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RMM Power Tools – How to Tame RMM Vital Record Specifications (VRS)

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Abstract

Are your RMM VRS's a mess? Did you inherit an RMM system and need to understand VRS? Can you barely spell VRS? If you answered yes to any of these questions, then this session is for you! Come to this session to learn about RMM VRS's and a simple methodology for how to tame them. Make RMM dance to your tune, for a change. This session is designed for any level of RMM administrator.

Agenda

- Introduction
- VRS Commands
  - ADDVRS
  - CHANGEVRS
  - DELETEVRS
  - LISTVRS
  - SEARCHVRS
- VRS Recommendations
- VRS and RMM PARMLIB

Agenda

- VRS Problem Resolution
- Summary
- Finally…

Introduction

- Vital Record Specifications (VRS) are retention and/or movement rules applied to datasets and/or tape volumes
- VRS's are input to RMM housekeeping job VRSEL (Vital Record SELection) and DSTORE (Disaster STORE) functions
- VRSEL sets required locations and retentions
- DSTORE performs volume movement between onsite/offsite locations

Introduction

- Three basic types of VRS records
- DSNAME VRS defined by specific or generic dataset name
- NAME VRS defines retention and/or movement policies
  - Can be chained together using ANDVRS/NEXTVRS
- VOLUME VRS defines policy based on specific or generic VOLSER (not commonly used)

VRS Commands – ADDVRS

- ADDVRS adds VRS's to RMM
- ADDVRS requires CONTROL access to STGADMIN.EDG.VRS
- Help available via TSO HELP RMMAS

VRS Commands - ADDVRS

- ADDVRS syntax tree – DSNAME VRS

```
(ADDVRS | AD) DSNAME(data_set_name_mask) | DSNAME('ABEND') |
              DSNAME('DELETED') | DSNAME('OPEN')

      ANDVRS(and_VRS_name) | NEXTVRS(next_VRS_name)
      BYDAYSCYCLE | CYCLES | DAYS | LASTREFERENCEDAYS
      COUNT(days/cycles | 99999)
      DELAY(number_of_days | 0)
      DELETEDATE(deletion_date | 1999/365)
      DESCRIPTION(VRS_description)
      GDG | NOGDG
      JOBNAME(jobname_mask) | JOBNAME('ABEND') | JOBNAME('DELETED' |
              JOBNAME('OPEN')
      LOCATION(HOME |  library_name | CURRENT | LOCAL | DISTANT | REMOTE |
              LOCDEF_location_name)
      OWNER(owner_ID | command_issuer_ID)
```

VRS Commands - ADDVRS

- ADDVRS syntax tree – DSNAME VRS (cont'd)

```
PRIORITY(priority | 0)
RELEASE(EXPIRYDATEIGNORE,SCRATCHIMMEDIATE)
STORENUMBER(days/cycles | 99999)
TZ((+|-)HH(:MM(:SS)))
UNTILEXPIRED
WHILECATALOG
```

VRS Commands - ADDVRS

- ADDVRS syntax tree – NAME VRS

```
(ADDVRS | AS) NAME(VRS_name)

      (((BYDAYSCYCLE | CYCLES | DAYS | LASTREFERENCEDAYS) UNTILEXPIRED
               WHILECATALOG) | EXTRADAYS)
      COUNT(days/cycles | 99999)
      DELETEDATE(deletion_date | 1999/365)
      DESCRIPTION(VRS_description)
      LOCATION(HOME |  library_name | CURRENT | LOCAL | DISTANT | REMOTE |
               LOCDEF_location_name)
      NEXTVRS(next_VRS_name)
      OWNER(owner_ID | command_issuer_ID)
      STORENUMBER(days/cycles/volumes | 99999)
```

VRS Commands - ADDVRS

- ADDVRS syntax tree – VOLUME VRS

```
(ADDVRS | AS) VOLUME(full_or_generic_volume_serial)

        COUNT(volumes/days | 99999)
        DELAY(number_of_days | 0)
        DELETEDATE(deletion_date | 1999/365)
        DESCRIPTION(VRS_description)
        LOCATION(HOME |  library_name | LOCAL | DISTANT | REMOTE |
                 LOCDEF_location_name)
        NEXTVRS(next_VRS_name)
        OWNER(owner_ID | command_issuer_ID)
        PRIORITY(priority | 0)
        STORENUMBER(volumes/days | 99999)
```

VRS Commands – ADDVRS Parms

- ANDVRS creates chain of VRS's to retain dataset
  - All retentions in ANDVRS chain must be true
  - First VRS in chain sets STORENUMBER and LOCATION
  - Not recommended unless you really need it

VRS Commands – ADDVRS Parms

- BYDAYSCYCLE retains all instances of a dataset created on same day as a single cycle
  - Mutually exclusive with CYCLES, DAYS, LASTREFERENCEDAYS, and EXTRADAYS
  - Can be used on dataset and NAME VRS's
  - Provides similar function to CA-1 CDAY=DAY option
  - Not recommended unless you really need it

VRS Commands – ADDVRS Parms

- COUNT is number of days, cycles, or volumes kept by VRS
  - Count specifies the number of days when DAYS, EXTRADAYS, or LASTREFERENCEDAYS is used
  - Count specifies cycles for BYDAYSCYCLE, CYCLES
  - Count specifies volumes for a *generic* Volume VRS
  - Decimal number in range 1 to 99999
  - Default is 99999 for DSNAME and VOLUME VRS's
  - Default is 99999 for NAME VRS's with retention type
  - Default is 0 for all other NAME VRS's

VRS Commands – ADDVRS Parms

- COUNT (cont'd)
  - 99999 means no limit
  - COUNT(0) valid for DSNAME and NAME VRS
  - COUNT(0) is placeholder to chain to a NEXTVRS
  - COUNT(0) common retention/movement rules to be shared among multiple VRS's
  - COUNT(0) can simplify VRS maintenance by changing one NEXTVRS to affect multiple VRS's

VRS Commands – ADDVRS Parms

- COUNT (cont'd)
  - Before COUNT(0):

```
ADDVRS DSNAME('TCONLEY.FILE1') DAYS COUNT(14) LOCATION(DR) GDG
ADDVRS DSNAME('TCONLEY.FILE2') DAYS COUNT(14) LOCATION(DR) GDG
ADDVRS DSNAME('TCONLEY.FILE3') DAYS COUNT(14) LOCATION(DR) GDG
```

  - After COUNT(0):

```
ADDVRS DSNAME('TCONLEY.FILE1') DAYS COUNT(0) GDG NEXTVRS(CONLEYDR)
ADDVRS DSNAME('TCONLEY.FILE2') DAYS COUNT(0) GDG NEXTVRS(CONLEYDR)
ADDVRS DSNAME('TCONLEY.FILE3') DAYS COUNT(0) GDG NEXTVRS(CONLEYDR)
ADDVRS NAME(CONLEYDR) DAYS COUNT(14) LOCATION(DR)
```

  - With COUNT(0), just change CONLEYDR in one place

VRS Commands – ADDVRS Parms

- COUNT (cont'd)
  - COUNT must be >= STORENUMBER when LASTREFERENCEDAYS, BYDAYSCYCLE, DAYS, or CYCLES specified
  - COUNT must equal STORENUMBER for EXTRADAYS
  - COUNT can be greater than or equal to STORENUMBER
  - If DELAY used with LASREFERENCEDAYS and DAYS, COUNT must be >= DELAY + STORENUMBER
  - Avoid using DELAY
  - STORENUMBER should always equal COUNT

VRS Commands – ADDVRS Parms

- CYCLES retains cycles (copies) of dataset
  - For GDG VRS's, this is based on GDG cycles, and subject to PARMLIB option GDG
  - For non-GDG's each occurrence of dataset is a cycle
  - Can be used for DSNAME and NAME VRS's
  - Mutually exclusive with BYDAYSCYCLE, DAYS, EXTRADAYS, or LASTREFERENCEDAYS
  - CYCLES is default for DSNAME VRS
  - CYCLES is default for NAME VRS if COUNT or ANDVRS specified with no retention type
  - CYCLES not recommended, discussed in more detail later

VRS Commands – ADDVRS Parms

- DAYS retains dataset based on days since creation
  - Valid for DSNAME and NAME VRS's
  - Mutually exclusive with BYDAYSCYCLE, CYCLES, LASTREFERENCEDAYS, EXTRADAYS

VRS Commands – ADDVRS Parms

- DELAY holds dataset before passing it to ANDVRS
  - Decimal number from 0 to 99, default is 0
  - COUNT added to creation date determines hold length
  - Volume held in current location until DELAY period met
  - When DELAY expires, volume moves to ANDVRS location
  - For DAYS retention, only current cycle of dataset delayed
  - New cycle sends current cycle to ANDVRS location

VRS Commands – ADDVRS Parms

- DELAY (cont'd)
  - If DELAY used with DAYS and LASREFERENCEDAYS, COUNT must be >= DELAY + STORENUMBER
  - If DELAY used with NEXTVRS, COUNT must be > DELAY + STORENUMBER
  - Cannot be used with LOCATION(HOME)
  - Not recommended, use NEXTVRS with DAYS

VRS Commands – ADDVRS Parms

- DELETEDATE is date to delete the VRS definition
  - Format: yyyy/ddd (recommended) or yyddd
  - Deleting VRS record makes all datasets or volumes retained by it eligible for normal expiration processing
  - Default is 1999/365, permanent retention
- DESCRIPTION is user description of VRS
  - 1 to 30 characters
  - Default is blanks

VRS Commands – ADDVRS Parms

- DSNAME is dataset name or mask for VRS
  - 1 to 44 character DSNAME ***OR***
  - 1 to 8 character MGMTCLAS or VRS management value, must be single qualifier
  - Fully qualified dsname, dsname mask, or GDG dsname
  - Fully qualified names resolve before dsname masks
  - Generic characters are '%' for a single character, '*' for a single qualifier with any characters, or 0 or more characters within a qualifier, '**' for 0 or more qualifiers that can't be within qualifier, and '¬' for a single character in pseudo-GDG dsname mask

VRS Commands – ADDVRS Parms

- DSNAME (cont'd)
  - DSNAME can also be an SMS MGMTCLAS or VRS management value
    - For example, EXPDT=99000 used for CATALOG control
    - DSNAME(M99000) is VRS management value defined with WHILECATALOG for catalog control
    - Value can be masked if retentions similar
    - Do not specify GDG for MGMTCLAS or management value
  - DSNAME('ABEND') controls datasets in abend state
  - DSNAME('DELETED') controls datasets allocated with a normal disposition of DELETE

VRS Commands – ADDVRS Parms

- DSNAME (cont'd)
  - DSNAME('OPEN') manages datasets still in OPEN status when housekeeping runs
  - OPEN datasets in use or left open by system failure
- EXTRADAYS is number of days since VRS first retained dataset
  - Only valid for NAME VRS
  - Cannot be used with ANDVRS, BYDAYSCYCLE, CYCLES, DAYS, LASTREFERENCEDAYS, UNTILEXPIRED, or WHILECATALOG

VRS Commands – ADDVRS Parms

- GDG specifies that DSNAME is GDG base
  - RMM checks for GnnnnVnn in final qualifier
  - Only valid for DSNAME VRS
  - Default is NOGDG

VRS Commands – ADDVRS Parms

- JOBNAME is name or mask of jobname creating dataset
  - Can further qualify VRS by applying only to jobname
  - If JOBNAME not specified, VRS based on dataset name only
  - JOBNAME('ABEND') controls all ABEND datasets
  - JOBNAME('DELETED') controls all DELETED datasets
  - JOBNAME('OPEN') controls all OPEN datasets

VRS Commands – ADDVRS Parms

- JOBNAME (cont'd)
  - JOBNAME behavior based on RMM PARMLIB option VRSJOBNAME
  - VRSJOBNAME(1) in PARMLIB gives precedence to JOBNAME
  - VRSJOBNAME(2) in PARMLIB gives precedence to DSNAME
  - If no JOBNAME match, VRSJOBNAME(1) still matches on DSNAME
  - If no JOBNAME match, VRSJOBNAME(2) does not match on DSNAME match

VRS Commands – ADDVRS Parms

- LASTREFERENCEDAYS - days since dataset read or written
  - Can be used in DSNAME and NAME VRS's
  - Mutually exclusive with BYDAYSCYCLE, CYCLES, DAYS, and EXTRADAYS
  - Can create inconsistent scratch dates from dataset to dataset
  - Not recommended unless you really need it

VRS Commands – ADDVRS Parms

- LOCATION is location where volume retained
  - Use HOME to return volume to HOME location
  - CURRENT leaves volume in CURRENT location
    - Used when volume movement required to be manual or movement not desired
  - Library name retains tape in library
  - Location defined in RMM PARMLIB option LOCDEF
  - HOME is default

VRS Commands – ADDVRS Parms

- NAME defines NAME VRS
  - 1 to 8 characters
  - Specifies movement and/or retention type
  - Chained to other VRS's via ANDVRS and NEXTVRS
  - NAME VRS's can be chained to multiple DSNAME VRS's
  - VRS subchain is defined as a chain of VRS's until the next subchain starts
  - Next VRS subchain starts with next VRS specifying retention criteria

VRS Commands – ADDVRS Parms

- NEXTVRS is next VRS in VRS chain
  - 1 to 8 characters
  - If NEXTVRS does not exist, volume returned to HOME
    - Message EDG2230I and RC4 issued
- NOGDG specifies that DSNAME is not a GDG base name
  - NOGDG is default
- OWNER is userid of VRS owner
  - 1 to 8 character userid
  - Default is ID of user issuing ADDVRS command

VRS Commands – ADDVRS Parms

- PRIORITY overrides LOCDEF priority
  - Lower priority numbers take precedence
  - RMM will match VRS with 100 priority before 200
  - Priority on DSNAME or VOLUME VRS controls VRS chain
  - Cannot be used on NAME VRS
  - Default value 0 means LOCDEF priority should be used
  - Should not normally have dataset resolving to two different VRS's, so this parm is not recommended

VRS Commands – ADDVRS Parms

- RELEASE specifies release options for VRS
  - RMM PARMLIB option VRSEL(NEW) required
  - EXPIRYDATEIGNORE releases dataset despite EXPDT
  - SCRATCHIMMEDIATE immediately releases volume to scratch, volume does not go to Pending Release unless there are other release actions to satisfy (e.g. INIT, NOTIFY, etc.)
  - Recommend SCRATCHIMMEDIATE for ALL VRS's

VRS Commands – ADDVRS Parms

- STORENUMBER – number of days, cycles, or volumes controlled for VRS
  - Specifies number of days when DAYS or LASTREFERENCEDAYS is used
  - Specifies number of cycles when CYCLES is used
  - Volumes – Volume VRS with generic volser
  - Decimal number in range 0 to 99999
  - Default is 99999
  - 99999 means to retain all datasets or volumes
  - STORENUMBER must be <= COUNT, should be equal

VRS Commands – ADDVRS Parms

- TZ is time-zone offset
  - Used for tapes in another time zone and UTC support
  - Format: +|- HH:MM:SS
  - + is offset east of 0 meridian, - is west

VRS Commands – ADDVRS Parms

- UNTILEXPIRED retains dataset until EXPDT
  - RMM releases at EXPDT despite COUNT or retention
  - UNTILEXPIRED also merges primary/secondary VRS
  - Primary VRS matches based on dataset name/mask, MGMTCLAS, or VRS management value
  - Secondary VRS matches based on MGMTCLAS or VRS management value
  - When primary VRS specifies UNTILEXPIRED, RMM releases tape based on earliest expiration defined between primary and secondary VRS

VRS Commands – ADDVRS Parms

- VOLUME is fully qualified or generic volser for VOLUME VRS
  - Seldom used option for VRS's
  - Most sites use DSNAME VRS's with NAME VRS chains

VRS Commands – ADDVRS Parms

- VOLUME is fully qualified or generic volser for VOLUME VRS
- WHILECATALOG retains dataset if it is cataloged
  - Use WHILECATALOG wherever possible
  - Datasets scratched if not cataloged when VRSEL runs
  - RMM PARMLIB option CATRETPD protects datasets in long-running jobs until they are cataloged
  - Use WHILECATALOG wherever possible

VRS Commands – ADDVRS Examples

- This VRS chain keeps 5 cycles total, one at HOME, 4 at LOCAL (not recommended):

```
RMM ADDVRS DSNAME('TCONLEYA.**') CYCLES COUNT(5)
     STORENUMBER(1) LOCATION(HOME) NEXTVRS(N1)
RMM ADDVRS NAME(N1) CYCLES STORENUMBER(4) LOCATION(LOCAL)
```

- Use this VRS chain instead (much clearer):

```
RMM ADDVRS DSNAME('TCONLEYA.**') CYCLES COUNT(1)
     LOCATION(HOME) NEXTVRS(N1)
RMM ADDVRS NAME(N1) CYCLES COUNT(4) LOCATION(LOCAL)
```

VRS Commands – ADDVRS Examples

- 20 cycles total, one at HOME, 10 at LOCAL, remaining 9 at HOME (extra cycles kept at HOME when COUNT <> STORENUMBER):

```
RMM ADDVRS DSNAME('TCONLEYB.**') CYCLES COUNT(20) STORENUMBER(1)
      LOCATION(HOME) NEXTVRS(N2)
RMM ADDVRS NAME(N2) STORENUMBER(10) LOCATION(LOCAL)
```

- Use this instead (much clearer):

```
RMM ADDVRS DSNAME('TCONLEYB.**') CYCLES COUNT(1) LOCATION(HOME)
      NEXTVRS(N2)
RMM ADDVRS NAME(N2) CYCLES COUNT(10) LOCATION(LOCAL) NEXTVRS(N3)
RMM ADDVRS NAME(N3) CYCLES COUNT(9) LOCATION(HOME)
```

VRS Commands – ADDVRS Examples

- MGMTCLAS example

```
RMM ADDVRS DSNAME('M99000') WHILECATALOG
```

- ACS routine sees EXPDT=99000 in JCL, assigns M99000 as the VRS
- VRS management value can also be assigned via EDGUX100 and UXTABLE

VRS Commands – CHANGEVRS

- CHANGEVRS updates DSNAME or NAME VRS
- CONTROL access to STGADMIN.EDG.VRS required
- Help available via TSO HELP RMMCS

VRS Commands – CHANGEVRS

- CHANGEVRS limited to changing COUNT, NEXTVRS, TZ
- To change other VRS fields, use DELETEVRS then ADDVRS
- RMM dialog CHANGE VRS panel does that automatically
- Dialog can change ANDVRS, DELETEDATE, DESCRIPTION, LOCATION, OWNER, STORENUM, TYPE, WHILECATALOG, and UNTILEXPIRED

VRS Commands – CHANGEVRS

- CHANGEVRS syntax tree

```
CHANGEVRS | CS

        (DSNAME(dataset_name) JOBNAME(jobname_mask) |
         NAME(VRS_name))
       COUNT(days/cycles)
       NEXTVRS(next_VRS_name)
       TZ((+|-)HH(:MM(:SS)))
```

VRS Commands – CHANGEVRS Parms

- COUNT changes days or cycles for DSNAME or NAME VRS
- DSNAME is dataset name or mask for DSNAME VRS
  - Can be MGMTCLAS or VRS management value
  - Can be special names ABEND, DELETED, OPEN
  - Mutually exclusive with NAME
- JOBNAME is optional jobname or jobname mask
  - Can be special names ABEND, DELETED, OPEN
  - Required if VRS defined with JOBNAME

VRS Commands – CHANGEVRS Parms

- NAME is name for NAME VRS
  - Mutually exclusive with DSNAME
- NEXTVRS is name of new NAME VRS
  - If NAME VRS invalid, RMM uses dummy VRS *broken*
- TZ is time-zone offset
  - Used for tapes in another time zone and UTC support
  - Format: +|- HH:MM:SS
  - + is offset east of 0 meridian, - is west

VRS Commands – DELETEVRS

- DELETEVRS deletes VRS record
- CONTROL access to STGADMIN.EDG.VRS required
- Help available via TSO HELP RMMDS

VRS Commands – DELETEVRS

- DELETEVRS syntax tree

```
DELETEVRS | DS

        (DSNAME(dataset_name) JOBNAME(jobname_mask) |
         NAME(VRS_name) |
         VOLUME(full_or_generic_volser))
```

VRS Commands – DELETEVRS Parms

- DSNAME is dataset name or mask for DSNAME VRS
  - Can be MGMTCLAS or VRS management value
  - Can be special names ABEND, DELETED, OPEN
  - Mutually exclusive with NAME, VOLUME
- JOBNAME is optional jobname or jobname mask
  - Can be special names ABEND, DELETED, OPEN
  - Required if VRS defined with JOBNAME

VRS Commands – DELETEVRS Parms

- NAME is name for NAME VRS
  - Mutually exclusive with DSNAME, VOLUME
- VOLUME is volume name or mask for VOLUME VRS
  - Mutually exclusive with DSNAME, NAME

VRS Commands – LISTVRS

- LISTVRS displays information about individual VRS's
- READ access to STGADMIN.EDG.MASTER required
- Help available via TSO HELP RMMLS

VRS Commands – LISTVRS

- LISTVRS syntax tree

```
LISTVRS | LS

        (DSNAME(dataset_name) JOBNAME(jobname_mask) |
         NAME(VRS_name) |
         VOLUME(full_or_generic_volser))
```

VRS Commands – LISTVRS Parms

- DSNAME is dataset name or mask for DSNAME VRS
  - Can be MGMTCLAS or VRS management value
  - Can be special names ABEND, DELETED, OPEN
  - Mutually exclusive with NAME, VOLUME
- JOBNAME is optional jobname or jobname mask
  - Can be special names ABEND, DELETED, OPEN
  - Required if VRS defined with JOBNAME

VRS Commands – LISTVRS Parms

- NAME is name for NAME VRS
  - Mutually exclusive with DSNAME, VOLUME
- VOLUME is volume name or mask for VOLUME VRS
  - Mutually exclusive with DSNAME, NAME

VRS Commands – LISTVRS Examples

- TSO RMM LS NAME(CATALOG)

```
Name         = CATALOG                      Retain until expired = NO
Count        = 99999 DAYS                 Retain while cataloged = YES
Store number = 99999 DAYS    in the HOME     location
Next VRS in chain    = EXTRA1   using NEXTVRS

VRS Owner    = LIBRARY
Description  =
Last Reference: Date =            Time =
Vital Record Specification to be deleted on 12/31/1999
```

VRS Commands – LISTVRS Examples

- TSO RMM LS NAME(EXTRA1)

```
Name         = EXTRA1                       Retain until expired = NO
Count        = 1     XTRDAYS               Retain while cataloged = NO
Store number = 1     XTRDAYS in the HOME     location
Next VRS in chain    =          using     VRS

VRS Owner    = LIBRARY
Description  = HOLD ONE DAY AFTER UNCATALOG
Last Reference: Date =            Time =
Vital Record Specification to be deleted on 12/31/1999
```

VRS Commands – SEARCHVRS

- SEARCHVRS lists VRS's based on criteria
- Multiple criteria are logically "AND"ed together
- Possible to generate fairly complex queries
- READ access to STGADMIN.EDG.VRS required
- Help available via TSO HELP RMMSS
- CLIST operand creates commands for further actions

VRS Commands – SEARCHVRS

- IMPORTANT TIP → To get as many hits as possible, ensure that your TSO PROFILE specifies VARSTORAGE(HIGH)
  - Rexx variables created in Rexx exec or in RMM ISPF dialog
  - VARSTORAGE(HIGH) stores Rexx variables above the line
  - Allows creation of many more Rexx variables
  - Allows display of more SEARCHVRS hits
  - RMM ISPF dialog will use CONTINUE under the covers

VRS Commands – SEARCHVRS

- SEARCHVRS lists following data for each VRS
  - Vital Record Specification – volser, dsname, VRS name
  - Job name – Jobname that created dataset
  - Type – DSN or NAME or VOL
  - Owner – userid of volume owner
  - Location – Location specified in VRS definition
  - Next VRS – name of next link in VRS chain

VRS Commands – SEARCHVRS

- SEARCHVRS syntax tree

```
SEARCHVRS | SS
      ANDVRS(and_VRS_name | *) | NEXTVRS(next_VRS_name | *)
      BYDAYSCYCLE | CYCLES | DAYS | EXTRADAYS | LASTREFERENCEDAYS
      CHAIN
      (CLIST(prefix_string,suffix_string) (LIST | NOLIST) (ADD | START))
      CONTINUE((DSNAME(dataset) JOBNAME(jobname)) |
               VOLUME(volser) | NAME(vrs_mask))
      ((DSNAME(dsname_mask | *) (GDG | NOGDG) JOBNAME(job_mask)
               RELEASE(EXPIRYDATEIGNORE,SCRATCHIMMEDIATE)) |
        NAME(vrs_mask | *) | VOLUME(full_or_generic_volser | *))
      LIMIT(10 | search_limit | *)
      LOCATION(HOME |  library_name | CURRENT | LOCAL | DISTANT | REMOTE |
               LOCDEF_location_name)
      OWNER(owner_ID | command_issuer_ID | *)
      UNTILEXPIRED
      WHILECATALOG
```

VRS Commands – SEARCHVRS Parms

- ANDVRS can be generic '*' for all ANDVRS
- CHAIN returns all VRS's in VRS chain
  - ANDVRS and NEXTVRS chains searched to develop list

VRS Commands – SEARCHVRS Parms

- CLIST creates commands with VRS name
  - prefix_string precedes VRS name
  - suffix_string follows VRS name
  - For commands, prefix_string should have trailing blank
  - For commands, suffix_string should start with a blank
  - Quote prefix and suffix strings to ensure correct syntax
  - Prefix and suffix strings limited to 255 characters
  - Commands written to DD RMMCLIST

VRS Commands – SEARCHVRS Parms

- CLIST creates commands with VRS name (cont'd)
  - If RMMCLIST not allocated, RMM dynamically allocates 'prefix.EXEC.RMM.CLIST' DSORG(PS) RECFM(VB) LRECL(255)
  - Prefix above is TSO PROFILE PREFIX value
  - Prefix is userid if TSO PROFILE NOPREFIX in effect
  - Jobname is used if no TSO PREFIX or userid available
  - RMM doesn't override DCB if RMMCLIST preallocated
  - RMM continues commands that exceed LRECL with '+'
  - LIST is default and lists all hits

VRS Commands – SEARCHVRS Parms

- CLIST creates commands with VRS name (cont'd)
  - NOLIST suppresses list from terminal for large hit lists
  - START writes records at beginning of CLIST dataset
  - START and ADD mutually exclusive
  - START is the default
  - ADD writes records at end of CLIST dataset
  - If CLIST dataset empty or new, ADD acts like START
  - ADD and START mutually exclusive
  - RMM creates member TEMPNAME if RMMCLIST is PDS

VRS Commands – SEARCHVRS Parms

- CONTINUE breaks up searches into smaller chunks
  - CONTINUE with no operands stops search at LIMIT value
  - CONTINUE value returned for use in next SEARCH
  - In TSO, CONTINUE value given in line mode message
  - Value returned based on SEARCHVRS command format

```
EDG3025I DSNAME('TCONLEY.RMM.DATASET')JOBNAME('TCONLEY*')
EDG3025I NAME('CATALOG')
EDG3025I VOLUME('TOM123')
```

  - In Rexx, CONTINUE value returned as Rexx variable

VRS Commands – SEARCHVRS Parms

- CONTINUE breaks up searches into smaller chunks (cont'd)
  - In RMM API, CONTINUE value can be line mode message, or an SFI or XML attribute
  - CONTINUE(DSNAME(dataset_mask))
  - CONTINUE(DSNAME(dsn_mask) JOBNAME(job_mask))
  - CONTINUE(NAME(VRS_name_mask))
  - CONTINUE(VOLUME(volser_mask))
  - Use same SEARCH command with CONTINUE
  - Issue SEARCH until no CONTINUE value returned

VRS Commands – SEARCHVRS Parms

- DSNAME searches on generic, fully-qualified, or all datasets
  - Generic characters
    - % - single character
    - * - single qualifier with any characters, or 0 or more characters within a qualifier
    - ** - 0 or more qualifiers
    - ** - should select all datasets, BUT for TSO PROFILE NOPREFIX, use *, not **
  - DSNAME mutually exclusive with NAME, VOLUME

VRS Commands – SEARCHVRS Parms

- GDG lists GDG VRS's
- JOBNAME selects DSNAME VRS's based on JOBNAME
  - 1 to 8 character name, generics allowed
  - JOBNAME(*) returns all VRS's with a jobname defined
  - For JOBNAME(*) VRS's without jobname not listed

VRS Commands – SEARCHVRS Parms

- LIMIT sets a limit for number of VRS's displayed
  - 1 to 4 digit number, 9999 is max
  - '*' means return ALL hits
  - Default for LIMIT is 10
  - With LIMIT '*' storage can be an issue
  - Ensure TSO PROFILE VARSTORAGE(HIGH)
- NAME searches on generic or specific NAME VRS
  - NAME mutually exclusive with DSNAME, VOLUME
- NEXTVRS can be generic '*' for all NEXTVRS

VRS Commands – SEARCHVRS Parms

- NOGDG lists NOGDG VRS's
- OWNER limits search to specific owner id
  - 1 to 8 characters, generics allowed
  - '*' lists datasets with any owner
  - If no VRS's returned, ensure that OWNER(*) specified
  - Default is userid issuing SEARCHVRS command

VRS Commands – SEARCHVRS Parms

- RELEASE searches on the RELEASE options
  - EXPIRYDATEIGNORE for VRS's with EXPIRYDATEIGNORE
  - SCRATCHIMMEDIATE for VRS's with SCRATCHIMMEDIATE
- UNTILEXPIRED lists VRS's with UNTILEXPIRED
- WHILECATALOG lists VRS's with WHILECATALOG
- VOLUME searches on generic or specific volser
  - VOLUME mutually exclusive with DSNAME, NAME

VRS Commands – SEARCHVRS Example

- RMM SEARCHVRS DSNAME('TCONLEY.**') OWNER(*) LIMIT(*)

```
Vital Record Specification                Job name Type Owner    Location Next VRS
--------------------------                -------- ---- -------- -------- --------
TCONLEY.FILE1.*                           TCON1*   DSN  TCONLEY  HOME     DR1
TCONLEY.FILE2.*                           TCON2*   DSN  TCONLEY           DR2
TCONLEY.FILE3.*                                    DSN  TCONLEY           DR3
TCONLEY.FILE4.*                                    DSN  TCONLEY           REMOTE
4 ENTRIES LISTED
```

VRS Recommendations

- CYCLES retention manages either GDG or single-dataset cycles
- BYDAYSCYCLE similar, treats all cycles on same day as 1 cycle (CDAY=DAY parm in CA-1)
- Single-dataset cycles problematic
  - Usually only current cycle cataloged to MVS
  - Older cycles must be referenced by volser
  - GDG's were designed to replace CYCLES

VRS Recommendations

- Example of a GDG CYCLE using GDG parm in ADDVRS

```
RMM ADDVRS DSNAME('TCONLEY.CYCLE') GDG CYCLES COUNT(3)
```

- This VRS will retain TCONLEY.CYCLE.G0001V00, TCONLEY.CYCLE.G0002V00, and TCONLEY.CYCLE.G0003V00
- Creating TCONLEY.CYCLE.G0004V00 causes RMM to release TCONLEY.CYCLE.G0001V00 from this VRS

VRS Recommendations

- Using CYCLES to manage GDG's is not ideal
- COUNT should match GDG LIMIT in MVS catalog
- Changing COUNT requires changing LIMIT and vice-versa
- Difficult to manage
- Only benefit is that RMM can manage more cycles than catalog limit of 255

VRS Recommendations

- Recommendation for DSNAME VRS's for GDG's

```
RMM ADDVRS DSNAME('TCONLEY.CYCLE') GDG CYCLES COUNT(99999)
     WHILECATALOG
```

- Allows GDG LIMIT to control number of GDG's
- When GDG rolls off, tape is released
- Use WHILECATALOG wherever possible
- For CYCLES covering single datasets, convert datasets to GDG's
- CYCLES can manage GDG's with LIMIT > 255

VRS Recommendations

- DAYS retention is very straightforward
- Be careful if combining DAYS with UNTILEXPIRED
  - Expiration date may prematurely release volume from VRS
- EXTRADAYS and DAYS are functionally equivalent
- EXTRADAYS self-explanatory
- LASTREFERENCEDAYS can give erratic retentions
  - Not recommended unless exactly right for situation

VRS Recommendations

- WHILECATALOG self-explanatory
  - WHILECATALOG highly recommended for use
  - Scratching dataset as easy as "U" from ISPF 3.4
- UNTILEXPIRED means that VRS will hold until EXPDT or RETPD
- Multiple retentions hold dataset if all retentions true
- If VRS specifies WHILECATALOG UNTILEXPIRED
  - VRS will release when dataset is uncataloged ***OR***
  - VRS will release when EXPDT or RETPD is reached

VRS Recommendations

- Release policies in VRS when VRS no longer controls dataset
  - EXPIRYDATEIGNORE expires dataset regardless of EXPDT
  - UNTILEXPIRED and EXPIRYDATEIGNORE are opposites
  - Use UNTILEXPIRED to honor user EXPDT in JCL
  - EXPIRYDATEIGNORE overrides user EXPDT in JCL
  - SCRATCHIMMEDIATE scratches tape without Pending Release, if no other release actions outstanding
  - Recommend SCRATCHIMMEDIATE on EVERY VRS

VRS Recommendations

- To perform volume movement, specify NAME VRS in NEXTVRS
- NAME VRS should specify location and clear retention type using COUNT, not STORENUM
  - STORENUM should always equal COUNT
  - DAYS specifies number of days to store at location
  - WHILECATALOG holds tape in location until uncataloged
  - UNTILEXPIRED leaves tape in location until EXPDT or RETPD reached

VRS Recommendations

- In practice, one NEXTVRS should be sufficient
- Volumes move offsite and come back when NEXTVRS releases
- Volumes stay onsite until they meet basic retention
- These recommendations should simplify your VRS construction
- Key to good VRS policy is to keep it as simple as possible

VRS and RMM PARMLIB Options

- RMM PARMLIB options affect VRS processing
- CATRETPD - number of hours RMM will wait for dataset to be cataloged by long-running job
- EXPDTDROP - sets thresholds for tapes retained by EXPDT and action RMM should take if too many are scratched
- MAXRETPD - maximum retention period in RMM, JCL EXPDT or RETPD cannot exceed MAXRETPD (recommend NOLIMIT)

VRS and RMM PARMLIB Options

- MOVEBY - determines if RMM will move individual volumes in multi-volume set or the set as a whole (MOVEBY(SET) similar to CA-1)
- RETAINBY determines if RMM will retain individual volumes in multi-volume set or the set as a whole (RETAINBY(SET) similar to CA-1)
- RETPD is default retention period if no EXPDT or RETPD specified in JCL creating dataset

VRS and RMM PARMLIB Options

- VRSCHANGE - determines if whether RMM will run VRSEL when VRS changes are made without first running VRSEL(VERIFY)
- VRSDROP - sets thresholds for tapes retained by VRS and action RMM should take if too many are scratched
- VRSJOBNAME - controls how JOBNAME in VRS is matched

VRS and RMM PARMLIB Options

- VRSMIN - specifies minimum number of VRS's required to run VRSEL, and action to take if VRSMIN not met
- VRSRETAIN - sets thresholds for tapes newly retained by VRS and RMM action if not enough are retained

VRS Problem Resolution

- My VRS's aren't behaving, what can I do?
- VRSEL creates two datasets with diagnostic info, VRSEL REPORT and ACTIVITY
- If you don't use these files in VRSEL, add them!
- VRSEL report is VBA 255 report
- ACTIVITY is flat file very similar to EXTRACT
- ACTIVITY record layout EDGACTRC defined in RMM Reporting manual
- Use SYS1.SAMPLIB(EDGJACTP) on ACTIVITY

VRS Problem Resolution

- Sample EDGHSKP JCL:

```
//HSKP EXEC PGM=EDGHSKP,
//  PARM='VRSEL'
//SYSPRINT DD SYSOUT=*
//MESSAGE  DD DISP=SHR,DSN=DFRMM.MESSAGES
//REPORT   DD DISP=SHR,DSN=DFRMM.VRSELRPT
//ACTIVITY DD DISP=SHR,DSN=DFRMM.ACTIVITY
```

- Recommend adding step or job to copy VRSELRPT and ACTIVITY to GDG's with LIMIT(255) so you can research any problems

VRS Problem Resolution

- VRS truncated REPORT example

```
REMOVABLE MEDIA MANAGER                        VITAL RECORDS RETENTION REPORT                                    PAGE 120
Copyright IBM CORPORATION 1993,2006            ----- ------- --------- ------                 TIME 11:21:02 DATE 03/22/2006

JOB MASK DATA SET OR VOLUME MASK (CONTINUED) OWNER TYPE RETN   C X   DELETE   DLY COUNT STNUM LOCATION RLSE LASTREF
-------------------------------------------- ----- ---- ----   - -   ------   --- ----- ----- -------- ---- -------
          *.GDG.*.ICRMT.**                    X002  DSN  CYCLES Y N 12/31/1999   0 99999 99999 LOCAL         03/22/2001

JOB NAME DATA SET NAME (CONTINUED) 2ndVRS 2ndNAME FSEQ DSEQ VOLUME VSEQ OWNER CURRENT REQUIRED PRTY  RETDATE   RETNAME
-------- ----------------------------------     ---- ---- ------ ---- ----- ------- -------- ---- ---------- -------
X015IJIC DT04.GDG.DSNDB06.ICRMT.SYSSTR.G0001V00     12   12 L01699    1 X015  LOCAL   LOCAL     300 WHILECATLG *

NUMBER OF DATA SETS RETAINED (GROUP STORE) =                                                 1     1

REMOVABLE MEDIA MANAGER                          UNUSED VRS CHAINS REPORT                                    PAGE 121
Copyright IBM CORPORATION 1993,2006              ------ --- ------ ------                 TIME 11:21:02 DATE 03/22/2006

JOB MASK DATA SET OR VOLUME MASK             OWNER TYPE RETN   C X   DELETE   DLY COUNT STNUM LOCATION RLSE LASTREF
-------------------------------------------- ----- ---- ----   - -   ------   --- ----- ----- -------- ---- -------
         *.BACKUP.**                         LIB   DSN  CYCLES Y N 12/31/1999   0 99999 99999 LOCAL         01/23/1992
         *.IMGCPY.IMSDB.**                   LIB   NAME DAYS   N Y 12/31/1999   0 99999 99999 HOME          12/12/2004
```

VRS Problem Resolution

- VRSEL REPORT shows all VRS records with their full definition
- Each VRS record shows datasets that matched it during VRSEL and important data for each dataset
- Any VRS records that did not match datasets are also listed in VRSEL REPORT

VRS Problem Resolution

- VRS truncated ACTIVITY example

```
Status Change and Drop Reason: RETAINED

DSNAME                                    JOBNAME  VOLSER O-ST N-ST RSN PRIMARY VRS
----------------------------------------- -------- ------ ---- ---- --- -------------
RMMUSER.D001                                       A00001 N    Y        RMMUSER.D001
RMMUSER.D002                                       A00004 N    Y        RMMUSER.D002
RMMUSER.D002                                       A00005 N    Y        RMMUSER.D002

Status Change and Drop Reason: DROPPED  DAYS

DSNAME                                    JOBNAME  VOLSER O-ST N-ST RSN PRIMARY VRS
----------------------------------------- -------- ------ ---- ---- --- -------------
DSMASTER.DS2                              JNAME0D1 A00021 Y    N    D   DSM*.DS2
DSMASTER.DS2                              JNAME0D1 A00022 Y    N    D   DSM*.DS2
DSMASTER.DS3                              JNAME0D2 A00022 Y    N    D   DSM*.DS3
```

VRS Problem Resolution

- ACTIVITY report shows DSNAME, JOBNAME, VOLSER, old status, new status, reason code, and primary VRS retaining dataset
- Old and new status
  - N – not VRS retained
  - Y – VRS retained
- Drop reason code 'D' means days
  - Drop reason codes documented in EDGACTRC macro found in RMM Reporting manual

VRS Problem Resolution

- Drop reason codes
  - B – BYDAYSCYCLE
  - C – CYCLES
  - D – DAYS
  - G – GDG rolloff
  - L – LASTREFERENCEDAYS
  - N – No matching VRS
  - U – UNTILEXPIRED
  - V – Volume Released
  - W – WHILECATALOG
  - X – EXTRADAYS

VRS Problem Resolution

- You should be able to resolve vast majority of VRS issues by reviewing the VRSEL REPORT
- If VRSEL report does not have the answer, you can dig into ACTIVITY file for deeper dive

Summary

- Reviewed RMM VRS commands
- Several VRS examples were presented
- Methodology to simplify VRS's was presented
- Discussed how to resolve problems with VRS's

Finally….

- I'm always interested to hear about your experiences with RMM and VRS, so if you have questions or come up with a neat solution to a problem, please feel free to drop me an Email pinncons@rochester.rr.com