOMSVM04)

Define an action called INCRBACK that will: •Submit backup job INCRJOB1 to the master backup server BKR00 •Place the console output of CP SMSG in the SCHEDULE data space •Place the console output of CP SMSG in the Operations Manager log •Execute this action on a specific action processing server: GOMSVM04



Operations Manager Summary

Assist with automated operations

- Monitoring user IDs for logoff status
- Monitoring service machine consoles
- Taking actions based on console text matching
- Scheduling actions
- Follow-on to Host Management Facility (HMF)
- V1.2.0 available February 24, 2006
 - RACF or ESM support
 - Flexible data space configuration
 - Define actions for specific action processing server
 - Enhanced viewing of monitored consoles
 - Support for SET OBSERVER
 - New scheduling options
 - New functions for HMF customers
 - Monitor logon status of specified user IDs
- Upcoming focus on integration with Tivoli system management portfolio



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IBM Tape Manager for z/VM

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Tape Manager for z/VM

• V1.2.0

- Announce: February 21, 2006
- GA: February 24, 2006
- NL and BLP support
- Generic scratch requests
- Data Security Erase utility
- Catalog verification utility
- ATL content verification utility
- Miscellaneous enhancements



Non-Label and Bypass Label Processing

Allow authorized users to

- Mount NL tapes
- Request a mount with the BLP option, or
- Both

NL mounts

- NL must be specified on the mount request
 - Default is SL
- Tape must be NL
 - Can't mount a Standard Label tape as NL
- User must be authorized by system default or individually

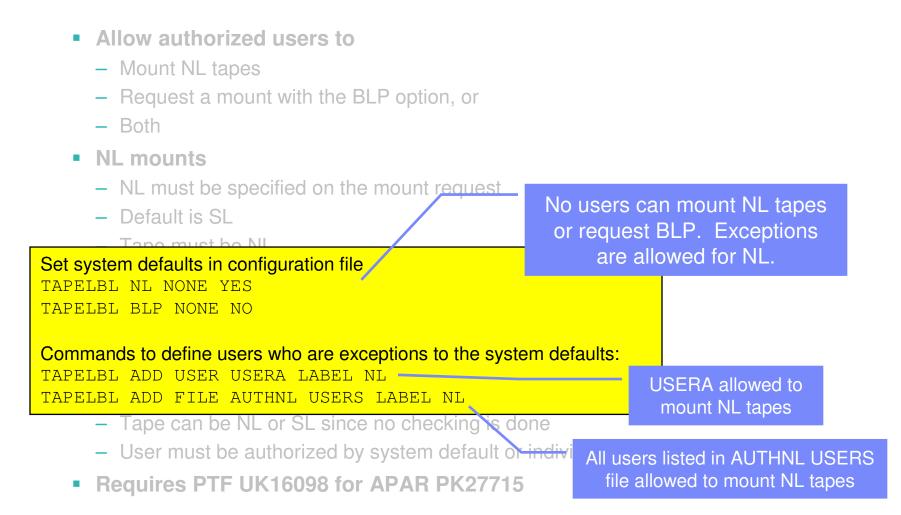
BLP support

- BLP must be specified on the mount request
 - Default is SL
- Tape can be NL or SL since no checking is done
- User must be authorized by system default or individually

Requires PTF UK16098 for APAR PK27715



Non-Label and Bypass Label Processing





Generic Scratch Requests

- System option effecting manual scratch mount requests only
- Mount message to operator and device specifies SCRATCH instead of a volser
- Operator mounts a tape from "scratch bin"
- Tape Manager verifies tape is scratch
 - In the catalog as an available scratch tape
 - In requesting mount pool or free pool
- Requires PTF UK16098 for APAR PK27715



Data Security Erase

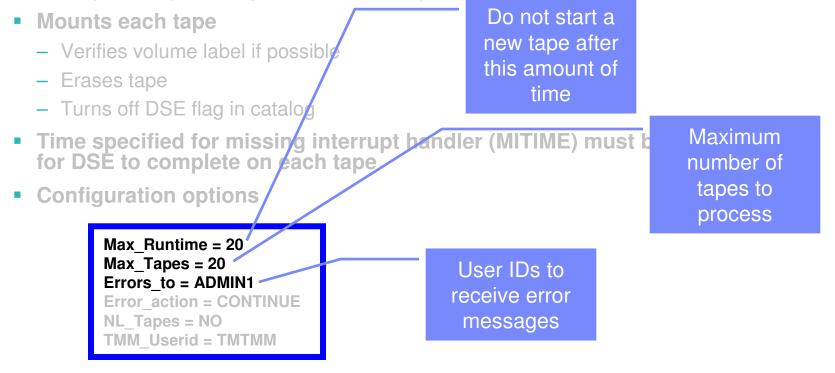
- Option to enable DSE at pool or tape level
- Tape marked as DSE-ready when it is freed
- Runs on separate user IDs/service machines
- Issues query against catalog to find all tapes with DSE flag on
 - Requires Tape Manager ADMIN authority
- Mounts each tape
 - Verifies volume label if possible
 - Erases tape
 - Turns off DSE flag in catalog
- Time specified for missing interrupt handler (MITIME) must be high enough for DSE to complete on each tape
- Configuration options

Max_Runtime = 20 Max_Tapes = 20 Errors_to = ADMIN1 Error_action = CONTINUE NL_Tapes = NO TMM_Userid = TMTMM



Data Security Erase

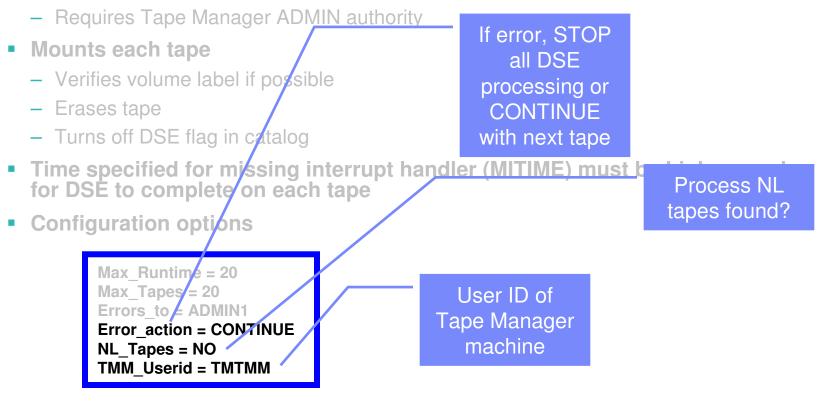
- Option to enable DSE at pool or tape level
- Tape marked as DSE-ready when it is freed
- Runs on separate user IDs/service machines
- Issues query against catalog to find all tapes with DSE flag on
 - Requires Tape Manager ADMIN authority





Data Security Erase

- Option to enable DSE at pool or tape level
- Tape marked as DSE-ready when it is freed
- Runs on separate user IDs/service machines
- Issues query against catalog to find all tapes with DSE flag on





ATL Verification

- Runs on separate user IDs/service machines
- Issues query against catalog to find all tapes in specified ATL(s)
- Requires Tape Manager Admin authority and RMS Admin authority
- For each tape

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- Queries DFSMSrms for tape status
- Takes action based on status and configuration options
- Configuration options

Max_Runtime = 20 Max_Tapes = 20 Errors_to = ADMIN1 ADMIN2 Error_action = CONTINUE TMM_Userid = TMTMM ATL_Names = IBMATL1 IBMATL2 Action_not_in_library = RESET Action_inaccessible = IGNORE Action_ejected = RESET Action_misplaced = WARN Action_label_damage = HOLD



ATL Verification

- Runs on separate user IDs/service machines
- Issues query against catalog to find all tapes in specified ATL(s)
- Requires Tape Manager ADMIN authority and RMS Admin authority
- For each tape

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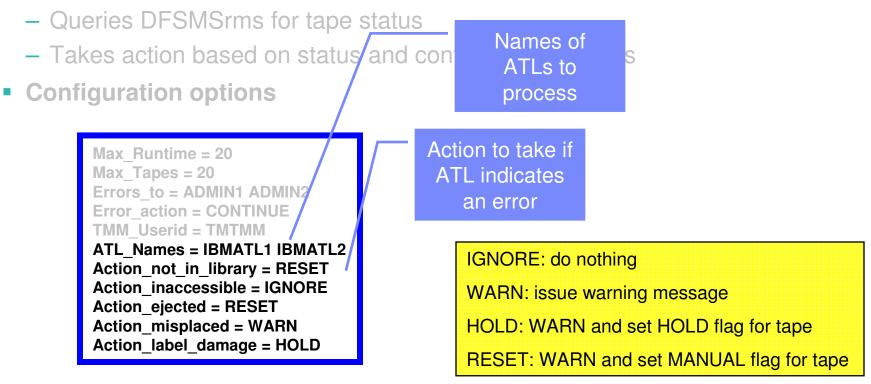
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- Takes action based on status and configuration options
- Configuration options

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|--|
| ATL_Names = IBMATL1 IBMATL2 Action_not_in_library = RESET Action_inaccessible = IGNORE Action_ejected = RESET |
| Action_misplaced = WARN Action_label_damage = HOLD |



ATL Verification

- Runs on separate user IDs/service machines
- Issues query against catalog to find all tapes in specified ATL(s)
- Requires Tape Manager ADMIN authority and RMS Admin authority
- For each tape





- Runs on separate user IDs/service machines
 - Tape Manager must be shut down
- Reads the catalog directly (not via Tape Manager commands)
 - Requires RR or MR access to TMTMM's 191, 200, and 210 disks
- For each entry
 - Verifies data format is correct (dates, numbers, etc.)
 - Verifies data is consistent across files (volser's in pool inventories vs. tape inventories)
 - Optionally corrects invalid data
- Strongly caution analysis before using the option to correct "errors"
- Configuration options

Errors_to = ADMIN1 ADMIN2 Error_action = CONTINUE TMM_Userid = TMTMM Database_disk_1 = 200 Database_disk_2 = 210 Config_disk = 191 Verbosity = MEDIUM Invalid_tape_inventory_records = WARN Invalid_pool_volume_records = WARN



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- Strongly caution using the option to correct "errors"
- Configuration options

| Errors_to = ADMIN1 ADMIN2 Error_action = CONTINUE TMM_Userid = TMTMM |
|---|
| Database_disk_1 = 200 |
| Database_disk_2 = 210 |
| Config_disk = 191 |
| Verbosity = MEDIUM |
| Invalid_tape_inventory_records = WARN Invalid_pool_volume_records = WARN |



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 - Optionally corrects invalid data

File locations (tape ries) and pool inventories, media types, and device pools)

- Strongly caution using the option to correct "error
- Configuration options

| Errors_to = ADMIN1 ADMIN2 Error_action = CONTINUE TMM_Userid = TMTMM |
|--|
| Database_disk_1 = 200 / Database_disk_2 = 210 |
| Config disk = 191 |
| Verbosity = MEDIUM |
| Invalid_tape_inventory_records = WARN |
| Invalid_pool_volume_records = WARN |



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- Configuration options

Level of informational output (does not affect warnings)

| Errors_to = ADMIN1 ADMIN2 Error_action = CONTINUE TMM_Userid = TMTMM Database_disk_1 = 200 | Action to take if errors found in files |
|---|---|
| Database_disk_2 = 210 | |
| Config_disk = 191 | IGNORE: do nothing |
| Verbosity = MEDIUM / Invalid_tape_inventory_records = WARN | WARN: issue warning message |
| Invalid_pool_volume_records = WARN | CORRECT: WARN and correct the error |



Miscellaneous Enhancements

Effective maintenance of catalog data

- Not erased when tape is freed or scratched
- Only erased or rewritten when tape is reused (including DSE)
- Improves recovery of metadata if tape is accidentally freed

Additional retry processing

- Automatically retries a mount request when
 - Internal label does not match volser requested
 - Used tapes applies to manual mounts only
 - Scratch tapes applies to ATLs and manual mounts, a new scratch volser is requested
 - Mounted tape is NL, but mount request specified SL (manual mounts only)
 - Mounted tape is SL, but mount request specified NL (manual mounts only)
 - RMM returns errors, 'not a scratch volume' and 'volume not found' (ATL only)
- Operator can request a retry on manual mounts when
 - Specific volser for a scratch request is not available
 - Tape Manager finds another scratch and reissues mount request



Tape Manager Summary

Automate daily tape operations

- Manage mount requests
- Control tape access
- Perform label verification
- Expire tapes

Efficiently manage tapes and tape drives

- Share devices
- Control access to individual tapes in an ATL

Improve productivity

- Notify and interact with operator on behalf of user
- Support manual and ATL mount requests
- Perform label verification before and after tape use
- Verify read/write attribute on manual mounts

• V1.2.0 available February 24, 2006

- SL and BLP support
- Data Security Erase
- Verify tapes are in ATLs
- Retain catalog data until tape is rewritten
- Support generic scratch mount requests



z/VM Tools Wrap-up

More information

- http://www.ibm.com/software/stormgmt/zvm/
- tld1@us.ibm.com

Other sessions

- 9199/1645 OMEGAMON XE on z/VM Linux
 - Thursday, 1:30pm
- 9198/1644 System and Performance Management Scenarios
 - Thursday, 3:00pm

Demo

- Operations Manager
- Backup and Restore Manager