IBM Education Assistance for z/OS V2R1
Item: Release Updates
Element/Component: DFSMSrmm

Material prepared for IBM Education Assistance and was current as of June 2013

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Trademarks

- See url http://www.ibm.com/legal/copytrade.shtml for a list of trademarks.

Session Objectives

- Present an overview about all the new DFSMSrmm features developed for release V2R1

- Show how to use and exploit the new features

Expire after days non-usage/Last reference date

Overview

- **Problem Statement:**

  For volumes managed by the VRSEL retention method the user can define vital record specifications to retain all copies of the data set based on the number of days since the data set was last read or written.

  The user wants to manage his data based on the number of days since the data set was last read or written on volumes managed by the EXPDT retention method.

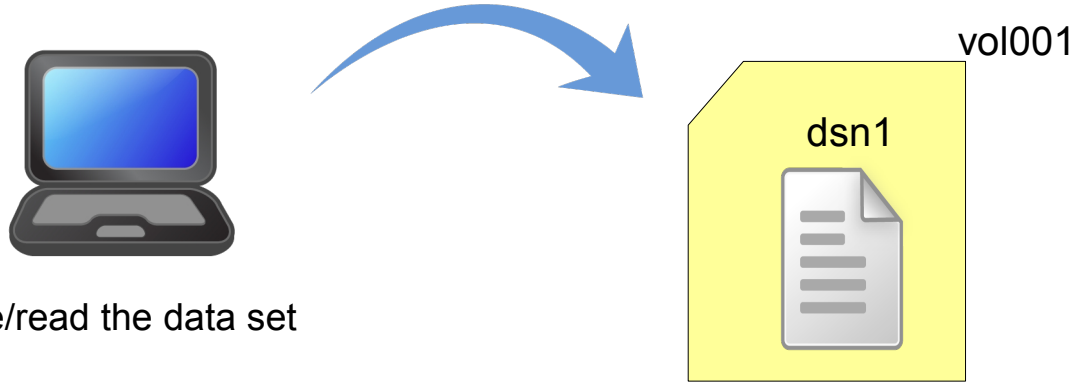
- **Solution:**

  A new attribute, LASTREF extra days is added to the data set record for data sets on volumes managed by the EXPDT retention method.

- **Benefit:**

  The user can manage his data based on the number of days since the data set was last read or written on volumes managed by the EXPDT retention method.

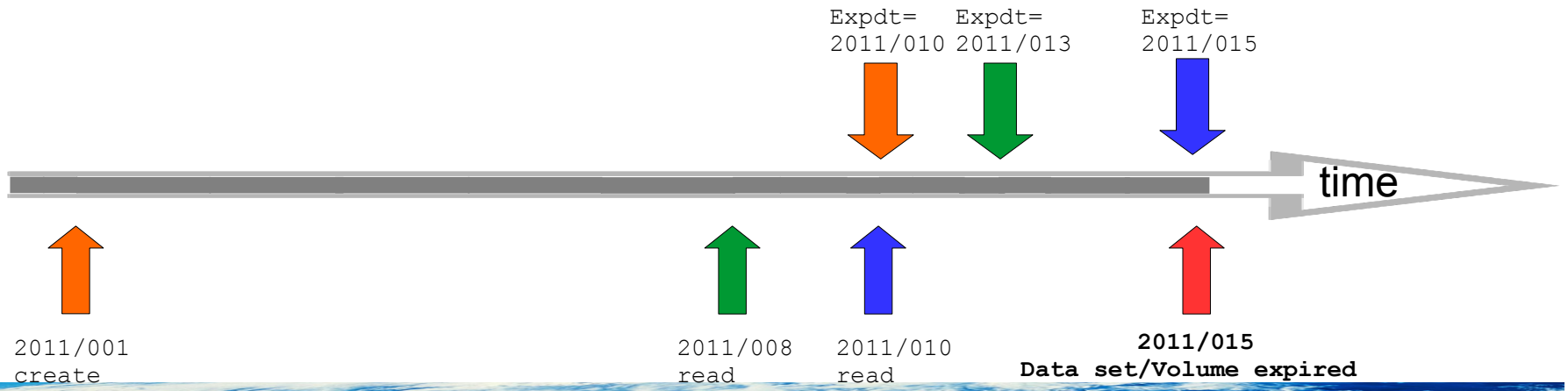
Usage & Invocation - LASTREF extra days



- **Creation date** = 2011/001
- Expdt = **2011/010**
- LASTREF = 5

- **Last Read date** = 2011/008
- Expdt = **2011/013**
- LASTREF = 5

- **Last Read date** = 2011/010
- Expdt = **2011/015**
- LASTREF = 5



Usage & Invocation - Setting LASTREF extra days

- The LASTREF extra days can only be set for data sets on volumes managed by the EXPDT retention method.
- The LASTREF extra days value can be **explicitly**
  - set by RMM ADDDATASET subcommand when the data set record is created and
  - changed by RMM CHANGEDATASET subcommand any time after the data set record has been created.
- The LASTREF extra days value will also be set from the **parmlib option**
  - when a data set is written on a volume managed by the EXPDT retention method and it was not set from a Management Class.
  - when RMM ADDDATASET subcommand was specified without the LASTREF extra days attribute.
  - when the retention method of a volume changes from VRSEL to EXPDT.
- The LASTREF extra days value can also be set by the **Management Class**
  - when the use of the management class attributes is enabled by the MCATTR parmlib option and
  - There is a value in Expiry after days non-usage in the Management Class.

Usage & Invocation - Propagation of LASTREF extra days

- The LASTREF extra days data set attribute
  - will be kept equal for all files of a multi-volume data set if the volume set is retained by VOLUME or SET.

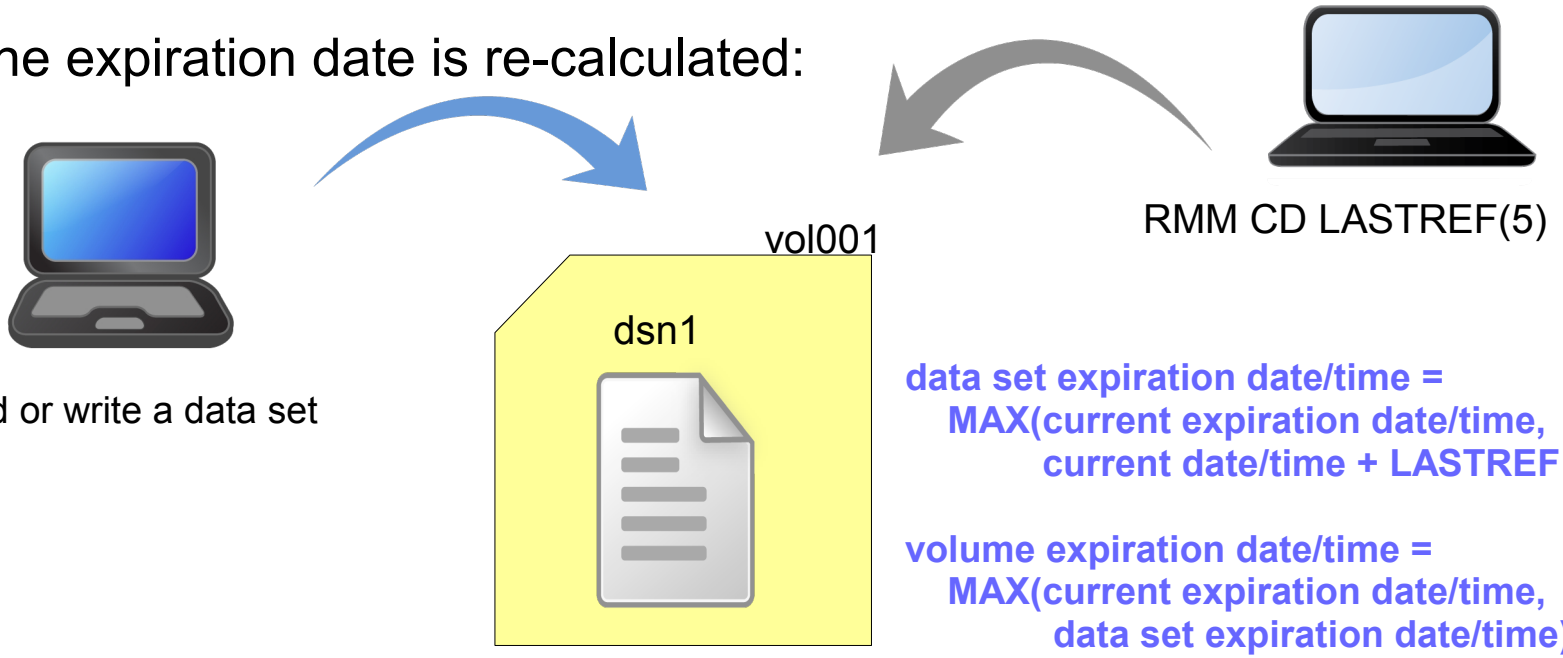
    The latest LASTREF extra days update for a single file in a multi-volume data set is propagated to all files that belong to the same multi-volume data set.

  - No additional processing will be performed to keep the expiration date equal for all files of a multi-volume data set if the volume set is retained by FIRSTFILE, because only the value of the first file is relevant for retention of the volume set.

Usage & Invocation - How LASTREF extra days influences the expiration date

- When
  - the data set last reference date and time changes or
  - RMM CHANGEDATASET LASTREF(extra_days) is issued

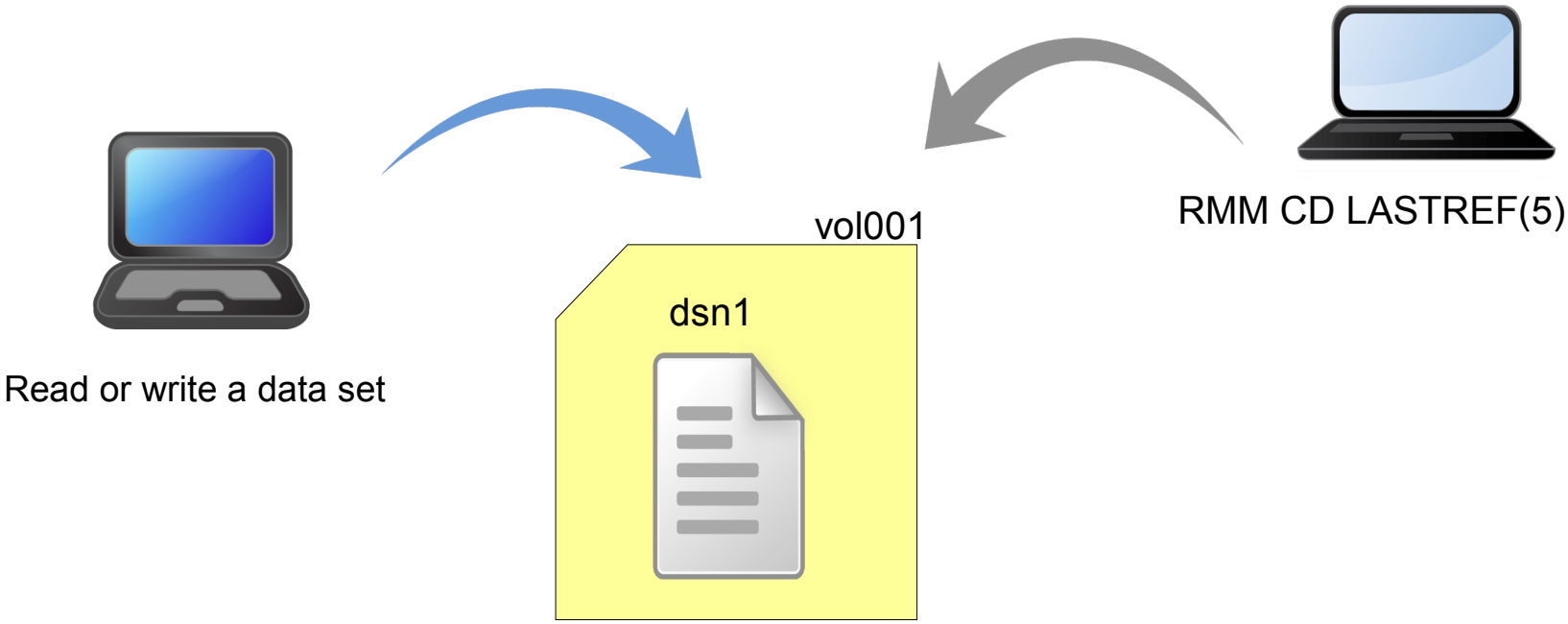
the expiration date is re-calculated:



data set expiration date/time =
MAX(current expiration date/time,
current date/time + LASTREF extra days)

volume expiration date/time =
MAX(current expiration date/time,
data set expiration date/time)

Usage & Invocation - How LASTREF extra days influences expiration date set by



- When the data set expiration date/time is set/changed because of the LASTREF attribute then the Expiration date Set by is set to MDESB_LASTREF.
- When the volume expiration date/time is set/changed because of the data set LASTREF attribute then the Expiration date Set by is set to MVESB_LASTREF.

Usage & Invocation - Examples 1/2

1) Set the data set expdt and also set a new LASTREF extra days value of 10.

```
RMM CD dsname …. EXPDT(2012/001) LASTREF(10)
```

2) Set the data set expdt and clear the LASTREF extra days.

```
RMM CD dsname …. EXPDT(2012/001) NOLASTREF
```

3) Set the new expiration date and do not change the existing value for LASTREF extra days.

```
RMM CD dsname... EXPDT(2012/001)
```

Note! The expiration date is lowered or increased regardless of the LASTREF (it is not checked at this moment). The next reference of the data set can then again increase the expiration date if necessary.

4) Override the use of LASTREF extra days by setting it to null. The expiration date stays unchanged.

```
RMM CD dsname … NOLASTREF
```

Usage & Invocation - Examples 2/2

1) If the retention method is changed from EXPDT to VRSEL the LASTREF extra days is reset.

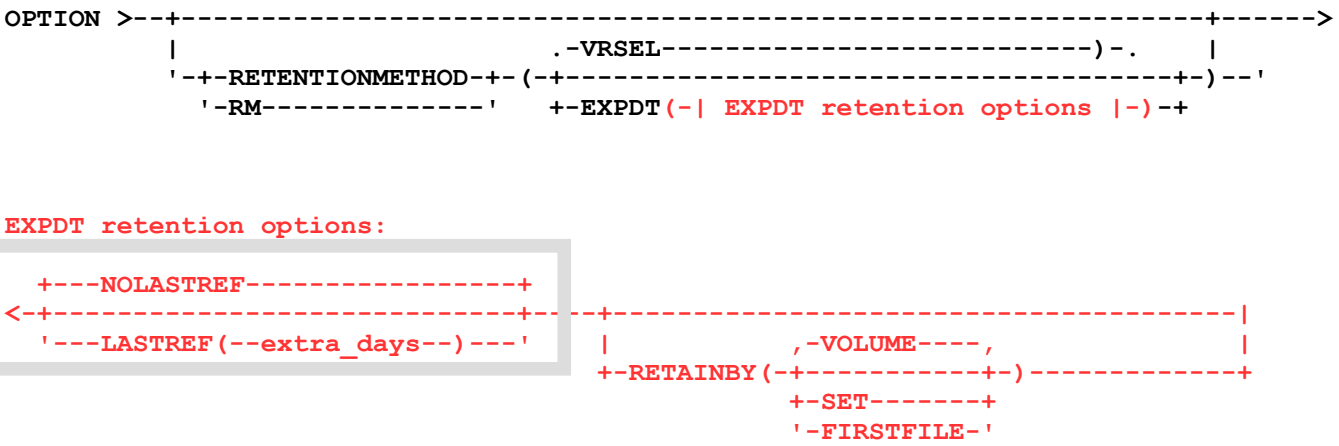
```
CV volume RM(VRSEL)
```

2) If the retention method is changed from VRSEL to EXPDT then the LASTREF extra days is taken from the parmlib options, but can be changed later for each data set by command.

```
CV volume RM(EXPDT)

CD dsname LASTREF(5)
```

3) If a volume is added to a multi volume chain with the following command then LASTREF extra days is updated to:
   a) the same value as the preceding data set part if there is a data set with the same name and same label number on the previous volume.
   b) the value in the parmlib options if the retention method is changed from VRSEL to EXPDT for this volume and a. didn't happen.
   c) zero if the retention method is changed from EXPDT to VRSEL for this volume. `CV volume2 PREVVOL(volume1)`

Usage & Invocation - LASTREF extra days parmlib option



LASTREF(extra_days)

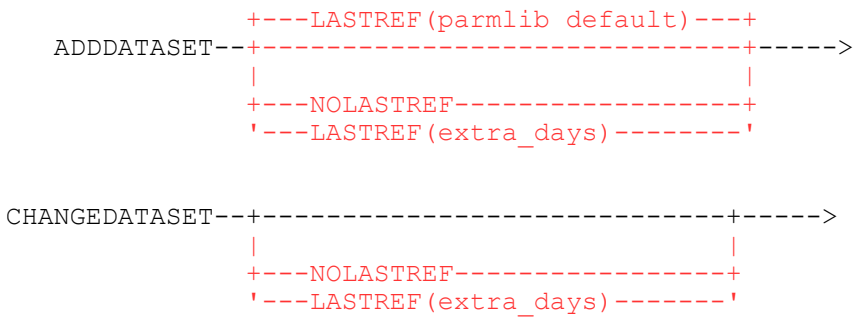
specifies the default for the data set record LASTREF extra days attribute, it applies only to data sets on volume managed by the EXPDT retention method. The value 0 is equal to NOLASTREF

Usage & Invocation - RMM LISTCONTROL output

The LC output is re-arranged

```
System options:
PARMLIB Suffix  = CL
Operating mode  = P    Retention period: Default = 1       Maximum = NOLIMIT
                                         Catalog = 12    hours
…
Retention period: Default = 5     Maximum = NOLIMIT
                  Catalog = 12    hours
Use of Management Class Attributes = NONE
Retention method: Default = EXPDT

RM(VRSEL) defaults:              RM(EXPDT) defaults:
  Retain by         = VOLUME       Retain by          = VOLUME
  Move By           = VOLUME
  VRS selection     = NEW          LASTREF extra days = 14
  VRS change        = INFO
  VRSMIN action     = FAIL
  VRSMIN count      = 1
  VRS job name      = 2
  GDG duplicate     = BUMP
  GDG cycle by      = GENERATION

VRSDROP action  = INFO     VRSDROP count  = 0              percent = 10
VRSRETAIN action= INFO     VRSRETAIN count= 0              percent = 80
EXPDTDROP action= INFO     EXPDTDROP count= 0              percent = 10
....
```

Usage & Invocation - data set commands



The LASTREF applies to data sets on RM(EXPDT) managed volumes. LASTREF(extra_days) specifies the number of days that the data set will be retained after the data set was last referenced . Days is a decimal number between 0 and 93000.

NOLASTREF specifies that DFSMSrmm does not consider the data set last reference date when evaluating the data set expiration date.

Usage & Invocation - LISTDATASET output

```
Data set name = MYDSN1
Volume        = A21201                 Physical file sequence number = 1
Owner         = RMMUSER                          Data set sequence = 1
Create date   = 02/17/2011 Create time = 05:56:35 System ID         = EZU0000
Expiration date       = 02/27/2011 Original expir. date  = 02/27/2011
         set by       = OCE_JFCB
LASTREF extra days    = 14
Block size            = 80         Block count           = 1
Data set size(KB)     = 1
Percent of volume     = 0          Total block count     = 1
Logical Record Length = 80         Record Format         = FB
Date last written     = 02/17/2011 Date last read        = 02/17/2011
Job name              = RMMUSERJ   Last job name          = RMMUSERJ
Step name             = SOURCE     Last step name        = SOURCE
Program name          = TAPEIO     Last program name     = TAPEIO
```

Usage & Invocation - Return and reason codes

Return Code	Reason Code	Message Number	Issuing Command	Description
12	274 (new)	3367 (new)	AD, CD	Lastref/Nolastref can only be specified for data sets on a volume retained by EXPDT retention method
12	108	3022	AD,CD	INSTALLATION DEFINED MAXIMUM RETENTION PERIOD EXCEEDED
12	276 (new)	3368	CV, AD, CD	FORCE OPERAND REQUIRED

Usage & Invocation - Messages

- New messages:

```
EDG3367I LASTREF OR NOLASTREF CAN ONLY BE SPECIFIED
FOR DATA SETS ON A RETENTIONMETHOD(EXPDT) VOLUME


EDG3368I FORCE OPERAND REQUIRED
```

- Changed messages:

```
EDG3022E THE INSTALLATION DEFINED MAXIMUM RETENTION
PERIOD MUST NOT BE EXCEEDED
```

Usage & Invocation – REXX support

REXX Variable Name	Description	Type	Length	Values	Command
EDG@LRED	Last reference extra days	Numeric	5	0 -93000	LC OPT LD

Usage & Invocation – API support

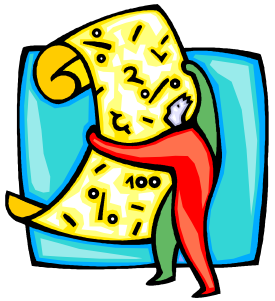
SFI Name	SFI Number	Data Type Identifier	Length	Values	Command
LRED	X'84F800'	Binary(32)	12	Last reference extra days Min = 0, Max = 93000	LC LD

Migration & Coexistence Considerations

- Coexistence support for z/OS >= V1R12 is required to pertain an existing set of consistent last reference extra days information for a multi-volume multi-data set created or maintained in V2R1 whenever retention information for a file in that set is added or changed in a lower release.
- New single data set records will get LASTREF extra days 0 assigned.
- When an existing multi volume data set is enlarged with MOD and a new data set record is added to the RMM CDS because of EOV then the LastReference is taken from the existing previous data set record.
- APAR OA35808

Session Summary

- The user can manage his data based on the number of days since the data set was last read or written without VRSEL processing.



'Retain by' options
for volumes managed by the EXPDT retention method

Overview

- **Problem Statement:**

  For volumes managed by the VRSEL retention method the user can specify whether a volume set is to be retained as a whole set expiring all at the same time or as individual volumes.

  The user wants also to manage his volume sets that are managed by the EXPDT retention method with the choice of retaining them as individual volumes or as whole sets or based on the expiration date of the first file.

- **Solution:**

  A new attribute, RETAINBY is added to the volume record for volumes managed by the EXPDT retention method. Possible values for RETAINBY attribute are VOLUME, FIRSTFILE and SET.

  A new sub-parameter RETAINBY for the EXPDT retention method is added to the DFSMSrmm parmlib member to specify a system wide default.

- **Benefit:**

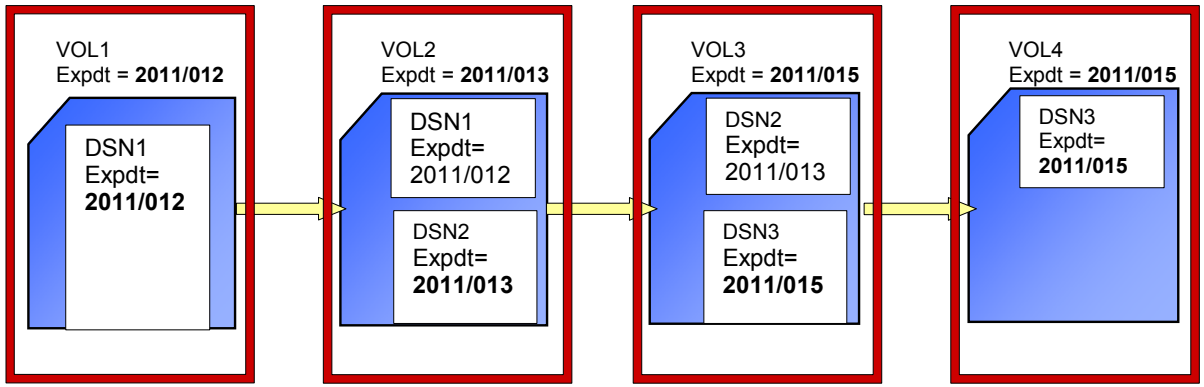
  The user has the choice of three RETAINBY options to manage his volume sets that are managed by the EXPDT retention method.

Usage & Invocation - EXPDT retention method RETAINBY volume attribute

RETAINBY(VOLUME)

The expiration date of the volume is considered for each volume separately, and each file on a volume can increment the volume expiration date.

An example of a volume set managed by the EXPDT retention method with RETAINBY(VOLUME):

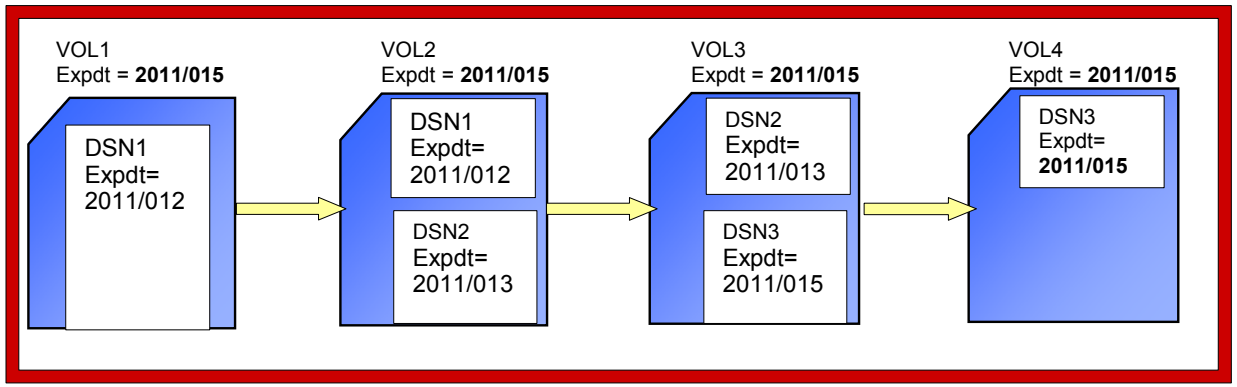


Usage & Invocation - EXPDT retention method RETAINBY volume attribute

RETAINBY(SET)

The highest expiration date of all volumes in the set is propagated to all volumes in the set. Any file can increment the volume expiration date.

An example of a volume set managed by the EXPDT retention method with RETAINBY(SET):

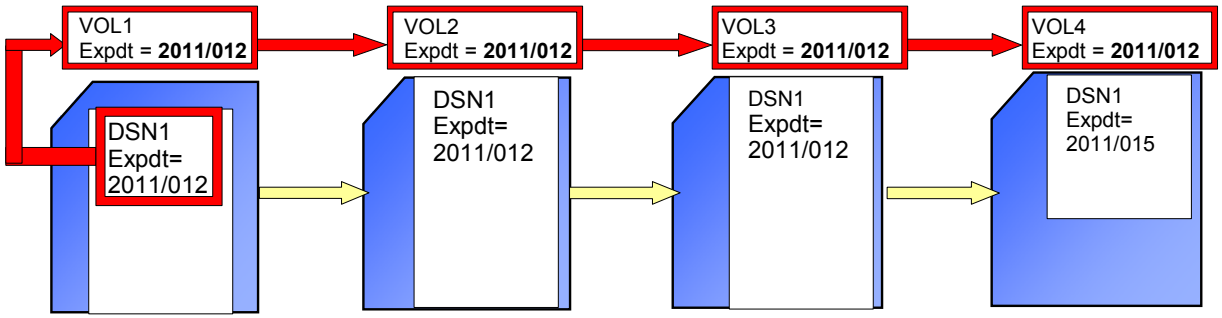


Usage & Invocation - EXPDT retention method RETAINBY volume attribute

RETAINBY(FIRSTFILE)

The expiration date of the first file is used to determine the expiration date of the volume or multi volume set. All volumes in a set will have the exact same expiration date.

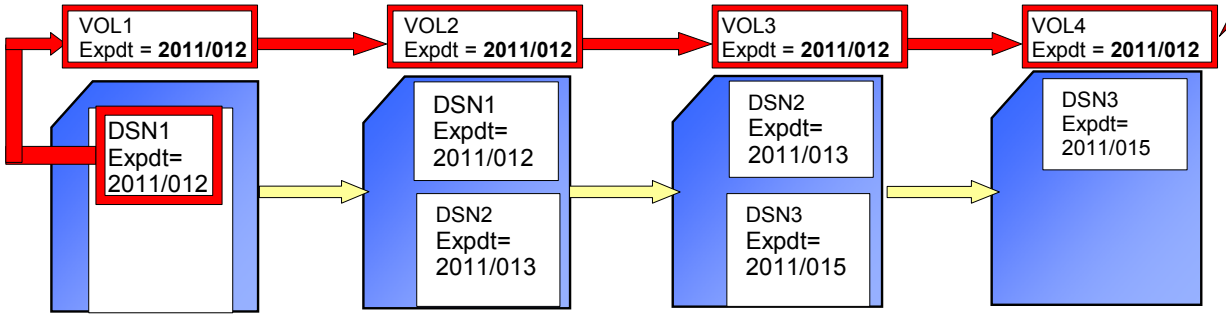
An example of a volume set managed by the EXPDT retention method with RETAINBY(FIRSTFILE):



Usage & Invocation - EXPDT retention method RETAINBY volume attribute

caution!!!

An example of a volume set managed by the EXPDT retention method with RETAINBY(FIRSTFILE):



If you have such a volume set it might be that your volumes expire prior the data set on it expires.
In this case it would be better to chose RETAINBY(VOLUME) or RETAINBY(SET).

Usage & Invocation - Setting the EXPDT retention method RETAINBY volume attribute

The RETAINBY attribute is only valid for volumes managed by the **EXPDT retention method.**

The RETAINBY attribute can explicitly be set for the first volume in a set by

- **RMM ADDVOLUME subcommand**
- **RMM CHANGEVOLUME subcommand**

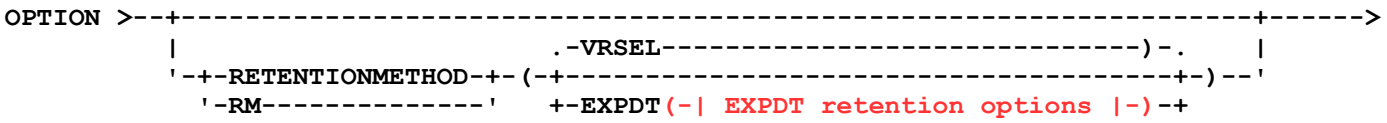
and will be propagated to all other volumes in the same volume set

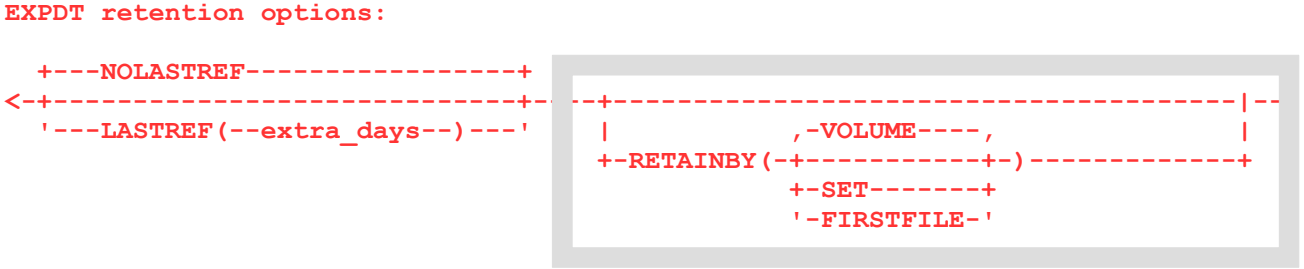
The RETAINBY attribute will be set for the first volume in a set from the parmlib option **OPTION RM(EXPDT(RETAINBY(value)))**

- when RMM ADDVOLUME subcommand was specified without the RETAINBY attribute
- when a volume record is created due to OCEOV processing, or EDGINERS init / erase processing or LCS entry / eject processing
- when the retention method of a volume changes from VRSEL to EXPDT, and RETAINBY attribute is not specified

RETAINBY attribute is the same for all volumes in a set, it cannot explicitly be set for volumes other than the first. DFSMSrmm ensures that volumes managed by the EXPDT retention method inherit the RETAINBY attribute from their previous volumes if existing.

Usage & Invocation - parmlib option





RM(EXPDT(RETAINBY(VOLUME | FIRSTFILE | SET)))

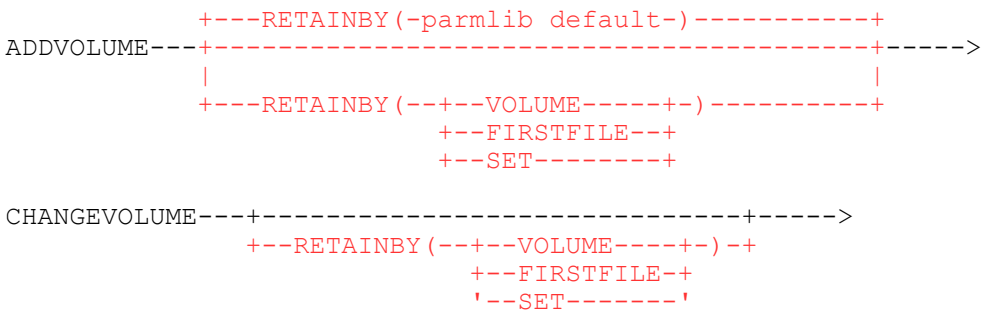
specifies the default for the volume record RETAINBY attribute, it applies only to volumes managed by the EXPDT retention method.

Usage & Invocation - RMM LISTCONTROL output

The LC output is re-arranged

```
System options:
PARMLIB Suffix  = CL
Operating mode  = P    Retention period: Default = 1       Maximum = NOLIMIT
                                         Catalog = 12    hours
…
Retention period: Default = 5     Maximum = NOLIMIT
                  Catalog = 12    hours
Use of Management Class Attributes = NONE
Retention method: Default = EXPDT

RM(VRSEL) defaults:              RM(EXPDT) defaults:
  Retain by         = VOLUME       Retain by          = VOLUME
  Move By           = VOLUME
  VRS selection     = NEW          LASTREF extra days = 14
  VRS change        = INFO
  VRSMIN action     = FAIL
  VRSMIN count      = 1
  VRS job name      = 2
  GDG duplicate     = BUMP
  GDG cycle by      = GENERATION

VRSDROP action  = INFO     VRSDROP count  = 0              percent = 10
VRSRETAIN action= INFO     VRSRETAIN count= 0              percent = 80
EXPDTDROP action= INFO     EXPDTDROP count= 0              percent = 10
....
```

Usage & Invocation - volume commands



RETAINBY(VOLUME | FIRSTFILE | SET)

Use the RETAINBY operand to specify whether DFSMSrmm determines the volume set expiration by individual volumes, by the volume set, or that the expiration is determined by the first file on the volume set. Use the RETAINBY operand for volume sets managed by the EXPDT retention method.

The subcommand CV RETAINBY on any volume can only be executed with minimum UPDATE access to STGADMIN.EDG.CV.RM resource. Otherwise the subcommand should be rejected if no CONTROL access is given to STGADMIN.EDG.MASTER.

Usage & Invocation - volume commands

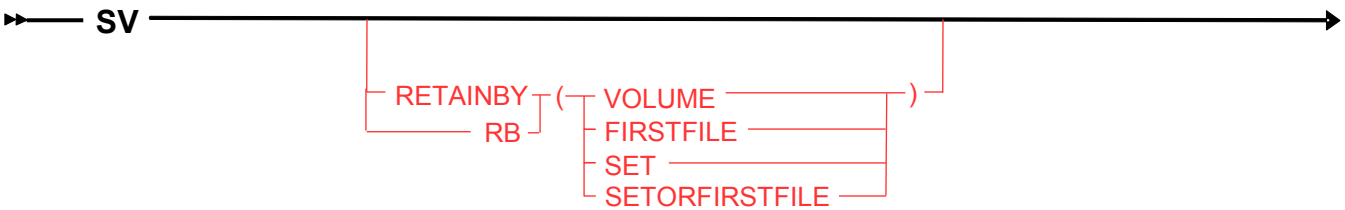
RETAINBY(VOLUME | FIRSTFILE | SET)

- Use the RETAINBY operand for EXPDT retention method volume sets only.
- Use the RETAINBY operand to specify whether DFSMSrmm retains multi volume set as individual volumes or as a set or if the expiration information is taken from the first file in the volume set.
- Specify this operand for the first volume in a multi-volume sequence. All other volumes added to the set will get the same RETAINBY value.
- Once a RETAINBY value is defined for a non-scratch volume it is not overridden to the default during OPEN output processing, but can be changed using CHANGEVOLUME subcommand.
- RETAINBY is rejected if the PREVVOL operand also is provided.
- RETAINBY operand is ignored if you use STATUS(SCRATCH) or STATUS(VOLCAT).
- RETAINBY operand cannot be specified for a volume managed by VRSEL retention method.

Usage & Invocation - LISTVOLUME output

```
Volume information:
Volume = A03700   VOL1  =          Rack  =           Owner    = RMMUSER
  Type = PHYSICAL         Stacked count  = 0         Jobname = SSTEINHA
  Worldwide ID =                                    WORM     = N
Creation:  Date = 2011/207    Time = 03:36:16  System ID = EZU0037
Assign:    Date = 2011/207    Time = 03:36:16  System ID = EZU0037
                                               User ID   = RMMUSER
Expiration date = 2011/237   Original      = 2011/237
         set by = OCE_JFCB
Retention date  =            Set retained  = NO
Retention method= EXPDT
         set by = LCS_DEF
      retain by = FIRSTFILE
Data set name = DS1
...
```

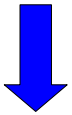
Usage & Invocation - RMM SEARCHVOLUME command – new operand



Use this operand to restrict the returned volumes based on the RETAINBY attribute.

Only EXPDT retention method volumes that have the specified RETAINBY will be listed.

Usage & Invocation - EDGJACTP EXPDROP Report Output - new RetainBy (RB) attribute



```
   EXPDT retained volumes subject to EXPDTDROP       09/03/10      06:28:51     - 1 -

Status: RELEASED

VOLSER VSEQ DSNAME                                    JOBNAME  EXPRSN ASSIGNED   EXPDT      RM RB RETDATE    ACTIONS LOCATION HOME     DEST     RLS ACT HOLD
------ ---- ---------------------------------------- -------- ------ ---------- ---------- -- -- ---------- ------- -------- -------- -------- ------- ----
A01502    1 RMMUSER.A01502.A111111.B222222.C333333.D4444 RMMTEST1 X      2010/243   2010/245   V                      SHELF    SHELF                S       N
A01503    1 RMMUSER.A01503.A111111.B222222.C333333.D4444 RMMTEST1 X      2010/243   2010/245   E  V                   SHELF    SHELF                S       N
A01504    2 RMMUSER.A01504.X111111.Y222222               RMMTEST1 X      2010/243   2010/245   E  V                   SHELF    SHELF                S       N
A01505    1 RMMUSER.A01505.X111111.Y222222               RMMTEST1 X      2010/243   2010/245   E  S                   SHELF    SHELF                S       N
A01506    1 RMMUSER.A01506.X111111.Y222222               RMMTEST1 X      2010/243   2010/245   V                      SHELF    SHELF                  OI N  N
A01507    1 RMMUSER.A01507.X111111.Y222222               RMMTEST1 X      2010/243   2010/245   E  F                   SHELF    SHELF                 R  E   N
A01508    1 RMMUSER.A01508                                        X      2010/243   2010/246   V                      SHELF    SHELF                S       N
A01509    2 RMMUSER.A01509                                        X      2010/243   2010/246   V                      SHELF    SHELF                S
A01510    3 RMMUSER.A01510                                        X      2010/243   2010/246   V                      SHELF    SHELF                S
A01511    4 RMMUSER.A01511                                        X      2010/243   2010/246   V                      SHELF    SHELF                S       N
A01512    1 RMMUSER.A01512                                        X      2010/243   2010/245   E  V                   SHELF    SHELF                S       N
A01513    2 RMMUSER.A01519                                        X      2010/243   2010/245   E  V                   SHELF    SHELF                S       N

Volumes in this status: 12


EXPDT retained volumes subject to EXPDTDROP       09/03/10      06:28:51     - 2 -

Status: NOCHANGE

VOLSER VSEQ DSNAME                                    JOBNAME  EXPRSN ASSIGNED   EXPDT      RM RB RETDATE    ACTIONS LOCATION HOME     DEST     RLS ACT HOLD
------ ---- ---------------------------------------- -------- ------ ---------- ---------- -- -- ---------- ------- -------- -------- -------- ------- ----
A01500    1 RMMUSER.A01500.DATA.SET1                              2010/243   2010/248   E  V                   SHELF    SHELF                S       N
A01501    1 RMMUSER.A01501                                        2010/243   2010/249   V                      SHELF    SHELF                S       N
A01514    1 RMMUSER.JUST.ANOTHER.DS                               2010/243   2010/248   V                      SHELF    SHELF                S
A01515    1 RMMUSER.THE.LAST.ONE                                  2010/243   2010/248   E  F                   SHELF    SHELF                S       N

Volumes in this status: 4
```

Usage & Invocation - Return and reason codes

Return Code	Reason Code	Message Number	Issuing Command	Description
12	280 (new)	3370 (new)	AV, CV	RETAINBY only for retention method EXPDT
12	282 (new)	3371	AV, CV	RETAINBY only for first volume in set
12	284 (new)	3372	CV	CHANGE expdt not allowed for volumes retained by first file

Usage & Invocation - Messages

- New messages:

```
EDG3369I FILE EXPIRATION ATTRIBUTES ACCEPTED BUT IGNORED FOR THE
VOLUME EXPIRATION BECAUSE VOLUME IS RETAINED BY FIRSTFILE

EDG3370I RETAINBY CAN ONLY BE SPECIFIED FOR A
RETENTIONMETHOD(EXPDT) VOLUME

EDG3371I RETAINBY CAN ONLY BE SPECIFIED FOR THE FIRST VOLUME IN A
SET

EDG3372I CHANGE OF EXPIRATION DATE NOT ALLOWED FOR VOLUMES
RETAINED BY FIRSTFILE
```

Usage & Invocation – REXX support

REXX Variable Name	Description	Type	Length	Values	Command
EDG@EXRB	EXPDT retention method Retain By Information	Character	9	VOLUME FIRSTFILE SET	LC OPT LV VOL

Usage & Invocation – API support

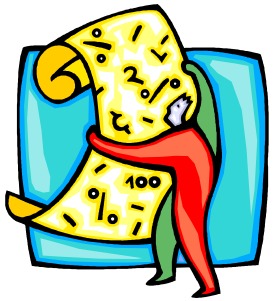
SFI Name	SFI Number	Data Type Identifier	Length	Values	Command
EXRB	X'830800'	3 - BIN(8)	9	RETAINBY 0 = VOLUME 1 = FIRSTFILE 2 = SET	LC OPT LV VOL

Migration & Coexistance Considerations

- Coexistence support for z/OS >= V1R12 is required to pertain an existing set of consistent Retain by information for a multi-volume set created or maintained in V2R1 whenever retention information for a volume in that set is added or changed in a lower release.
- When an existing multi volume data set is enlarged with MOD and a new volume record is added to the RMM CDS because of EOV then the RETAINBY value is taken from the existing previous volume record.
- When a volume is added to an EXPDT retention method volume set using the CV/AV PREVVOL subcommand the RETAINBY value is taken from the previous volume record.
- A new single EXPDT retention method volume record created in a lower release will get RETAINBY(VOLUME) assigned.
- APAR OA35808

Session Summary

- The user can manage his EXPDT retention method volume sets as individual volumes, as a whole set or based on the expiration date of the first file.



Conversion Support Changes

Overview

- **Problem Statement:**

  RMM implemented a new data set attribute LASTREF and a new volume attribute RETAINBY, for data sets and volumes managed by the EXPDT retention method. If a customer wants to use these new attributes he has to use TSO RMM CHANGEDATASET and CHANGEVOLUME commands.

- **Solution:**

  It is possible to set the LASTREF and RETAINBY attributes during conversion.

- **Benefit:**

  At conversion time, for the EXPDT retention method, similar attributes of the input data can be translated to the RMM data set and volume attributes. No extra updates of these attributes are needed after the conversion.

Usage & Invocation - RETAINBY and LASTREF in Conversion support

The volume attribute **RETAINBY** and data set attribute **LASTREF** can be specified for **EXPDT retention method** managed data at conversion time.

A default value can be set via new **EDGCNVT SYSIN** statements :

- **OPTION EXPDT_RETAINBY**
- **OPTION EXPDT_LASTREF**

For specific volumes or data sets these values can be specified by editing the records EDGCLREC and/or EDGCDREC.

- **LVEXPDT_RETAINBY** field in 'L record' EDGCLREC
- **LDS1LRED** field in 'L record' EDGCLREC and **DSNLRED** field in 'D record' EDGCDREC

Usage & Invocation - EDGCNVT SYSIN (1/2)

OPTION EXPDT_RETAINBY VOLUME | FIRSTFILE | SET

VOLUME

The volume expiration date is set to the maximum date of the volume expiration date and the data set expiration dates on it. If OPTION EXPDT_RETAINBY is omitted VOLUME is the default.

FIRSTFILE

The expiration date of the first file is used to set the expiration date of the volume or multi volume set. All volumes in a set will have the exact same expiration date.

SET

The expiration date is the highest expiration date of all volumes and all data sets in the set. All volumes in the set will have the exact same expiration date.

EXPDT_RETAINBY is not used for data sets on VRSEL retention method managed volumes.

Usage & Invocation - EDGCNVT SYSIN (2/2)

OPTION EXPDT_LASTREF extra_days

extra_days

Extra_days specify the number of days that the data set will be retained after the data set was last referenced. Extra_days is a decimal number between 0 and 93000. The data set LASTREF extra_days is used to evaluate the data set expiration date. The extra_days is added to the date of last reference or in case the date of last reference is zero added to the create date. The data set expiration date is set to the maximum of the date calculated using data set LASTREF extra_days and the data set expiration date. Later when DFSMSrmm is up and running any reference to the data set by a write or read operation will re-determine the expiration date. If OPTION EXPDT_LASTREF is omitted extra_days equals 0 is the default.

EXPDT_LASTREF is not used for data sets on VRSEL retention method managed volumes.

Usage & Invocation - Setting of the volume attribute RETAINBY

At conversion time (EDGCNVT processing) **the volume RETAINBY attribute** of a single volume or of the first volume of a multi-volume set is set from the following data, using this priority:

1. LVEXPDT_RETAINBY field in EDGCLREC
2. SYSIN OPTION EXPDT_ RETAINBY value
3. EXPDT_ RETAINBY VOLUME

All subsequent volumes of a multi-volume data set inherit the RETAINBY attribute from the first volume of a multi volume set.

Usage & Invocation - Setting of the data set attribute LASTREF

At conversion time the (EDGCNVT processing) **the data set LASTREF extra days attribute** of a single volume data set or of the first file of a multi-volume data set is set from the following data, using this priority:

1. LDS1LRED/DSNLRED field in EDGCLREC or EDGCDREC
2. SYSIN OPTION EXPDT_LASTREF extra_days
3. NOLASTREF

All subsequent files of a multi-volume data set inherit the LASTREF extra days attribute from the first file of a multi volume data set.

Usage & Invocation - Data set Expiration date

EDGCNVT processing for data set expiration date

The expiration dates of data sets on **EXPDT retention method** managed volumes are processed at conversion time as follows:

- The data set expiration date of a single data set or of the first file of a multi volume data set is set to the maximum of the data set expiration date and the date calculated using data set LASTREF extra_days. The LASTREF extra_days is added to the date of last reference or in case the date of last reference is zero added to the create date.
- All subsequent files of a multi volume data set inherit the expiration date of the first file of a multi volume data set.

The expiration dates of data sets on **VRSEL retention method** managed volumes are converted with no additional processing, except multi volume data sets are processed as follows:

- All subsequent files of a multi volume data set inherit the expiration date of the first file of a multi volume data set.

Usage & Invocation - Volume Expiration date

EDGCNVT processing for volume expiration date

The expiration dates of **EXPDT retention method managed volumes** are processed at conversion time as follows:

- For volumes that are retained by VOLUME or SET the expiration date is set to the highest date of the volume expiration date and the expiration dates of the data sets residing on the volume.
- Additionally for volumes retained by SET the highest volume expiration date of the volume set is propagated to all volumes in the set.
- For volumes retained by FIRSTFILE the expiration date of the first file on a single volume or on the first volume in a multi volume set is propagated to the single volume and respectively to all volumes in the multi volume set.
  - In case the volume expiration date copied from the first file is lower than the volume expiration date the warning message EDGCNVT-00180 is issued.

The expiration dates of **VRSEL retention method managed volumes** are converted with no additional processing.

Usage & Invocation - New message

EDGCNVT-00180 Expiration date YYYY/ddd of volume nnnnnn is lowered to YYYY/ddd, which is the expiration date of first data set in volume set: dsname on volume nnnnnn.

Problem determination: where

YYYY/ddd	Expiration date (Julian format)
nnnnnn	Volume serial number
dsname	Data set name

Severity: Warning

Explanation: EDGCNVT has detected that the volume EXPDT_RETAINBY is FIRSTFILE and updates all volume expiration dates to the expiration date of the first data set in the volume set. You will see this message if the **expiration date of the volume is lowered** by this processing.

System action: The job continues and sets a minimum return code of 4.

User response: It is recommended to check the conversion input and, if you decide to adjust the expiration date of the volume or the expiration date of the first data set in the volume set, or you decide to change the volume attribute RETAINBY of the first volume in the set, rerun the job.

Migration & Coexistence Considerations (1/2)

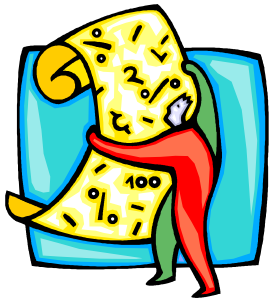
- Coexistence support for z/OS >= V1R12 is required to pertain an existing set of consistent last reference extra days information for a multi-volume multi-data set created or maintained in V2R1 whenever retention information for a file in that set is added or changed in a lower release.
- New single data set records will get LASTREF extra days 0 assigned.
- When an existing multi volume data set is enlarged with MOD and a new data set record is added to the RMM CDS because of EOV then the LastReference is taken from the existing previous data set record.
- APAR OA35808

Migration & Coexistance Considerations (2/2)

- Coexistence support for z/OS >= V1R12 is required to pertain an existing set of consistent Retain by information for a multi-volume set created or maintained in V2R1 whenever retention information for a volume in that set is added or changed in a lower release.
- When an existing multi volume data set is enlarged with MOD and a new volume record is added to the RMM CDS because of EOV then the RETAINBY value is taken from the existing previous volume record.
- When a volume is added to a EXPDT retention method volume set using the CV/AV PREVVOL subcommand the RETAINBY value is taken from the previous volume record.
- A new single EXPDT retention method volume record created in a lower release will get RETAINBY(VOLUME) assigned.
- APAR OA35808

Session Summary

- RMM implemented a new data set attribute LASTREF and a new volume attribute RETAINBY, for data sets and volumes managed by the EXPDT retention method. These new attributes can be set during conversion time.



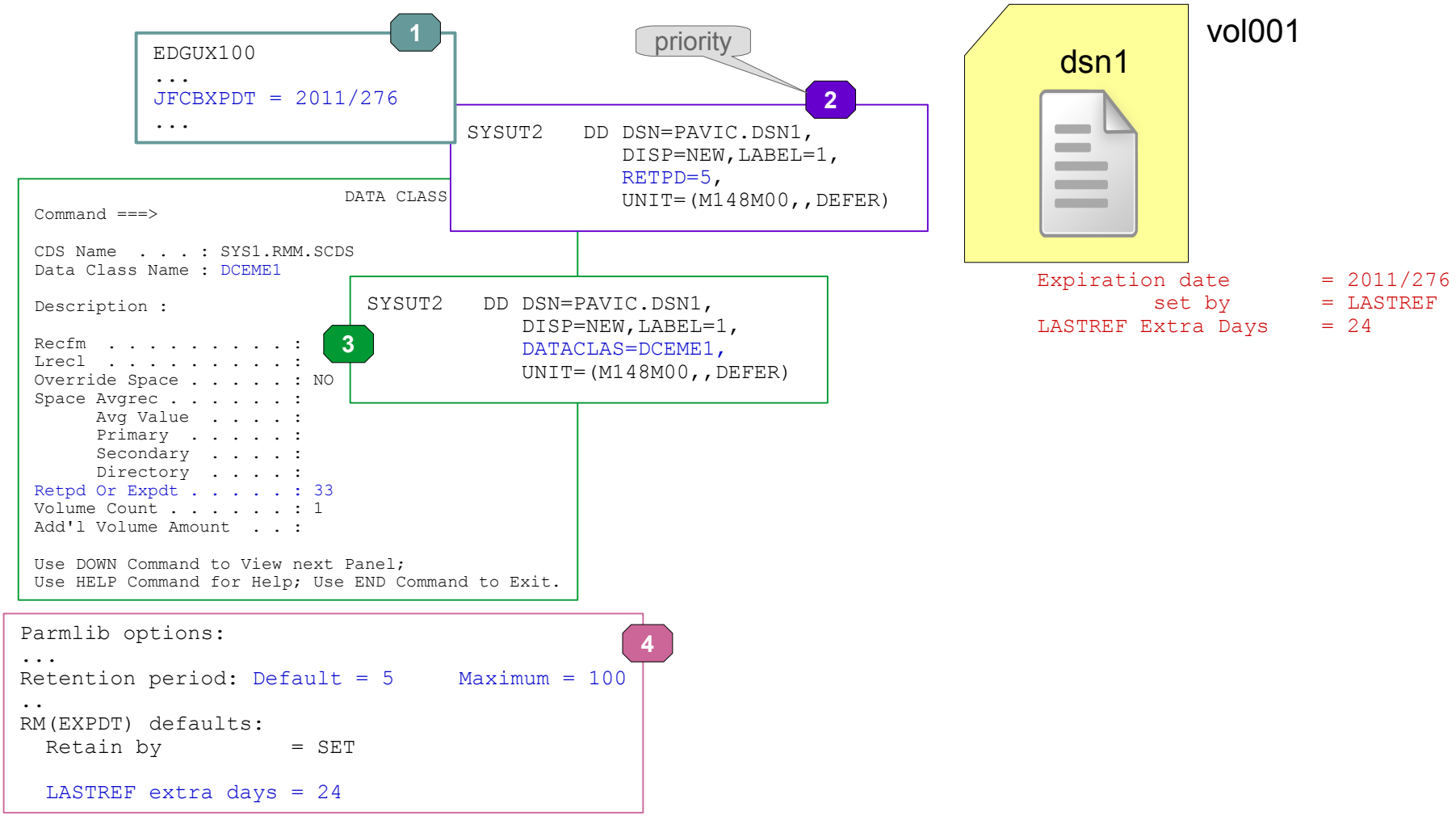
Management Class attributes enablement and Management Class expiration attributes processed by DFSMSrmm

Overview

- We continue the strategy of moving DFSMSrmm expiration and retention decisions outside VRSEL inventory management, and enable the use of DFSMS Management Class attributes for tape data sets.
- **Problem Statement**
  - The user wants to use the benefits of the EXPDT retention method, but has to assign the expiration date and Last reference days to each data set explicitly by the JCL, DataClass, TSO RMM command or use the DFSMSrmm parmlib default. What the user wants is to have an automatism for these settings.
- **Solution**
  - To automate the setting of expiration date and Last reference days DFSMSrmm now gives the user the possibility to obtain management class attributes relevant for tape data set management.
- **Benefit / Value**
  - The user can automate setting the expiration date or LASTREF extra days, without using the JCL expiration date or Data Class or TSO command.

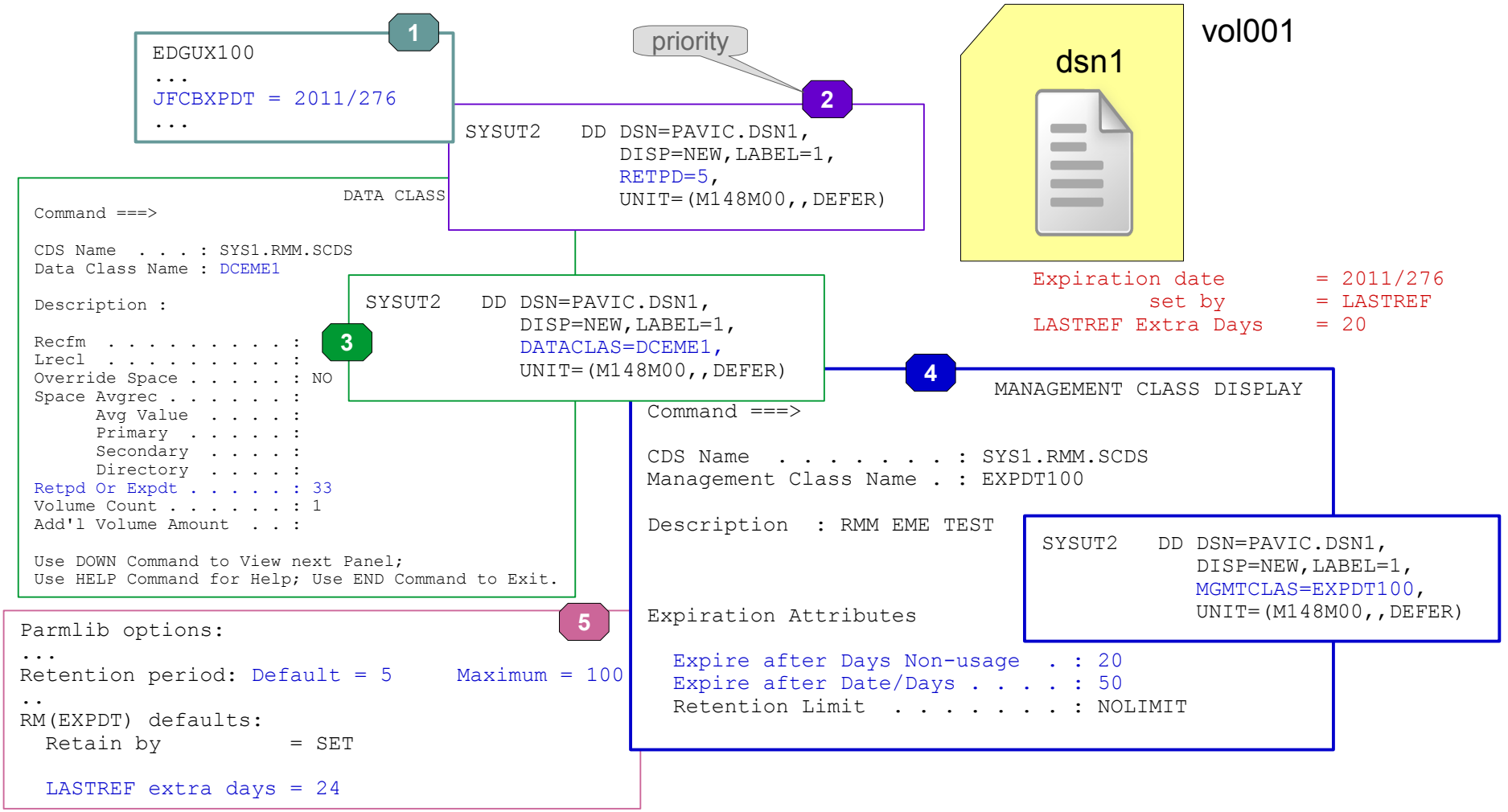
Usage & Invocation - The data set expiration date (1)

You can set the data set expiration date when writing a data set on several ways



Usage & Invocation - The data set expiration date (2)

The ways you can set the expiration date for a tape data set is extended to SMS Management Class (MC).



Usage & Invocation - How the Management Class attributes are extracted

JCL/ DATACLASS RETPD/ EXPDT (JFCB)	Management Class Expiration Attributes		Expire after Days Non-usage	
			NOLIMIT	*Days-Non-usage*
blank	Expire after Date/Days	NOLIMIT	• Expdt = 99365 (PERMANENT) • LASTREF= DFSMSrmm parmlib LASTREF	• Expdt = parmlib RETPD • LASTREF= *Days-Non-usage*
		daysMC	• Expdt = *daysMC* • LASTREF= DFSMSrmm parmlib LASTREF	• Expdt = *daysMC* • LASTREF= *Days-Non-usage*
daysJOB	Expire after Date/Days	NOLIMIT	• Expdt = *daysJOB* • LASTREF= DFSMSrmm parmlib LASTREF	• Expdt = *daysJOB* • LASTREF= *Days-Non-usage*
		daysMC	• Expdt = *daysJOB* • LASTREF= DFSMSrmm parmlib LASTREF	• Expdt = *daysJOB* • LASTREF= *Days-Non-usage*

- Expdt=max(Expdt,(LASTREF extra days + current date))
- Parmlib option MAXRETPD is limiting the expdt as before
- The processing of the expiration date is unchanged

Usage & Invocation - Processing of the Management Class attributes

The attributes taken from the management class are bound to the data set record depending on the retention method.

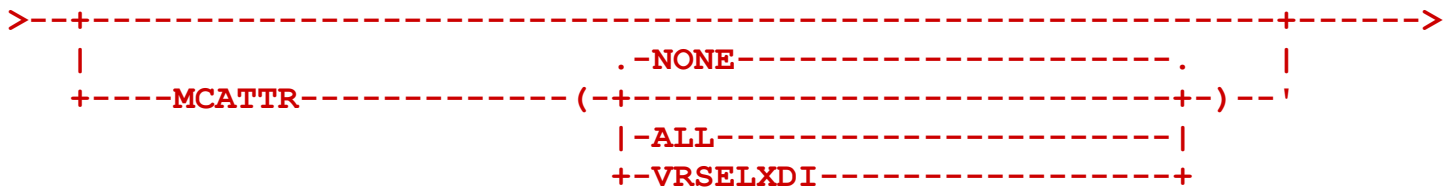
```
                          MANAGEMENT CLASS DISPLAY
Command ===>

CDS Name  . . . . . . . . : SYS1.RMM.SCDS
Management Class Name . : EXPDT100

Description  : RMM EME TEST



Expiration Attributes

  Expire after Days Non-usage  . : 20
  Expire after Date/Days . . . . : 50
  Retention Limit  . . . . . . . : NOLIMIT
```

```
SYSUT2   DD DSN=PAVIC.DSN1,
            DISP=NEW,LABEL=1,
            MGMTCLAS=EXPDT100,
            UNIT=(M148M00,,DEFER)
```


```
Expiration date      = 2011/276
        set by       = OCE_MC
LASTREF Extra Days   = 20
```

Usage & Invocation - How to enable the use of management class attributes by DFSMSrmm (1)

New RMM parmlib option MCATTR




```
                              MANAGEMENT CLASS DISPLAY
Command ===>

CDS Name  . . . . . . . . : SYS1.RMM.SCDS
Management Class Name . : EXPDT100

Description  : RMM EME TEST



Expiration Attributes

  Expire after Days Non-usage  . : 20
  Expire after Date/Days . . . . : 50
  Retention Limit  . . . . . . . : NOLIMIT
```

- When you enable the use of Management Class attributes by DFSMSrmm the Management Class expiration attributes (in this release without the Management Class Expiration attribute Retention Limit) are retrieved by DFSMSrmm during OPEN for output and used to set the expiration date and the LASTREF extra days for the tape data set.
- During OPEN processing for input the Management Class attributes are not considered.
- During OPEN processing for output with Disposition MOD the Management Class attributes are not considered.

Usage & Invocation - How to enable the use of management class attributes by DFSMSrmm (2)

New RMM parmlib option MCATTR

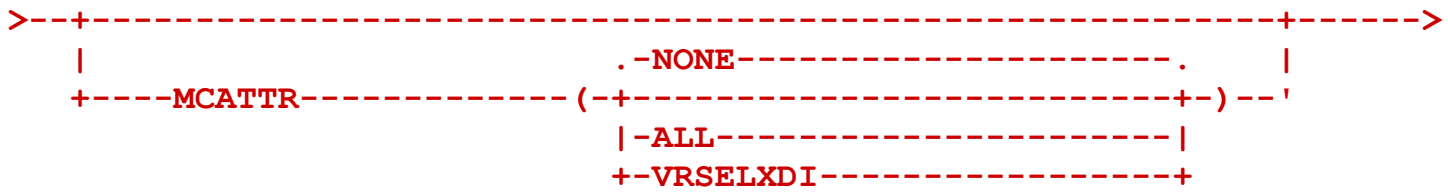
```
>--+-------------------------------------------------------+------>
   |                          .-NONE-------------------.    |
   +---+MCATTR-----------+-(-+-------------------------+-)--'
                          |-ALL----------------------|
                          +-VRSELXDI-----------------+
```

```
                              MANAGEMENT CLASS DISPLAY
Command ===>

CDS Name  . . . . . . . : SYS1.RMM.SCDS
Management Class Name . : EXPDT100

Description  : RMM EME TEST



Expiration Attributes

  Expire after Days Non-usage  . : 20
  Expire after Date/Days . . . . : 50
  Retention Limit  . . . . . . . : NOLIMIT
```

- The enablement in DFSMSrmm provides options to use or not use these Management Class attributes for all volumes, and it provides an option to use the Management Class attributes for all volumes except the Management Class expiration attributes for volumes managed by the VRSEL retention method.
- VRSELXDI (VRSEL Expiry date ignore) is recommended if the processing of VRSEL managed volumes should not be changed with DFSMSrmm V2R1 release.

Usage & Invocation - How to enable the use of management class attributes by DFSMSrmm (3)

New RMM parmlib option MCATTR



MCATTR(NONE|ALL|VRSELXDI)

This operand enables the use of DFSMS Management Class (MC) attributes for DFSMSrmm that are relevant for tape management, and specifies the range of MC attribute usage by DFSMSrmm. The attributes relevant for tape management are the MC Expiration attributes 'Expire after Date/Days' and 'Expire after Days Non-Usage', without the Retention Limit.

NONE
No Management Class attributes are used at all.

ALL
The use of Management Class attributes relevant for tape management is enabled. The MC attributes are exploited as they are appropriate.

VRSELXDI
The use of Management Class Attributes is partially enabled. MC Expiration attributes 'Expire after Date/Days' and 'Epire after Days Non-Usage' are not applied to data sets on volumes managed by the VRSEL retention method. All other MC attributes relevant for tape management are exploited as they are appropriate.

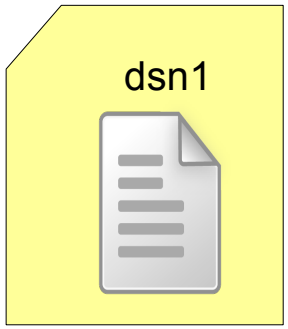
Usage & Invocation - RMM TSO LC output

```
System options:
PARMLIB Suffix  = CL            Operating mode  = P
Control data set name      =
Journal file data set name =
Journal threshold          =  0%              Journal transaction = NO
Catalog SYSID              = *
Scratch procedure name     = EDGXPROC
Backup procedure name      = SUB
IPL date check  = N        Date format    = A       RACF support    = N
SMF audit       = 0        SMF security   = 0       CDS id          = MZTEST
MAXHOLD value   = 100      Lines per page = 54      System ID       = EZUCLIE
BLP             = RMM      TVEXT purge    = RELEASE Notify          = Y
                             days         = 0
Uncatalog       = S                                 Message case    = M
MASTER overwrite= MATCH    Accounting     = J
Disp DD name    =          Disp msg ID    = EDG4054I
PREACS          = NO       SMSACS         = NO      CMDAUTH Owner   = YES
Reuse bin       = CONFIRMMOVE                       CMDAUTH Dsn     = NO
Local tasks     = 10                                Media name      = 3480

Retention period: Default = 1     Maximum = NOLIMIT
                  Catalog = 12    hours
Use of Management Class Attributes = ALL
Retention method: Default = EXPDT

........
```

The panel LC output is similar

Usage & Invocation - Management Class name and VRSEL - unchanged

- Regardless of whether the Management Class attributes are used or not for a tape data set, the Management Class name is recorded, just as is done today, in the data set record, and if the volume is managed by VRSEL retention method will be used in the normal VRS matching – this is unchanged from how DFSMSrmm VRSEL works today.



vol001

```
Data set name = PAVIC.DSN1
Volume        = A21200                Physical file sequence number = 1
Owner         = RMMUSER                            Data set sequence = 1
Create date   = 2011/252   Create time = 03:56:17 System ID          = EZU0037
Expiration date       = 2011/276   Original expir. date  =
         set by       = LASTREF
....
Management class      = EXPDT100   VRS management value  =
Storage group         = SGMTL01    VRS retention date    = 2011/259
Storage class         = SCMTL01    VRS retained          = YES
Data class            = DCMED00    Closed by Abend       = NO
....
```

VRSEL processing

```
Data set mask . : 'EXPDT100'                                    GDG . : NO
     Job name mask . :

Count . . . : 7                    Retention type  . . . . . : DAYS
```

Usage & Invocation - RMM TSO CD/AD MANAGEMENTCLASS() - unchanged

- The processing of these commands will be as before: DFSMSrmm will save the mcname as a data set attribute and if the data set is on a volume that is managed by the VRSEL retention method it will be used for matching to a VRS. But there will be no additional processing of the Management Class attributes.

Usage & Invocation - REXX variables and SFI's

Rexx Name	Description	Type	Length	Value	Commands
MCAT	SMS Management class attributes enabling	Character	8	NONE ALL VRSELXDI	LC OPT

SFIName	SFINumber	Data Type Identifier	Length	Value	Commands
MCAT	X'851200'	Binary(8)	9	SMS Management class attributes enabling 0 = NONE 1 = ALL 2 = VRSELXDI	LC

Usage & Invocation - Expiration date set by

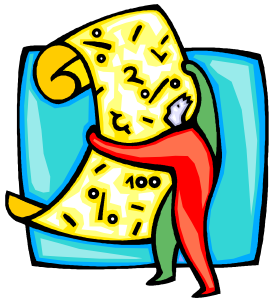
```
&P.EsbExpdtSetBy   DS  FL1          Expiry date set by
&P.ESB_UNKNOWN     EQU 0            unknown or not set
&P.ESB_CMD         EQU 1            command
&P.ESB_CMD_DEF     EQU 2            command from default RETPD
&P.ESB_CMD_VOLCAT  EQU 3            command from VOLCAT
&P.ESB_OCE_JFCB    EQU 4            O/C/EoV from JFCB
&P.ESB_OCE_EXIT    EQU 5            O/C/EoV from EDG_EXIT100
&P.ESB_OCE_DEF     EQU 6            O/C/EoV from default RETPD
&P.ESB_OCE_MAX     EQU 7            O/C/EoV from MAXRETPD
&P.ESB_OCE_VOLCAT  EQU 8            O/C/EoV from VOLCAT
&P.ESB_LCS         EQU 9            Library Control System
&P.ESB_LCS_DEF     EQU 10           LCS from default RETPD
&P.ESB_TVEXTPURGE  EQU 11           TVEXTPURGE interface
&P.ESB_CNVT        EQU 12           conversion
&P.ESB_EXPORT      EQU 13           export to stacked volume
&P.ESB_LASTREF     EQU 14           last reference event
&P.ESB_OCE_MC      EQU 15           O/C/EoV from Mgmt Class
```

Migration & Coexistence Considerations

- Coexistence support for z/OS >= V1R12 is required to pertain an existing set of consistent last reference extra days information for a multi-volume multi-data set created or maintained in V2R1 whenever retention information for a file in that set is added or changed in a lower release.
- New single data set records will get LASTREF extra days 0 assigned.
- When an existing multi volume data set is enlarged with MOD and a new data set record is added to the RMM CDS because of EOV then the LastReference is taken from the existing previous data set record.
- APAR OA35808

Session Summary

We continue the strategy of moving DFSMSrmm expiration and retention decisions outside VRSEL inventory management, and enabling the use of DFSMS Management Class attributes for tape data sets.



Appendix

Books and References

- DFSMSrmm Application Programming Interface SC23-6872-00
- DFSMSrmm Managing and Using Removable Media SC23-6873-00
- DFSMSrmm Implementation & Customization Guide SC23-6874-00
- DFSMSrmm Reporting SC23-6875-00
- DFSMSrmm Diagnosis Guide SC23-6876-00